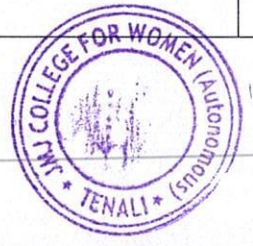
3.4.3

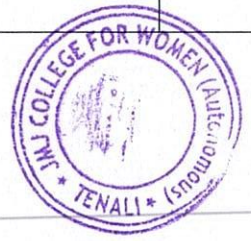
Full Length Research Papers Published in the Journals Notified on UGC Care List

2018-19

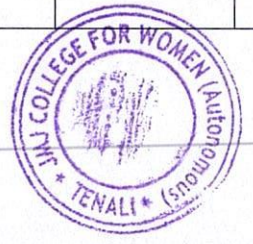
2018-2019						
72.	Effect of cadmium on Enzmatic parameters of fresh water cat Fish Hetropneustes Fossils	Dr.P.Bujjamma	Zoology	International Journal of Zoology Studies	Jan.2018	ISSN :2455-7269.
73.	A Study of Plant diversity and indices of woody species (trees and lianas) of G. Ariyur Sacred Grove,Viluppuram District, Tamil Nadu, South India	M. Subramanian	Botany	International Journal of Creative Research Thoughts (IJCRT)	April.2018	2320-2882
74.	Consumer BehaviourTo Select Household Appliances In Srimushnam Taluk, Cuddalore	S.Ramprasath	Commerce	International Journal Of Creative Research Thoughts	April.2018	2320-2882
75.	A Study of the Difference of Leadership Styles of Zuari Cements Limited	P.V. Nagarjuna Reddy	Commerce	Journal of Emerging Technologies and Innovative Research (JETIR)	June.2018	2349-5162
76.	Woody species diversity of Melkalpoondi Sacred Grove in Tittakudi Taluk of Cuddalore District, Tamil Nadu	M. Subramanian	Botany	International Journal for Research Trends and Innovation	June.2018	2456-3315
77.	The FM/FM/1 queue with single working vacation and set-up times	N. Sathiyamoorthi	Mathematics	International Journal of Pure and Applied Mathematics	June.2018	1314-3395
78.	Quantification of pimavanserin in bulk and tablet dosage form using a stability indicating high performance liquid chromatographic method	K.Geetha Bhavani	Chemistry	Pharamaceutical sciences	July.2018	doi 10.15171/PS.2018.42



79.	Theoretical and Spectral Investigation of Some Schiff Bases	M.Sathiyaseelan	Chemistry	Der Pharma Chemica	Jul-18	0975-413X
80.	A Study of Relationship between Leadership Styles and Socio-Economic and Organizational Position Variables as Perceived by Subordinates in Zuari Cements Limited	P.V. Nagarjuna Reddy	Commerce	International Journal of Research in Commerce,Economics and Maaaaanagement	July.2018	2231-4245
81.	Studies on Effect of Temarature on Fertilizations and Hatching Rate of Pangasius Hypothalmus Eggs"	Dr.P.Bujjamma	Zoology	International Journal of Zoology Studies	Sept.2018	ISSN :2455-7269.
82.	A Study of the Difference of Leadership Styles of Bharathi Cement Corporation Private Limited	P.V. Nagarjuna Reddy	Commerce	International Journal of Management, IT & Engineering	Oct.2018	2249-0558
83.	A Study of Relationship between Leadership Styles as Perceived by Leaders in Bharathi Cement Private Limited	P.V. Nagarjuna Reddy	Commerce	International Journal in Social Sciences	Nov.2018	2249-2496
84.	"Film provides Authentic and varied Language"	Ms.E.Pranavi and Ms.J.Saroja Kumari	English	JOELL	Nov.2018	ISSN: 2349-9753
85.	"Estranged Identity in Immigrant"	Ms.G.Jyothi Olivia	English	JOELL	Nov.2018	ISSN: 2349-9753
86.	"The Exsistance of Multiculturalism in Jhumpa lahari's Interpreter of Maladies" A study	Dr.N.Vimala Devi	English	JOELL	Nov.2018	ISSN: 2349-9753



87.	"Literature, Culture and English language Teaching &Learning"	Dr.Sr.Shiny.K.P	English	JOELL	Nov.2018	ISSN: 2349-9753
88.	"Map Approach to Vocabulary Acquistion for Engineering Graduates.	Dr.N.Vimala Devi	English	JOELL	Nov.2018	ISSN: 2349-9753
89.	"Role of culture and creativity in shaping human personality"	Ms.P.Hema Latha	Home Science	JOELL	Nov.2018	ISSN: 2349-9753
90.	Cultural Context in Chinua Achebe's Things Fall Apart	Anitha X.A	English	JOELL	Nov.2018	ISSN: 2349-9753
91.	"The Educational Sojourn and Culture shock among International students studying at VFSTR	Dr.PoornimaRavinathan	Political Science	JOELL	Nov.2018	ISSN:2349-9753.
92.	"Literature ,Culture and regional cooperation in Indian sub continent"	Dr.PoornimaRavinathan	Political Science	JOELL	Nov.2018	ISSN: 2349-9753
93.	"Effects of Schema theory on reading comprehension in camparision with traditional reading approach"	Dr.P.Mary Padmalatha,	Mathematics	JOELL	Nov.2018	ISSN: 2349-9753
94.	"Importance of Literature and culture"	Ms.M.Aruna	Zoology	JOELL	Nov.2018	ISSN: 2349-9753
95.	The analysis of M/M/1 queue with working vacation in fuzzy environment	N. Sathiyamoorthi	Mathematics	Application and Applied Mathematics (An International Journal)	Dec.2018	1932-9466
96.	Different types of Ideal in the partially ordered Ternary semi groups	Dr.P.Mary Padmalatha,	Mathematics	Intrnational Journal of Management, Technology and Engineering	Dec.2018	ISSN No.2249-7455



97.	Jaashuvaa Maanavathaa Vaadam	Dr.B.Mary Kumari	Telugu	IOSR Journal of Humanities and Social Science	Dec.2018	ISSN 2279-0837
98.	Mutual Funds Performance EvalutionIn India	R.Krishnaveni	Commerce	International Journal Of Current Research	Jan.2019	0975-833X
99.	Analysis of a FM/FM/1 WV and Vacation Interruptions with Set-up times	N. Sathiyamoorthi	Mathematics	Journal of Physical Sciences	Jan.2019	2350-0352
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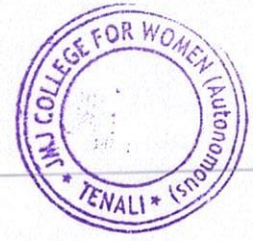
101.	"BeeduvarinaMedallanu Dunne Nagali Ravuri BhardwajaSahithyam"	Ms.D.Vijaya Lakshmi	Telugu	Bhava Veena Special Addition	Jan.2019	ISSN NO.2456-4702
102.	"SammonnathaSahitheSikaramgna napeet Ravuri Bharadwaja"	Dr.P.Mary Padmalatha,	Mathematics	Bhava Veena Special Addition	Jan.2019	ISSN NO.2456-4702
103.	Analysis on Different Types of Cancers using Mechine Learning Algorithms: A Survey	Sr.F.Amul Mary	Computer Science	International Journal of Scientific Research and Review	Jan-19	ISSN: 2279-543X
104.	Fuzzy multiple queue and multiple server queuing system	N. Sathiyamoorthi	Mathematics	American International Journal of Research in Science, Technology, Engineering & Mathematics	Feb.2019	2328-3491



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106.	PrapanchaPrakhyathiGanchinaSthreeMurthulu	B.Mary Kumari	Telugu	International journal of Emerging Technologies and Innovative Research	Mar.2019	ISSN: 2349-5162
107.	5.Determination Flecainide Acetate and its Degradation Impurities by UPLC-MS	Ms.K.Geetha Bhavani	Chemistry	Current Trends in Bio Technology and Pharmacy	April.2019	ISSN No. 0973-8916
108.	"Challenges faced by Elderly-Solutions "	Dr.Sr.Shiny.K.P	English	International Journal of Scientific Research and Review	May.2019	ISSN No.2279-543x
109.	Health and Well Being of Elderly Women	Ms.P.Hema Latha	Home Science	International Journal of Research	May.2019	ISSN: 2236-6124
110.	A Review on Defluoridation in India	Dr.K.Nirmala Jyothi	Chemistry	Universal Review	May.2019	ISSN: 2277-2723
111.	Elderly Depression in Women - An Emerging Public Health Challenge	Dr.N.Vimala Devi	English	International Journal of Research	May.2019	ISSN 2236-6124
112.	Dementia, A challenging health problem of Elderly women in India – A review	Ms.M.Aruna	Zoology	international journal of research	May.2019	ISSN No. 2236-6124

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116.	"Socio Economic conditions of (Marginalised) Construction women workers in AP With Special Guntur City	Ms.M.Miriam	Economics	EPRA International Journal of Economics & Business Review	May.2019	ISSN No.2347-9671
117.	Parasite Resistance and Tolerance in Honeybees at the individual and Social Level	Mrs.M.Aruna	Zoology	International journal of Management Technology and Engineering	May.2019	ISSN2249-7455
118.	Socio Economic ISSUE of Women in Contemporary India	Dr. Poornima Ravinathan	Political Science	International Journal of Research	May.2019	ISSN 2236-6124

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Effect of cadmium on Haematological changes in a freshwater catfish, *Heteropneustes fossilis*

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Abstract
Toxic pollutants such as heavy metals are particularly harmful to aquatic life. They can take up metals concentrated at different levels in their different body organs. Thus heavy metals acquired through the food chain as a result of pollution are potential chemical hazards and threatening consumers. The effects of exposure to any hazardous substance depend on the dose, exposure time, the mode of exposure, personal habits, traits, and presence of other chemicals. Therefore it is important to monitor heavy metals in aquatic environment, especially in fish. Increased loads of heavy metals in waste water may increase the risk of ground water contamination. The present work is designed to evaluate effect of cadmium on haematological parameters of *Heteropneustes fossilis*. The main haematological alteration resulting from exposure of *H. fossilis* to various concentrations of cadmium for 7, 14 and 21 days include significant decrease in haematocrit and haemoglobin concentration and in red blood cell counts. The white blood cell counts increased followed by a change in the composition as seen from the differential white blood cell counts. MCHC exhibited a significant decline when compared to control fishes. MCV and MCH values were found to exhibit a significant rise in treated fish than in control fish. The changes in the hematological parameters indicated that they can be used as indicators of cadmium related stress in fish on exposure to elevated levels in the water.

Keywords: *Heteropneustes fossilis,* cadmium, haematological parameters, in haematocrit and haemoglobin

1. Introduction
Fishes have been recognized as good accumulators of organic and inorganic pollutants (Eneji *et al.,* 2011) [11]. Aquatic organisms such as fish and shell fish accumulate metals to concentrations many times higher than present in water or sediment. They can take up metals concentrated at different levels in their different body organs. Thus heavy metals acquired through the food chain as a result of pollution are potential chemical hazards and threatening consumers (Sani, 2011) [37]. At low levels, some heavy metals such as copper, cobalt, zinc, iron and manganese are essential for enzymatic activity and many biological processes. Other metals, such as cadmium lead are not known to have essential role in living organisms and are toxic even at low concentrations. The essential metals also become toxic at high concentrations. The consequence of heavy metal pollution can be hazardous to man through his food (Sani, 2011) [37].

Fish is the most susceptible of the aquatic animals to these metals. It is cheap, easy to get and is consumed in different forms such as boiling, frying in deep oil, smoking, sun drying amongst others. The physical and chemical environment in which the fish resides appears to influence the rate of bioaccumulation of trace elements in fish. Fish is generally appreciated as one of the healthiest and cheapest source of protein and it has amino acid composition higher in cysteine than most other sources of protein. The effects of exposure to any hazardous substance depend on the dose, exposure time, the mode of exposure, personal habits, traits, and presence of other chemicals (Adekola *et al.*, 2007) [1]. Therefore it is important to monitor heavy metals in aquatic environment, especially in fish. Increased loads of heavy metals in waste water may increase the risk of ground water contamination. The major anthropogenic sources of heavy metals include waste water run-off from roads, industrial wastes, from mining, manufacturing and metal finishing plants. The present work is designed to evaluate effect of cadmium on haematological parameters of *Heteropneustes fossilis.*

The freshwater catfish, *Heteropneustes fossilis*) is an important group of food fishes in India. This stinging catfish (*H. fossilis*) is commercially important and valuable food species also in many Asian countries (Akand *et al.,* 1991) [3]. *H. fossilis*, commonly known as Shing or Singhi is a popular catfish in India and found naturally in lakes, ponds, swamps and marshes, ditches, floodplains and in muddy rivers. It can survive at a reduced oxygen level (Stickney, 1979) [48]. It is characterized by an accessory respiratory organ (air breathing organ) which enables it to exist for hours when out of water or in indefinitely oxygen-poor water and even in moist mud (Akand *et al.*, 1991) [3]. So, this species is very potential in seasonal water bodies of India.

2. Material and Methods
Collection of fishes
The freshwater catfish, *Heteropneustes fossilis* (Bloch) with a size range of 16-20 cm and, weighing 54-74 g irrespective of their sex, have been chosen as the test organism in the present study. The fishes were collected from the domestic fish market located at Guntur city (16°20' N 80°27' E and 31 m elevation), Guntur district, Andhra Pradesh, India.

Acclimatization
Fishes were acclimatized to the laboratory conditions in large

fiber glass tanks with unchlorinated ground water for 3 to 4 weeks at a room temperature of 28 ± 2°C. As these catfishes are benthic in nature, overcrowding was avoided by keeping small numbers of fishes in each tank. Water was changed on alternate days. Tanks were covered with fish netting to prevent the escape of fishes.

Selection of sub-lethal concentrations

In the present study 1/10th of the 96h LC_{50} value was taken as sub-lethal concentration (A). The two other doses, B & C, used were a reduction in concentration of the sub-lethal concentration (A) in a graded manner. The half concentration of the sub-lethal concentration A (50 % reduction) was used as the second dose (B) while the third dose (C) was 50 % reduction in concentration of the second dose B (Kayode *et al.*, 2016) [23].

Haematological studies

After determining 96 h LC_{50} value, 3 sub-lethal concentrations (A, B, C) of Cadmium chloride were taken and 10 fishes were introduced in each concentration. For each sub-lethal exposure, five replicates were maintained. The water was changed every day in the control and renewed in the treatment group, so that the concentration of cadmium chloride remained the same during the experimental period. *Heteropneustes fossilis* was exposed to sub-lethal concentration of Cadmium for 21 days. At the end of 7th, 14thand 21st day sampling was done. At the end of the exposure period, blood was taken by the following method. The fish were caught very gently using a small dip net, one at a time with least disturbance. Each fish was held and wrapped with a clean, dry towel and the posterior half of its body was blotted with a clean coarse filter paper. Blood from the Control and Cadmium chloride treated fishes were obtained by severance of caudal peduncle and collected in Eppendorf tubes containing 1 % of Ethylene diamine tetra acetic acid (EDTA) as anticoagulant (Mgbenka *et al.*, 2003) [26]. Haematological parameters were estimated by standard methods as described by Hesser (1960) [18] and Blaxhall and Daisley (1973) [5].

Red Blood Corpuscular (RBC) Count

Red blood Corpuscles (RBC) count was done with a Neubauer chamber as described by Sohn and Henry (1969) [46]. The pipette with red glass bead was used for charging the counting chamber. All counts were done in triplicate.

Procedure

The blood was taken in a vial containing Ethylenediamine tetra acetic acid (EDTA) as anticoagulant. Blood was drawn up to 0.5 mark in RBC pipette and immediately, the diluting fluid (Hayem's solution) was drawn up to the 101 mark (thus the dilution is 1:200). Pipette was shaken thoroughly and diluted blood was charged into the counting chamber, after discarding two drops. The solution was allowed to settle for few seconds and the number of RBCs was counted in five small squares of the RBC column under high power microscope and the number of RBCs per cubic mm was calculated.

$$\text{RBC (millions)} = \frac{\text{No. of cells X Dilution factor X Depth factor}}{\textit{Area counted}}$$

Estimation of Haemoglobin (Hb) content

Haemoglobin was determined by the Cyanmethemoglobin method (Dacie and Lewis, 1968)[9]. In this method, all types of Hb will be converted first to methemoglobin and then to cyanomethemoglobin which can be measured colorimetrically. Blood sample of 0.02 ml was pipetted into 5 ml of Drabkin's reagent (commercial name Aculute by Glaxo). It was shaken well and allowed to stand for 10 minutes. Sometimes a jelly like substance was seen in the solution formed by the ruptured cell walls of RBCs. It can be removed by centrifugation. Optical density was measured at 540 nm in a spectrophotometer against a reagent blank. Using a commercial cyanmethemoglobin standard, a standard graph was prepared from which the values of Hb can be read directly as g/dl.

Estimation of Packed Cell Volume (PCV)

PCV was estimated by employing the microhaematocrit method (Snieszko, 1960) [45]. Heparinized, non-clotted blood was collected in unheparinized even bored capillaries. It was allowed to run 1/2 to 3/4 lengths of capillary tube and the tubes were sealed with sealing wax on opposite sides. The tubes were then transferred to a high speed microhaematocrit centrifuge and were placed in the grooves of capillary head. They were centrifuged in the centrifuge at 12000 rpm for 5 minutes. PCV was measured directly on a microhaematocrit reader associated with the centrifuge as volume present.

White Blood Corpuscles (WBC) Count

WBCs were counted according to the method described by Donald Hunter and Bomford (1963) [10].

Procedure

Blood was collected in vials containing EDTA as anticoagulant. The blood was drawn up to 0.5 mark of WBC pipette and immediately diluted fluid, Turk's solution was drawn up to l 1 marks above the bulb. Solution was mixed thoroughly and was allowed to stand for 2 minutes. Solution was expelled and a drop of fluid was allowed to flow under the cover slip. It was allowed to stand for 2 minutes and the WBCs were counted in the 4 comer square millimeters. The number of WBCs per cubic millimeter was calculated accordingly.

$$\text{WBC (millions)} = \frac{\text{No. of cells X Dilution factor X Depth factor}}{\textit{Area counted}}$$

Calculation of RBC constants

Based on the results of the tests which measure total RBC, Hb and PCV several calculations have been derived which give quantitative information about the red blood corpuscles. These values are called RBC constants.

Mean Corpuscular Volume (MCV)

The mean corpuscular volume is the volume of the average cell or the average cell volume of all the RBCs.

$$MCV\ (\mu m3) = \frac{PCV\ \%}{RBC\ in\ million} X\ 10$$

Mean Corpuscular Haemoglobin (MCH)

MCH is the amount of Hb in the average RBC or average amount of Hb per cell in all the red cells.

$$MCH\ (pg) = \frac{Hb\ \left(\frac{g}{dl}\right)}{RBC\ in\ million} X\ 10$$

Mean Corpuscular Haemoglobin Concentration (MCHC)

MCHC is the portion of the average RBC containing haemoglobin or the concentration in the average cell.

$$MCHC\ (\%) = \frac{Hb\ \left(\frac{g}{dl}\right)}{PCV\ (\%)} X\ 100$$

3. Results and Discussion

Haematology deals with the study of blood and embraces various aspects of physiological, pathological as well as the biochemical characteristics of the blood. Fish haematology is a tool to assess the status of general health. A number of blood parameters such as total RBC count, total WBC count, hemoglobin (Hb) content, packed cell volume (PCV), mean cell volume (MCV), mean cell hemoglobin (MCH) and mean cell hemoglobin concentration (MCHC) have been used as indicators of metal pollution in the aquatic environment. In the last three decades, studies on fish blood has gained increasing importance for fishery biologists and ichthyologists for regular monitoring of health of the fish stocks and to develop an information database about inter-specific and intra-specific variations in blood characteristics under exposure to heavy metals.

The results of the present investigation showed various anomalies in the blood of *H. fossilis* during prolonged exposure to cadmium. The mean±SD values of hematological parameters of control and treated fish under sub-lethal concentrations of Cadmium exposed for 7, 14 and 21 days are depicted in Table 1. Significant changes were not observed in the measured variables of fish maintained in uncontaminated water (control). The main haematological alteration resulting from exposure of *H. fossilis* to various concentrations of cadmium for 7, 14 and 21 days included significant decrease in haematocrit and haemoglobin concentration and in red blood cell counts and an increase in white blood cell counts (Table1). MCHC exhibited a significant decline when compared to control fishes. MCV and MCH values were found to exhibit a significant rise in treated fish than in control fish.

Table 1: Cadmium induced changes in Hematological parameters of *H. fossilis*

Treatments	Exposure period	Experiment						
		RBC (millions)	Hb (g/dl)	PCV (%)	WBC (millions)	MCV (μm^3)	MCH (pg)	MCHC (%)
Control	7th Day	3.10±0.112	10.52±0.16	38.94±1.16	3.72±0.160	119.80±3.26	33.93±1.22	27.01±0.34
	14th Day	3.11±0.342	10.64±0.68	38.98±1.18	3.78±0.226	121.15±4.12	34.21±1.02	27.29±0.64
	21th Day	3.11±0.645	10.72±0.12	38.98±0.96	3.78±0.468	121.92±2.62	34.46±1.46	27.50±0.46
A	7th Day	2.08±0.342	8.28±0.34	37.18±0.84	3.98±0.234	199.42±2.88	39.80±1.20	22.27±0.48
	14th Day	1.66±0.112	7.02±0.48	35.06±0.82	4.09±0.146	260.60±3.12	42.28±1.16	20.02±0.74
	21th Day	1.22±0.126	5.72±0.34	32.88±0.68	4.24±0.248	367.86±3.78	46.88±1.28	17.39±0.66
B	7th Day	2.42±0.246	9.64±0.28	38.18±0.66	3.90±0.106	164.38±4.12	39.83±0.86	25.27±0.78
	14th Day	1.98±0.242	8.16±0.46	36.68±0.96	3.98±0.426	210.50±3.46	41.21±0.96	22.24±0.84
	21th Day	1.78±0.422	7.20±0.68	35.26±0.88	4.08±0.346	240.78±2.86	42.69±1.08	20.41±0.56
C	7th Day	2.76±0.116	9.82±0.24	38.85±0.86	3.82±0.420	140.76±2.68	35.57±1.28	25.27±0.86
	14th Day	2.48±0.112	9.10±0.26	37.86±0.68	3.88±0.268	160.72±2.78	36.69±1.02	24.03 ±0.66
	21th Day	2.04±0.246	8.46±0.42	36.24±0.84	3.96±0.262	202.15±3.26	41.47±0.98	23.34±0.82

*Each value is represented as mean ± SD (n=5); Values are significant at $p<0.05$ (based on t-test)

A = Sub-lethal conc. (2.068 ppm); **B** = 50% SL of A (1.034 ppm); **C** = 50% SL of B (0.517 ppm)

Red Blood corpuscles (RBC)

The present study reveals that there is a significant reduction in RBC of fish after 7, 14 and 21 days of exposure to sub-lethal concentrations of cadmium than in the control fish. The number and percent change in RBC of *H. fossilis* exposed to sub-lethal concentrations of cadmium for 7, 14 and 21 days are given in Table 2 and Figure 1. The maximum percent change of total RBC count was found in treatment- A for 21days (60.77%) and minimum in treatment-C for 7 days (10.96%). The total RBC count was found to decrease with an increase in dosage and duration.

The reduction of RBC at sub-lethal level of cadmium might be due to the destruction of mature RBCs and inhibition of erythrocyte production due to the reduction of haemo synthesis affected by pollutants (Hussein *et al.*, 2011). Gill and Epple (I993) [15] found a significant reduction in RBC in American eel (*Anguilla rostrata*) after exposure to 150 µg Cd/L. Karuppaswamy *et al.* (2005) [26] found a significant decrease in total erythrocyte count in air breathing fish, *Channa punctatus* after exposure to sub lethal dose of Cadmium. The decrease in RBC count may be attributed to haematopathology or acute haemolytic crisis that result in severe anemia in most vertebrates including fish species exposed to different environmental pollutants.

Annune *et al.* (1994) [4] reported a non-significant decrease and swelling of red blood cells in *Oreochromis niloticus*. Flos *et al.* (1987) [12] and Soundararajan *et al.* (2014) [47] stated that the swelling of red blood cells (erythrocytes) may be due to an increase in protein and carbon dioxide in the blood. The decrease in the total erythrocyte count (TEC) may be due to the cytotoxic effect of heavy metal compounds on the erythropoietic tissue. Such a disturbance in bone marrow leads to alteration of cell cycle and reduction in erythropoeisis (Tariq *et al.*, 2006) [49].

Table 2: Changes in RBC and percent change over the control in the blood of *H. fossilis* exposed to sub-lethal concentrations of Cadmium for 7, 14 and 21 days

S. No	Exposure Period	Parameter : RBC(millions)						
		Treatments						
		Control	A	% Change	B	% Change	C	% Change
1	7th Day	3.10±0.112	2.08±0.342	32.90	2.42±0.246	21.93	2.76±0.116	10.96
2	14th Day	3.11±0.342	1.66±0.112	46.62	1.98±0.242	36.33	2.48±0.112	20.25
3	21th Day	3.11±0.645	1.22±0.126	60.77	1.78±0.422	42.76	2.04±0.246	34.40

*Each value is represented as mean ± SD (n=5); Values are significant at p<0.05 (based on t-test)

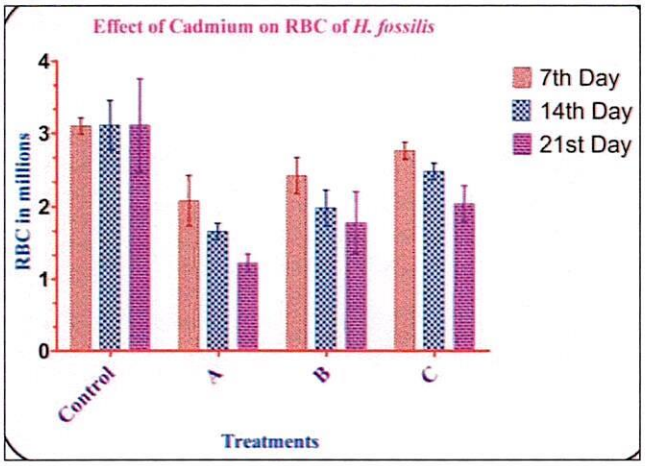

Fig 1: Changes in RBC in the blood of *H. fossilis* exposed to sub-lethal concentrations of Cadmium for 7, 14 and 21 days

Haemoglobin (Hb) content

In this study, Hb content significantly decreased in fish exposed to sub-lethal concentration of cadmium for 7, 14 and 21 days than that of control fish. The Hb content and percent changes of effected fish Hb are tabulated in Table 3 and Figure 2. The maximum percent change of Hb content was found in treatment- A for 21days (46.64%) and minimum in treatment-C for 7 days (6.65%). The total Hb concentration was found to decrease with an increase in dosage and duration. These results may be due to cumulative response of cadmium toxicity towards excessive red cell destruction there by lead to anemic to protect the fish against infections under cadmium stress (Kaoud *et al.*, 2011) [20].

According to the results obtained from the present study, Hb seems to be the best blood indicator of environmental stress. Khalesi *et al.* (2014) [4] and Cazenave *et al.* (2005) [8] suggested that the increase in Hb concentration could be a reliable first indicator of an adaptational improvement in the oxygen transporting capacity of the blood. In addition to behavioral and morphological adjustments, fish could respond to low oxygen levels by adjusting several physiological and biochemical parameters (Val *et al.*, 1998) [51]. Reduction in haemoglobin concentration may probably be due to production of reactive oxygen species under the influence of heavy metal cadmium which results in destruction of the red blood cell membrane and its function (Tariq, 2006) [49]. The observed depletion in the haemoglobin values in the fish could also be attributed to the lysing of erythrocytes. The significant reduction in these parameters is an indication of severe anemia caused by exposure of the experimental fish to cadmium in the water (Kaoud *et al.*, 2011) [20].

Soundararajan *et al.* (2014) [47] reported the reduction in Hb content of *Heteropenustes fossilis* exposed to zinc. Similarly the decreased amount of Hb could be corroborated with previous investigations in *Oreochromis mossambicus* exposed to copper and zinc (Senthamilselvan, 2015) [40]. Pamila *et al.* (1991) [32] have reported that the reduction in Hb content might be due to the inhibitory effect of toxic substance on the enzyme systems involved in the synthesis of hemoglobin. Joshi *et al.* (2002) [19] have reported that heavy metal exposure decreased Hb due to impaired intestinal absorption of iron. Karuppasamy *et al.* (2005) [22] observed a significant decrease in Hb in *Channa punctatus* exposed to cadmium. The changes in Hb may be due to immunological reactions to produce antibodies to cope up with the stress induced by cadmium (Vijay Ramdas, 2013) [52].

Table 3: Changes in Hb and percent change over the control in the blood of *H. fossilis* exposed to sub-lethal concentrations of Cadmium for 7, 14 and 21 days

S. No	Exposure Period	Parameter : Hb g/dl						
		Treatments						
		Control	A	% Change	B	% Change	C	% Change
1	7th Day	10.52±0.16	8.28±0.34	21.29	9.64±0.28	8.36	9.82±0.24	6.65
2	14th Day	10.64±0.68	7.02±0.48	34.02	8.16±0.46	23.31	9.10±0.26	14.47
3	21th Day	10.72±0.12	5.72±0.34	46.64	7.20±0.68	32.84	8.46±0.42	21.08

*Each value is represented as mean ± SD (n=5); Values are significant at p<0.05 (based on t-test)

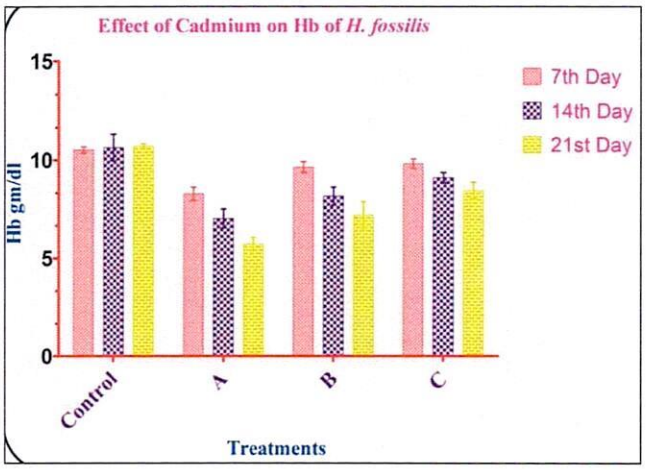

Fig 2: Changes in Hb in the blood of *H. fossilis* exposed to sub-lethal concentrations of Cadmium for 7, 14 and 21 days

Packed Cell Volume (PCV)

The present study reveals that the fish exposed to cadmium showed significant decline in PCV. Calculated values of PCV in control and treated fish along with percent change over control are given in Table 4 and Figure 3. The total PCV percentage was found to decrease with increase in dosage and duration. The maximum percent change of packed cell volume was found in treatment-A for 21days (15.64 %) and minimum in treatment-C for 7 days (0.23 %).

The decrease in PCV may be due to the disturbances that occurred in both metabolic and hemopoietic activities of the fish exposed to sub-lethal concentrations of cadmium (Santhakumara *et al.*, 2000) [38]. Mazon *et al.* (2002)[25], Kuruppasamy *et al.* (2005) [22], Gupta *et al.* (2009) [16] and Sharma and Langer (2014) [12] reported that hemopoietic organs get impaired by toxicity resulting in slower erythropoiesis and thereby lead to reduction in PCV.

The present results are in agreement with the earlier works reported (Kuruppasamy, 2000; Tyagi and Srivastava, 2005; Gupta, 2008; Olanike *et al.*, 2008, Witeska *et al.*, 2010 and Kaoud *et al.*, 2011) [21, 50, 17, 29, 55, 20]. Joshi *et al.* (2002) [19] and Sandeep *et al.* (2013) [36] suggested that decrease in PCV is due to hemodilution mechanism because of gill damage or impaired osmoregulation and impaired intestinal absorption of iron. However, Witeska (2005) [52] in *Cyprinus carpio* and Caravalho and Fernandes (2006) [7] in *Prochilodus lineatus* observed copper induced blood alternations, characterized by an increase in PCV. They suggested that heavy meals induced a hypoxic condition in fish that stimulates the spleen for RBC production and release of stored erythrocytes into the circulation. Similar result has also been reported earlier by Ghazaly (1992) [13], Palackova *et al.* (1994) [31] and Wilson and Taylor (1993) [53].

Table 4: Changes in PCV and percent change over the control in the blood of *H. fossilis* exposed to sub-lethal concentrations of Cadmium for 7, 14 and 21 days

S. No	Exposure Period	Parameter : PCV %						
		Treatments						
		Control	A	% Change	B	% Change	C	% Change
1	7th Day	38.94±1.16	37.18±0.84	4.51	38.18±0.66	1.95	38.85±0.86	0.23
2	14th Day	38.98±1.18	35.06±0.82	10.05	36.68±0.96	5.90	37.86±0.68	2.87
3	21th Day	38.98±0.96	32.88±0.68	15.64	35.26±0.88	9.54	36.24±0.84	7.03

*Each value is represented as mean ± SD (n=5); Values are significant at $p<0.05$ (based on t-test)

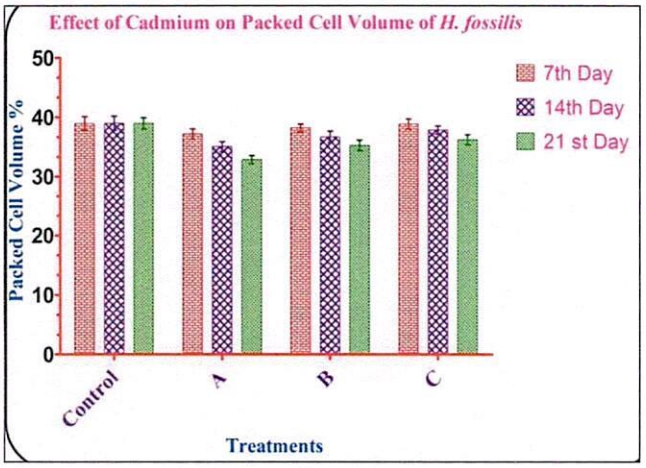

Fig 3: Changes in PCV in the blood of *H. fossilis* exposed to sub-lethal concentrations of Cadmium for 7, 14 and 21 days

The Packed cell volume (PCV) appears to be positively correlated with erythrocyte count. Fall in the number of red blood cells followed by PCV confirms anemia in *Heteropneustes fossilis.* The probable mechanisms for developing anemia in *Heteropneustes fossilis* could be due to the loss of erythrocytes as compensatory erythropoiesis could not be observed, which was reflected in the absence of immature erythrocytes in the peripheral blood.

In the present study, similar pattern of reduction in RBC, Hb and PCV indicates anaemic stage of experimental fish caused due to decreased erythropoietic activity or increased destruction of blood cells. The reduction in red blood cell count and haemoglobin percentage indicates the occurrence of acute anaemia (Prasanta Nanda, 1997) [33].

White Blood Corpuscles (WBC)

The results of the present study i.e. calculated values for total WBC in control and exposed fish along with percent change over control are given in Table 5 and Figure 4. The total WBC was found to increase with increase in dosage and duration. The maximum percent change of WBC was found in treatment-A for 21days (12.16%) and minimum in treatment-C for 7 days (2.65%).

Leucocytes or WBC are cells of immune system which play a key role in both non-specific and specific immune responses in protecting the body against foreign substances. Review of literature shows two opposite lines of response of leucocytes

to different heavy metals. One group of researchers reported increase in WBC in fish in response to heavy metal toxicity (Buthelezi, 2000; Singh and Tandon, 2009; Raina and Sachar, 2014 and Sharma and Langer, 2014) [6, 43, 34, 42]. Increase in WBC count can be attributed to a stimulation of the immune system in response to tissue damage caused by heavy metals. Moraes (2007) [27] stated that one of the most elementary ways to assess the immune system is to explore changes in the WBC count.

The other group researchers advocated decrease in WBC in response to heavy metals in fish (Witeska, 2005; Oliveira *et al.*, 2006; Olanike, 2007; Olanike *et al.*, 2008; Safahieh *et al.*, 2010 and Witeska *et al.*, 2010) [54, 30, 28, 29, 35, 55]. The decline in WBC count is due to release of epinephrine during stress because of heavy metal toxicity and weakening of the immune system (Olanike, 2007) [27]. The results of the present study are in accordance with first group of researchers who have observed increase in WBC of fish on exposure to cadmium.

Table 5: Changes in WBC and percent change over the control in the blood of *H. fossilis* exposed to sub-lethal concentrations of Cadmium for 7, 14 and 21 days

S. No	Exposure Period	Parameter : WBC (millions)						
		Treatments						
		Control	A	% Change	B	% Change	C	% Change
1	7th Day	3.72±0.160	3.98±0.234	6.98	3.90±0.106	4.84	3.82±0.420	2.65
2	14th Day	3.78±0.226	4.09±0.146	8.02	3.98±0.426	5.29	3.88±0.268	2.69
3	21th Day	3.78±0.468	4.24±0.248	12.16	4.08±0.346	7.94	3.96±0.262	4.76

*Each value is represented as mean ± SD (n=5); Values are significant at $p<0.05$ (based on t-test)

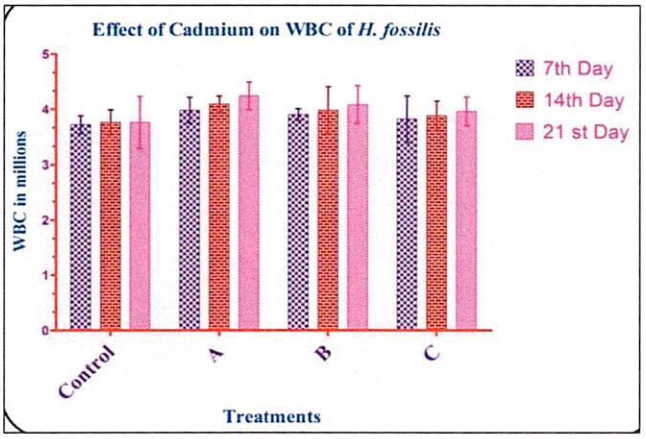

Fig 4: Changes in WBC in the blood of *H. fossilis* exposed to sub-lethal concentrations of Cadmium for 7, 14 and 21 days

Mean Corpuscular Volume (MCV)

MCV (µm3) values were found to exhibit significant rise in treated fish exposed to various sub-lethal concentrations of cadmium for 7, 14 and 21 days than in control fish. The MCVs and their percent changes are represented in Table 6 and Figure 5. The total MCV was found to increase with increase in dosage and duration. The maximum percent change of MCV was found in treatment-A for 21days (201.72%) and minimum in treatment-C for 7 days (17.50%). Mean corpuscular volume (MCV) is one of the important blood parameters which gives an indication of the status of size of RBC. In the present study a marked increase in MCV was observed which can be attributed to reduction in total erythrocyte count because MCV and total erythrocyte count exhibit inverse relationship with each other. This is in agreement with the works of Shah (2006) [41] in *Tinca tinca*, Olanike (2007) [29] in *Clarias gariepinus*, Afaq (2009) [2] in *Cirrhinus mrigala*, Gupta *et al.* (2009) [16] in *Labeo boga*, Sandeep *et al.* (2013) [36] in *Labeo rohita*, and Sharma and Langer (2014) [42] in *Garra gotyala*. The increase in MCV may be due to the enlargement of RBCs as a result of hypoxic condition or osmotic disturbances and uptake of electrolytes and water into the cells accompanied by acidification of cytoplasm of RBC or macrocytic anemia in fishes exposed to metal pollution (Sinha *et al.*, 2000) [44].

Table 6: Changes in MCV and percent change over the control in the blood of *H. fossilis* exposed to sub-lethal concentrations of Cadmium for 7, 14 and 21 days

S. No	Exposure Period	Parameter : MCV(µ m^3)						
		Treatments						
		Control	A	% Change	B	% Change	C	% Change
1	7th Day	119.80±3.26	199.42±2.88	66.46	164.38±4.12	36.89	140.76±2.68	17.50
2	14th Day	121.15±4.12	260.60±3.12	115.10	210.50±3.46	73.75	160.72±2.78	32.66
3	21th Day	121.92±2.62	367.86±3.78	201.72	240.78±2.86	97.49	202.15±3.26	65.80

*Each value is represented as mean ± SD (n=5); Values are significant at $p<0.05$ (based on t-test)

COLLEGE FOR WOMEN

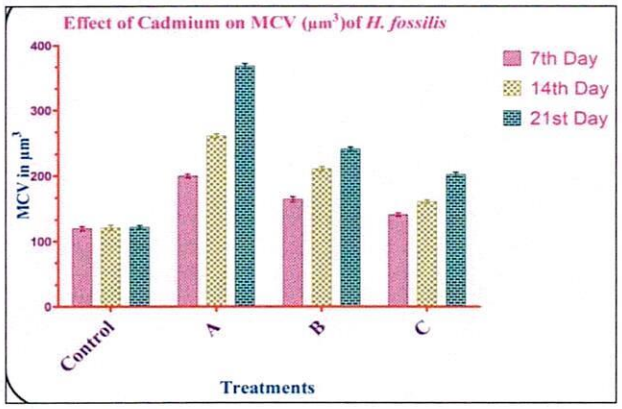

Fig 5: Changes in MCV in the blood of *H. fossilis* exposed to sub-lethal concentrations of Cadmium for 7, 14 and 21 days

Mean Corpuscular Haemoglobin (MCH)

The present study reveals that the fish exposed to cadmium showed significant increase in MCH. Calculated values for MCH in control and exposed fish along with percent change over control are given in Table 7 and Figure 6. The total MCH was found to increase with increase in dosage and duration. The maximum percent change of WBC was found in treatment-A for 21days (36.04%) and minimum in treatment-C for 7 days (4.83%).

MCH represents the average weight of haemoglobin in RBC. MCH exhibited an increasing trend in all exposure periods of sub-lethal concentrations. These results are in line with the findings of Sandeep *et al.* (2013) [36], Raina and Sachar (2014) [34] and Sharma and Langer (2014) [42]. Such changes in MCH may either be due to the increased lysis of RBCs or reduction in cellular blood iron thereby resulting in reduced Hb synthesis (Sharma and Langer, 2014). In contrast to the above results, no significant effects of metal toxicity on MCH have been observed by Oliveira *et al.* (2006) [30], Carvalho and Fernandes (2009) [7] and Safahieh *et al.* (2010) [35] in fish.

Table 7: Changes in MCH and percent change over the control in the blood of *H. fossilis* exposed to sub-lethal concentrations of Cadmium for 7, 14 and 21 days

S. No	Exposure Period	Parameter : MCH (pg)						
		Treatments						
		Control	A	% Change	B	% Change	C	% Change
1	7th Day	33.93±1.22	39.80±1.20	17.30	39.83±0.86	17.39	35.57±1.28	4.83
2	14th Day	34.21±1.02	42.28±1.16	23.59	41.21±0.96	20.46	36.69±1.02	7.25
3	21th Day	34.46±1.46	46.88±1.28	36.04	42.69±1.08	23.88	41.47±0.98	20.34

*Each value is represented as mean ± SD (n=5); Values are significant at p<0.05 (based on t-test)

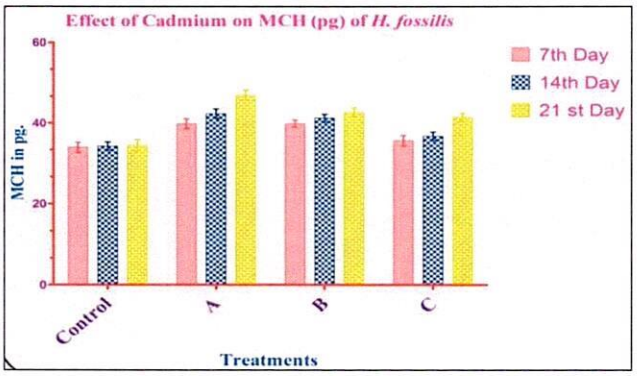

Fig 6: Changes in MCH in the blood of *H. fossilis* exposed to sub-lethal concentrations of Cadmium for 7, 14 and 21 days

Mean corpuscular Haemoglobin Concentration (MCHC)

In the present investigation, significant decrease in MCHC was noticed in fish exposed to cadmium than in control. The MCHC values and percent changes are presented in Table 8 and Figure 7. The total MCHC was found to decrease with increase in dosage and duration. The maximum percent change of MCHC was found in treatment-A for 21days (36.76%) and minimum in treatment-C for 7 days (6.44%).

MCHC is the indication of average concentration of haemoglobin in RBC cells, calculated based on Hb and PCV. Decrease in Hb and PCV coupled with increase in MCV might be the reason for the decreased MCHC.

Table 8: Changes in MCHC and percent change over the control in the blood of *H. fossilis* exposed to sub-lethal concentrations of Cadmium for 7, 14 and 21 days

S. No	Exposure Period	Parameter : MCHC %						
		Control	Treatments					
			A	% Change	B	% Change	C	% Change
1	7th Day	27.01±0.34	22.27±0.48	17.55	25.27±0.78	6.44	25.27±0.86	6.44
2	14th Day	27.29±0.64	20.02±0.74	26.64	22.24±0.84	18.50	24.03±0.66	11.95
3	21th Day	27.50±0.46	17.39±0.66	36.76	20.41±0.56	25.78	23.34±0.87	15.13

*Each value is represented as mean ± SD (n=5); Values are significant at p<0.05 (based on t-test)

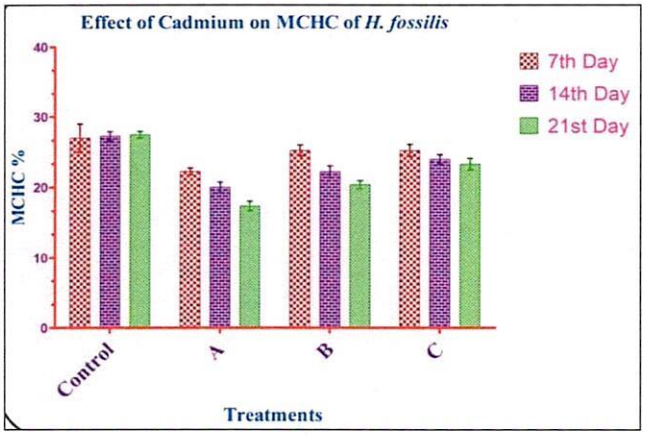

Fig 7: Changes in MCHC in the blood of *H. fossilis* exposed to sub-lethal concentrations of Cadmium for 7, 14 and 21 days

The present results are in line with the findings of Sandeep *et al.* (2013) [36], Raina and Sachar (2014) [34] and Sharma and Langer (2014) [42]. Such changes in MCHC may be either due to the increased lysis of RBCs or reduction in cellular blood iron thereby resulting in reduced Hb synthesis (Sharma and Langer, 2014) [42]. The low concentration of MCHC during the treatment might have resulted from decrease in Hb synthesis due to toxic action or swelling of erythrocytes by which blood oxygen transport capacity is increased when fish were subjected to less effective gas exchange (Saravanan *et al.*, 2011) [39]. Alterations in MCV, MCH and MCHC clearly indicated that the fish are under chemical stress, which lead to pathological condition in the tissues. Gill *et al.* (1991) [14] have also studied the haematology of different fish in response to different chemical stresses and the present observations corroborate with their findings.

4. Conclusion

The circulatory system of fish is in close association with the external environment and with every tissue. It is sensitive to foreign stimuli and reflects the homeostasis of the animal. Thus haematological studies helped to check the systemic responses during stress conditions due to cadmium. The main haematological alteration resulting from exposure of *H. fossilis* to various concentrations of cadmium for 7, 14 and 21 days include significant decrease in haematocrit and haemoglobin concentration and in red blood cell counts. The white blood cell counts increased followed by a change in the composition as seen from the differential white blood cell counts. MCHC exhibited a significant decline when compared to control fishes. MCV and MCH values were found to exhibit a significant rise in treated fish than in control fish. The changes in the hematological parameters indicated that they can be used as indicators of cadmium related stress in fish on exposure to elevated levels in the water.

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A Study of Plant diversity and indices of woody species (trees and lianas) ofG. Ariyur Sacred Grove,Viluppuram District, Tamil Nadu, South India

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Abstract: Sacred groves are ecologically important with great heritage of genetic diversity of many local forest based plant species having medicinal, economic, cultural and religious values. The present study was aimed at documenting the wealth of plant diversity of a sacred grove.A survey was conducted to record density, species richness and diversity of woody species (trees and lianas) in the G.Ariyur sacred grove which is dedicated to Aiyanar with an area of 2.5 hectares and which is situated in Tirukkoyilur taluk of Viluppuram district, TamilNadu, South India.A total of 39 plant species representing 37 genera were recorded,belonging to 23 families. Of these, 32 (71%) species were trees and 7 (29%) species were lianas. The dominant families are: Mimosaceae (5 species), Caesalpiniaceae (4 Species) and Rutaceae (4 Species). Apocynaceae, Capparaceae, Fabaceae, Rhamnaceae, Rubiaceae,and Sapindaceae which were represented by two species each from the study site. Density, species richness and diversity of trees were recorded for the detailed study of plant diversity. The vegetation type indicatesthat this grove is considered to be an inland tropical dry evergreen forest.

Keywords: *G. Ariyur, sacred groves, plant biodiversity, conservation, cultural tradition.*

INTRODUCTION:

Ancient societies such as those of Greece, Rome, Asia and Africa had long practiced preserving patches of forests in their original state due to the belief that they were the abodes of gods and goddesses (Gadgil and Vartak, 1975). Sacred groves may be defined as patches of climax vegetation protected on religious grounds and buttressed by cultural mores. Fortunately, in many parts of the world, including India, there are many patches of pristine forests which have been preserved in their original state due to the prevalence of religious beliefs and social customs. These patches of forests are known as sacred groves and are considered to be the abode of ancestral deities and village gods. The names of the sacred groves vary from place to place in various

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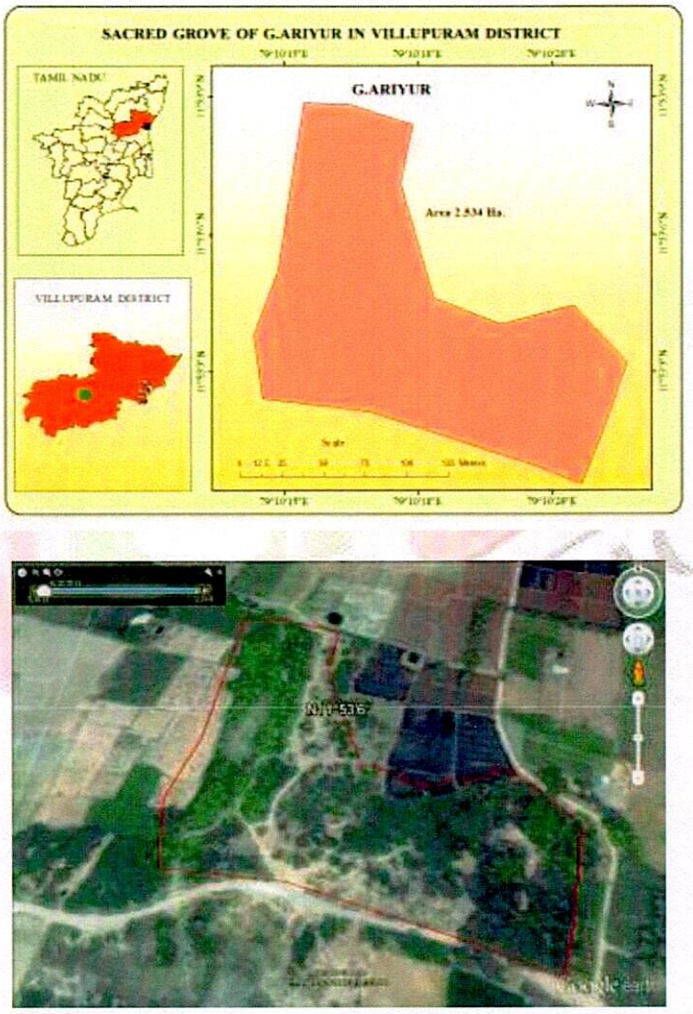
regions of the country (Malhotra *et al*., 2001). These groves are the repositories of varied biodiversity and thus play an important role in its conservation (Anthwal *et al.* 2006). The important role played by the sacred groves in preserving biodiversity has long been recognized (Khan *et al.*2008). Sacred groves are thus veritable natural museums of rare medicinal plants, balancers of the watershed, a gene bank of economic species and laboratory for environmentalists (Vartak and Kumbhojakar, 1984; Amirthalingam, 1998; Ramanujam, 2000; Sukumaran and Raj,2010). These sacred groves are kept in a state of good preservation as islands of native species of plants, animals, insects and micro-organisms. Hence it is necessary to make a detailed study of the G.Ariyur sacred grove and its plant diversity.

METHODOLOGY

Study Area

Plate 1: Base map and Google earth photo of G.Ariyur sacred grove



The present study was conducted in G.Ariyur sacred grove which has an inland tropical dry evergreen forest types which is situated in Tirukkoyilur taluk of Viluppuram district, Tamil Nadu, South India. The total area of the grove is 2.5 hectares. It lies between latitude 11°53'3.54"N and longitude 79°10'18.12"E. In this grove, regular *poojas* are performed on Tuesdays, Fridays and Saturdays. Once in a year, during the month of *Masi* (February – March), a two days festival is conducted. Some of the devotees offer animal sacrifice for the

fulfilment of their wishes. The practice of offering terracotta statues and tributes for the development and maintenance of the temple is found to be common. Tonsure ceremony for the children is also conducted regularly. The grove is maintained by the people of the Udaiyar community. However, the priest is usually from the Manudaiyar community. Crops like sugarcane, cotton, corn, green gram are cultivated in the surrounding areas (Plate 1). An overview of the groves is given in plate -2.

METHODS

Floristic composition of the grove was analysed during the periodic field visits spread over different seasons. In this grove, the size one hectare plot was laid and data collected accordingly. The study plot was further divided into sub-grids of 10 x 10m size to facilitate the inventory. During inventory, all trees ≥ 10cm girth at breast height (gbh) were measured at 1.5m from ground level and the lianas ≥ 1cm diameter were measured at 1.3 m from the rooting point. Voucher specimens were collected for all the species, methodically processed and identified using regional floras (Gamble and Fischer, 1915–1935; Hooker, 1872–1897; Matthew, 1991) and confirmed with the herbarium repository in the Department of Plant Biology and Plant Biotechnology, Presidency College, Chennai. Following Diversity indices such as Shannon (H'), Simpson (D) and Fisher's alpha were calculated as per Magurran (2004). Species Importance Value Indices (IVI)was calculated as per Mori *et al.* (1983). A modified Family Importance Value (FIV) was calculated by summing up the relative diversity (number of species in the family/total number of species × 100) and relative density of the individuals (Mori *etal.*, 1983) as it gives the relative contribution of the species to the stand structure.

RESULTS

Floristic analysis of G.Ariyur sacred grove

In this grove, there were 39 plant species representing 37 genera distributed in 23 families. Of these, 32 species were trees (71%) and 7 species were lianas (29%), (Table 2). The dominant families are: Mimosaceae (5 species), Caesalpiniaceae (4 Species) and Rutaceae (4 Species). Apocynaceae, Capparaceae, Fabaceae, Rhamnaceae, Rubiaceae, and Sapindaceae were representened with two species each. Alangiaceae, Anacardiaceae, Annonaceae, Arecaceae, Ebenaceae, Loganiaceae, Meliaceae, Moraceae, Moringaceae, Oleaceae, Santalaceae, Sapotaceae, Tiliaceae, Vitaceae had only one species in each of the families.

Diversity analysis

Shannon (H') index for tree and liana species was 0.7 and the Alpha index was 10.07. This shows that more dominant species with almost equal contributions among 475 individuals were available in the stand. The Simpson (1/D) index was 8.1 and the Berger-Parker dominance (1/d) index was 4.1 indicating a good diversity in the grove. Hill's number (H1) index for the tree and liana species was 66.1 (Table 1).

Table 1: Inventory of wood species comprising the G.Ariyur sacred grove

Variables	Number / Value (Number of individuals)
Species richness	39
Number of the Genera	37
Number of families	22
Number of tree species	32 (414)
Number of liana species	7 (61)
Density (ha^{-1})	475

Average tree girth	32.52
Average liana girth	6.69
Diversity indices	
Shannon J'	0.7
Alpha	10.068
Simpsons Diversity (1/D)	8.126
Berger-Parker dominance (1/d)	4.095
Hill's Number H1	66.154

Species richness

The grove has a stand density of 475 ha^{-1}. It was distinctly dominated by *Albizia amara*, *Prosopis juliflora, Azadirachta indica*, *Cascabela thevetia*, *Wrightia tinctoria*, *Ziziphus oenopolia,Diospyros montana* and *Crateva magna*(Table 2).

Table 2: Plant Phytosociology of woody species at Aiyanar grove in G.Ariyur

S.No	Botanical name	Count	Habit	BA	RBA	RD	RF	IVI
1	*Abrus precatorius* L.	5	L	0.0008	0.0087	1.0526	1.3699	2.4311
2	*Acacia leucophloea* (Roxb.) Willd.	2	T	0.0314	0.3585	0.4211	0.6849	1.4645
3	*Aegle marmelos* (L.) Correa	1	T	0.0145	0.166	0.2105	0.3425	0.719
4	*Alangium salviifolium* (L.f.) Wangerin	3	T	0.0287	0.3287	0.6316	1.0274	1.9877
5	*Albizia amara* (Roxb.) B.Boivin	116	T	0.9093	10.398	24.4211	15.753	50.572
6	*Annona squamosa* L.	1	T	0.0032	0.0371	0.2105	0.3425	0.5901
7	*Atalantia monophylla* DC.	4	T	0.0199	0.2272	0.8421	1.0274	2.0967
8	*Azadirachta indica* A.Juss.	48	T	0.4511	5.158	10.1053	11.986	27.25
9	*Benkara malabarica* (Lam.) Tirveng.	1	T	0.0123	0.1406	0.2105	0.3425	0.6936
10	*Borassus flabellifer* L.	5	T	0.3975	4.5453	1.0526	1.3699	6.9678
11	*Capparis zeylanica* L.	1	L	0.0003	0.0031	0.2105	0.3425	0.5561
12	*Cascabela thevetia* (L.) Lippold	33	T	0.1157	1.3229	6.9474	6.5068	14.777
13	*Cassia fistula* L.	2	T	0.0161	0.1838	0.4211	0.6849	1.2898
14	*Cassia roxburghii* DC.	1	T	0.0044	0.0507	0.2105	0.3425	0.6037
15	*Cissus quadrangularis* L.	11	L	0.0009	0.0108	2.3158	2.7397	5.0663
16	*Clausena dentata* (Willd.) M. Roem.	1	T	0.0056	0.0639	0.2105	0.3425	0.6169
17	*Crateva magna* (Lour.) DC.	12	T	0.079	0.9034	2.5263	4.1096	7.5393
18	*Dichrostachys cinerea* (L.) Wight & Arn.	3	T	0.0111	0.1267	0.6316	0.6849	1.4432
19	*Diospyros montana* Roxb.	13	T	0.1462	1.672	2.7368	4.1096	8.5184

20	*Ficus religiosa* L.	1	T	1.8612	21.284	0.2105	0.3425	21.837
21	*Grewia orientalis* L.	11	L	0.0053	0.0602	2.3158	3.7671	6.1431
22	*Jasminum angustifolium* (L.) Willd.	7	L	0.003	0.0338	1.4737	2.3973	3.9048
23	*Lannea coromandelica* (Houtt.) Merr.	2	T	0.057	0.6523	0.4211	0.6849	1.7583
24	*Lepisanthes tetraphylla* (Vahl) Radlk.	7	T	0.0507	0.5793	1.4737	1.7123	3.7653
25	*Leucaena leucocephala* (Lam.)de Wit	1	T	0.0186	0.2124	0.2105	0.3425	0.7654
26	*Madhuca longifolia* (J.Koenig ex L.) J.F.Macbr.	2	T	0.1059	1.2107	0.4211	0.6849	2.3167
27	*Morinda pubescens* J.E.Smith	10	T	0.0567	0.648	2.1053	3.0822	5.8354
28	*Moringa oleifera* Lam.	1	T	0.0047	0.0533	0.2105	0.3425	0.6063
29	*Peltophorum pterocarpum* Auct. non K.Heyne	3	T	0.1032	1.1798	0.6316	1.0274	2.8388
30	*Pongamia pinnata* (L.) Pierre	10	T	0.0632	0.723	2.1053	2.3973	5.2255
31	*Prosopis juliflora* (Sw.) Dc.	98	T	0.5284	6.0427	20.6316	13.356	40.03
32	*Santalum album* L.	1	T	0.003	0.0346	0.2105	0.3425	0.5876
33	*Sapindus emarginatus* Vahl	3	T	0.0399	0.4557	0.6316	1.0274	2.1147
34	*Strychnos nux-vomica* L.	4	T	0.0644	0.7368	0.8421	1.3699	2.9488
35	*Tamarindus indica* L.	1	T	3.3411	38.207	0.2105	0.3425	38.76
36	*Toddalia asiatica* (L.) Lam.	11	L	0.0064	0.0728	2.3158	2.7397	5.1283
37	*Wrightia tinctoria* R.Br	19	T	0.1227	1.4031	4	3.4247	8.8277
38	*Ziziphus mauritiana* Lam.	5	T	0.0528	0.6034	1.0526	1.3699	3.0259
39	*Ziziphus oenopolia* (L.) Miller	15	L	0.009	0.1027	3.1579	5.137	8.3976
	Total	**475**		**8.7449**	**100**	**100**	**100**	**300**

L- Liana., T- Tree. BA=Basal Area, RBA = Relative Basal Area, RD=Relative Density, RF =Relative Frequency, IVI=Importance Value Index.

Girth class and stand density

The largest GBH observed was that of *Ficus religiosa* (483.5cm), followed by *Tamarindus indica* (647.8 cm), *Madhuca longifolia* (112.3 cm), *Borassus flabellifer* (110.2 cm) and *Azadirachta indica* (85.6 cm). Tree species belonging to 10 to 30 cm gbh class percentage are represented by 285 individuals; 31 to 60 cm gbh represented by 117 individuals and above 61cm gbh by 12 individuals (Fig. 1).

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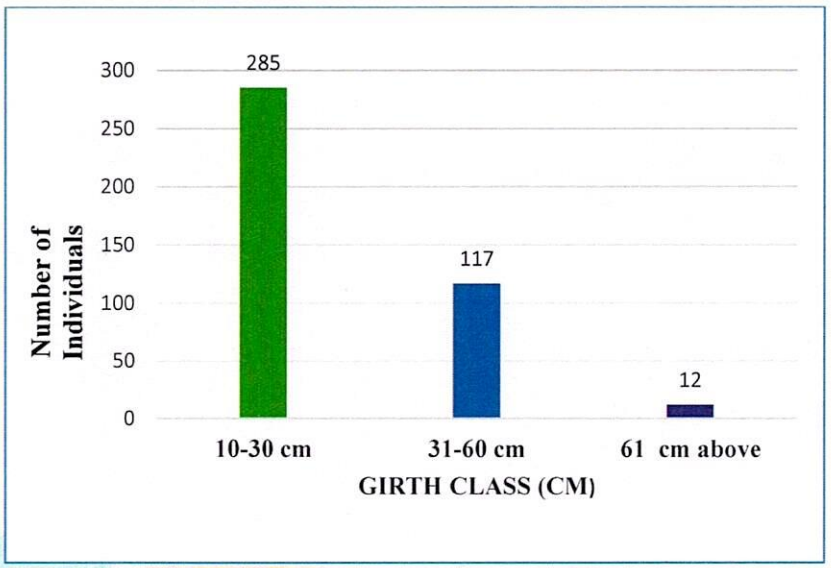
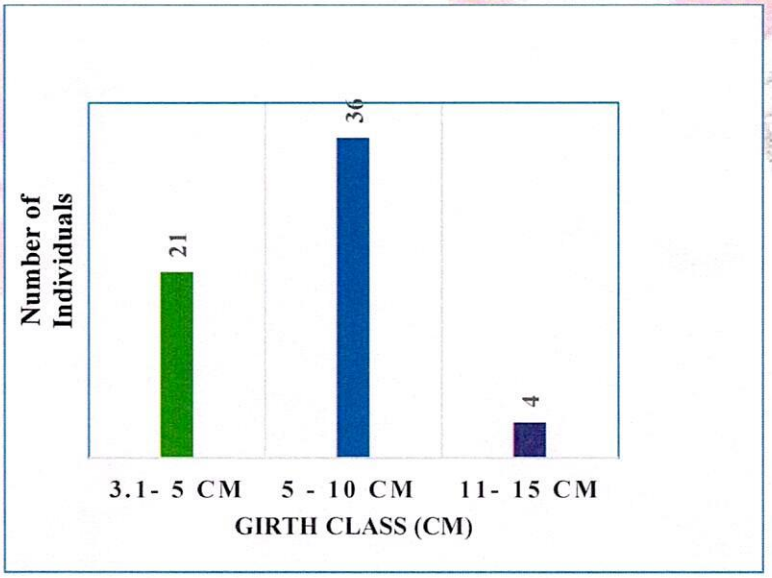
Fig. 1: GBH of dominant trees in G.Ariyur sacred grove



As far as lianas are concerned, *Toddalia asiatica* had a maximum GBH (14.3 cm), followed by *Grewia orientalis* (13.4 cm) and *Ziziphus oenopolia* (12.4 cm). Liana species belonging to 5 to 10 cm gbh are represented by 36 individuals; 3.1 to 5 cm gbh arerepresented by 21 individuals; 11 to 15cm gbh are represented by 4 individuals (Fig. 2).

Fig. 2: GBH of dominant lianas in G.Ariyur sacred grove



Basal area of stand of woody species

The total basal area is 8.74 m^2 ha^{-1} in the study area. *Tamarindus indica* has the largest share in stand basal area (3.3411 m^2 ha^{-1}) followed by *Ficus religiosa* (1.8612 m^2 ha^{-1}), *Albizia amara* (0.9093 m^2 ha^{-1}), *Prosopis juliflora* (0.5284 m^2 ha^{-1}), and *Ziziphus oenopolia* (0.0090 m^2 ha^{-1}). The lowest basal area is represented by *Capparis zeylanica* (0.0003 m^2 ha^{-1})(Table 2).

Importance value index

Dominant Importance Value Index (IVI) is maximum for *Albizia amara* (IVI = 50.572), followed by *Prosopis juliflora* (IVI = 40.03), *Tamarindus indica* (IVI = 38.76), *Azadirachta indica (*IVI = 27.25) and *Ficus religiosa* (IVI = 21.837.). The IVI is minimum for *Capparis zeylanica* (IVI = 0.5561) (Table 2).

Vegetation profile

Albizia amara, *Prosopis juliflora*, *Azadirachta indica, Cascabela thevetia* and *Wrightia tinctoria* are dominant and medium size trees. Tree species like *Tamarindus indica* and *Ficus religiosa*are present as the upper canopy trees in the grove. Slightly short trees such as *Prosopis juliflora*, *Albizia amara*, and *Cascabela thevetia* are sparsely distributed in the grove.

Disturbance analysis

The local community collects the fallen branches and other dead wood from the grove with no restrictions. Some areas within the groves have been cleared for raising commercial crops such as drumstick and banana. Unrestricted grazing is also being practiced in the grove which has resulted in the disappearance of some rare species. The grove has also become a refuge for drunkards and other anti-social elements.

DISCUSSION

The tropical dry evergreen forest (TDEF) sites scattered along the Coromandel coast of India are invariably protected as sacred forests in which different researches have been carried out on plant biodiversity by the researchers including Meher Homji, 1986; Ramujam and Kadamban (2001), Parthasarathy and Karthikeyan, 1997; Mani andParthasarathy (2007), Parthasarathy, et.al., (2008), etc. However, there is no complete documentation and research on the social and biodiversity values till date. To fulfill this scientific gap, the present study has been carried out in ten inland sacred groves from Cuddalore and Villupuram districts of Tamil Nadu.

The present study has enumerated a total of 39 plant species representing 37 genera distributed in 23 families. Of these, 32 species are trees (71%) and 7 species are lianas (29%), (Table 2). The dominant families are: Mimosaceae (5 species), Caesalpiniaceae (4 Species) and Rutaceae (4 Species). This is closer to the value from India at comparable 1-ha scale.

The total basal area is 8.74 m^2 ha^{-1} in the study area. *Tamarindus indica* has the largest share in stand basal area (3.3411 m^2 ha^{-1}) followed by *Ficus religiosa* (1.8612 m^2 ha^{-1}), *Albizia amara* (0.9093 m^2 ha^{-1}), *Prosopis juliflora* (0.5284 m^2 ha^{-1}), and *Ziziphus oenopolia (*0.0090 m^2 ha^{-1}). The lowest basal area is represented by *Capparis zeylanica* (0.0003 m^2 ha^{-1}) (Table 2). This is closer to the tree diversity (stem ≥ 10 cm gbh) ranged from a low value of 26.3±6.7 with range from 18-37 species per hectare in TDEF, India (Vivek and Parthasarathy, 2015), Similarly, the mean stands 21±5.5 with range from 12 - 33 species per ha from Cuddalore and Villupuram districts (Karthik *et al.* 2016) to a higher value of 51.2 ± 9.5 species per ha with range from 42-66 in the Southern Eastern Ghats (Rao *et al.*, 2011) were recorded.

A total of 32 species belonging to 37 genera and 23 families enumerated on one ha. Scale recorded is significant (Table 2). Thereare32 in woody speciesand7 are lianas. The dominant families are: Mimosaceae (5 species), Caesalpiniaceae (4 Species) and Rutaceae (4 Species). Apocynaceae, Capparaceae, Fabaceae, Rhamnaceae, Rubiaceae, and Sapindaceae were representened with two species each. Alangiaceae, Anacardiaceae, Annonaceae, Arecaceae, Ebenaceae, Loganiaceae, Meliaceae, Moraceae, Moringaceae,

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Oleaceae, Santalaceae, Sapotaceae, Tiliaceae, Vitaceae have only one species in each of the familieswhich are reported in this grove.

As far as vegetation analysis is concerned, it indicates that the stand density of the grove ranging from 117 to 285 stems per hectare. It is far below the 1663 stems ha-1 recorded for Shanmuganathapuram nearby (Mani and Parthasarathy 2007).

Based on the data, the patchy vegetation of the grove has a mixture of Bravi-deciduous and tropical dry evergreen trees forming an apparently two layered forest. *Albizia amara*, *Prosopis juliflora*, *Azadirachta indica*, *Cascabela thevetia* and *Wrightia tinctoria* are dominant and medium size trees. Tree species like *Tamarindus indica* and *Ficus religiosa*are present as the upper canopy trees in the grove. Slightly short trees such as *Prosopis juliflora*, *Albizia amara*, and *Cascabela thevetia* are sparsely distributed in the grove.Such as two layer structure is a special type of formation confined only to the south east coast of India and north east part of Sri Lanka (Rao and Meher-Homji1993).

CONCLUSION

The analysis showed that the stand density and tree diversity of the grove is on the lower side when compared to the other inland tropical dry evergreen forest type groves of this area. It was revealed that tree diversity varied according to biogeography and habitat destruction. Another factor that played an important role in affecting the composition of the grove was anthropomorphic activities. The grove is also closely linked with the religious and cultural traditions of the local communities. The grove is also performing a very useful function in conserving the biodiversity and providing the natural habitat for plants and animals. However, this study has focused on a tropical dry evergreen forest as it is essential that this type of forest is preserved from species extinction. It is also to be noted that the sacred groves fulfil the function of repositories of genetic diversity of native trees.

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Plate – 2 Overview of the G. Ariyur Aiyanar Sacred Grove

Mud path leading to the site

The major deity and terracotta horses

Minor deities in the site

A major drinking water source inside the grove

A part of the grove cleared for banana plantation

Adjoining agricultural land with paddy cultivation

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CONSUMER BEHAVIOUR TO SELECT HOUSEHOLD APPLIANCES IN SRIMUSHNAM TALUK, CUDDALORE

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ABSTRACT

Home appliances are that without which a modern home is considered incomplete, especially in urban areas. Modern home appliances have made our life more comfortable and easier than ever. The study area and analyse their pre-purchasing and post- purchasing behaviour, factors, influencing buying decision and level of satisfaction of the consumers. The study has been conducted among 100 individual investors in the kattumannar Kovil Taluk. The sample investors were selected by adopting the convenience sampling method. In the modern, fast moving world, household appliances play a vital role. In this regard, marketers of household appliances should consider the conditions of environment and also the ever changing needs and tastes of consumers.

KEY WORDS: Household Appliances, Consumer behaviour, level of satisfaction

INTRODUCTION

Home appliances are electrical/mechanical appliances which accomplish some household functions, such as cooking and cleaning. Household appliances represent a significant part of energy consumption in the household. Recent technology developments allow a smart operation of these appliances. Home appliances are that without which a modern home is considered incomplete, especially in urban areas. Modern home appliances have made our life more comfortable and easier than ever. In metro cities and big towns such household appliances are regarded as a boon, as they are instrumental in cutting down the time involved in most of the domestic chores.

STATEMENT OF THE PROBLEM

Household appliances are inevitable in this mechanized world. Most of the womenfolk are having dual role. In order to fulfil the needs of the modern world, more and more companies started to manufacture different household appliances to satisfy the needs of the customers. One can find different brands for each and every household appliance. Understanding consumer behaviour is never simple, because customers may say one thing but do another. They may not be in touch with their deeper motivations and they may respond to influences and change their minds at the last minute. Companies find different strategies to compete with their own competitors and to increase market share. Studying consumer's preference will be useful to companies manufacturing household appliances.

OBJECTIVES OF THE STUDY

- To study the profile of consumers in the study area and analyse their pre-purchasing and post- purchasing behaviour.
- To evaluate the factors, influencing buying decision.
- To assess the level of satisfaction of the consumers of the study area on product and service related factors.

METHODOLOGY

The study has been conducted among 100 individual investors in the kattumannar Kovil Taluk. The sample investors were selected by adopting the convenience sampling method. For compilation of data, questionnaire comprising two parts, namely, part A and part B were developed. In the first part questions relating to demographic characteristics of the consumers were included. In part B, questions pertaining to

consumer's preferences and level of satisfaction and motivational factors of the consumers on the performance of select household appliances were included.

Data Analysis and Interpatation

The demographic characteristics of the consumers in the kattumannar Kovil Taluk are presented in Table:1

TABLE: 1

SL. No	Demographic Variables		No. of Respondents (100)	Percentage (%)
1	Gender	Male	63	63.0
		Female	37	37.0
2	Age (In years)	Below 25 years	8	8.0
		26 to 35 years	57	57.0
		36 to 45 years	26	26.0
		Above 46 years	9	9.0
3	Educational status	Illiterate	21	21.0
		High School/H.S.C	4	4.0
		Degree	24	24.0
		PG Degree	29	29.0
		Diploma/ITI/Others	22	22.0
4	Occupational status	Farmer	19	19.0
		Businessman	8	8.0
		Home maker	10	10.0
		Student	4	4.0
		Government Employed	13	13.0
		Private Employed	25	25.0
		Professional	8	8.0
		Others	13	13.0
5	Monthly Income	Below 10000	35	35.0
		10001 to 20000	31	31.0
		20001 to 30000	17	17.0
		30001 to 40000	12	12.0
		Above 40000	5	5.0
6	Marital status	Married	62	62.0
		Unmarried	38	38.0

Source: Primary Data.

The above table itself is self-explanatory.

The above table shows that out of the 100 sample respondents (1) 63 per cent of them belong to male category; (2) 57 per cent of the respondents fall in the age group of 26-35 years; (3) A considerable number of consumers (29) have Post Graduate level educational qualification; (4) 25 per cent of them are private employed; (5) 39 percent of the individual investors fall in the monthly income group of below Rs.10,000 and (6) majority of them (62 per cent) are married.

A number of home appliances and branded are available in the markets. Even though the authors had listed out ten home appliances in the questionnaire and asked the consumers. To revel in which of them, they had parked their hard earned money. The responses of the consumers have been in the following Table.

TABLE: 2

Appliances	No. of Respondents
Television	25
Refrigerator	52
Washing Machine	29
Air Conditioner	40

DVD Player/Home Theater	62
Micro Wave Oven	27
Mixie	73
Wet Grinder	41
Electric Cooker	47
Fan	68

Source: Primary Data.
Notes: Figures in brackets indicate the percentages to total sample.
Figures without brackets indicate the number of respondents unless otherwise specifically mentioned.

From the above table it is crystal clear that out of the 100 individual investors, 25 per cent of the respondents are having sony brand televisions,52 per cent of the respondents are having LG brand refrigerators, 29 per cent of the respondents are having whirlpool brand washing machines. 40 per cent of the respondents have preferred LG brand air conditioners. The majority (62 per cent) of the respondents is having sunny brand DVD players/Home Theater, 24 percent of the respondents are having IFB brand microwave ovens. The majority (73 per cent) of the respondents is having Preethi brand mixes, 41 per cent of the respondents are having Laxmi brand wet Grinders. 47 per cent of the respondents are having Prestige brand Electric cookers. The majority (60 per cent) of the respondents is having Usha brand fans.

The authors had listed ten Factors namely Price, Quality, Durability, Safety, Convenience, Comfort, Seasonal Discount, By Aid Household Members, Design and Style, Replacement Value in the questionnaire to know which might have motivated the sample respondents to purchasing household appliances. The responses have been given in the following Table.

TABLE: 3

Ranking of Motivational Factors										
Motivational Factors	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Price	13	29	21	4	15	14	4	0	0	0
Quality	48	30	8	0	14	0	0	0	0	0
Durability	0	0	10	23	8	4	21	12	14	8
Safety	22	10	32	23	9	0	0	4	0	0
Convenience	12	8	5	4	22	20	5	10	0	14
Comfort	0	18	2	12	8	32	8	0	16	4
Seasonal Discount	0	0	4	0	12	16	36	9	6	17
To Aid Household Members	0	0	14	8	0	0	16	27	16	19
Design and Style	5	0	4	26	0	10	4	21	30	0
Replacement Value	0	5	0	0	12	4	6	22	13	38

Source: Primary Data.

Out of the 100 sample investors, 48 respondents have been motivated by the factor "Quality" to prefer a particular appliance. Similarly 22, 13, 12 respondents have been motivated by the factors and also have been given much weightage by the consumers are "Safety", "Price", "Convenience". The remaining factors "Durability", "Comfort", "Seasonal Discount", "To Aid Household Members" have motivated the sample respondents to some extent only. They have not been seriously considered by the respondents. It is to be noted here that the factors "Design and Style" and "Replacement Value" have not been given much weight by the sample respondents.

The researcher has included some statements for assessing the level of satisfaction of the consumers. The factor scores regarding the level of satisfaction are given in Table.

TABLE: 4

Factors	Level of Satisfaction				
	Highly Satisfied	Satisfied	Neither Satisfied Nor Dissatisfied	Dissatisfied	Highly Dissatisfied
Quality	40 (40.0)	60 (60.0)	0	0	0
Price	31 (31.0)	40 (40.0)	29 (29.0)	0	0
Colour	31 (31.0)	40 (40.0)	21 (21.0)	0	0
Design	44 (44.0)	39 (39.0)	17 (17.0)	0	0
Durability	10 (10.0)	62 (62.0)	16 (16.0)	12 (12.0)	0
After Sales Services	4 (4.0)	37 (37.0)	21 (21.0)	24 (24.0)	14 (14.0)
Guarantee and Warrantee	47 (47.0)	39 (39.0)	14 (14.0)	0	0
Advertisement	23 (23.0)	42 (42.0)	27 (27.0)	4 (4.0)	4 (4.0)
Brand	58 (58.0)	37 (37.0)	5 (5.0)	0	0
Information Provided by People	4 (4.0)	32 (32.0)	56 (56.0)	8 (8.0)	0

Source: Primary Data.

The table depicts that majority of the consumers have the satisfaction (when the responses under the heads "Satisfied" and "Highly Satisfied" are put together) with the factors 'Quality' (100.0 per cent), ' Price', 'Colour' (71.0 per cent), 'Design' (83.0 per cent), 'After Sales Services' (41.0 per cent), 'Guarantee and Warrantee' (86.0 per cent), 'Advertisement' (65.0 per cent), 'Brand' (95.0 per cent), 'Information Provided by People' (36.0 per cent). 29.0 per cent, 21.0 per cent, 17.0 per cent, 16.0 per cent, 21.0 per cent, 14.0 per cent, 27.0 per cent, 5.0 per cent, 56.0 per cent, of the consumers have expressed that they neither satisfied nor dissatisfied with factors are Price, Colour, Design, Durability, After Sales Services, Guarantee and Warrantee, Advertisement, Brand, Information Provided by People. But the majority of the consumers (38.0 per cent) has expressed that they have disagreed with the factor 'After Sales Services'.

How did you come to know about that brand of household appliances in the following Table.

TABLE: 5

	No. of Respondents	Percentage (%)
Sales People	19	19.0
Dealers	4	4.0
Self Experience	26	26.0
Television	21	21.0
Friend, Colleagues and Relatives	22	22.0
Magazines and Newspapers	8	8.0
Total	**100**	**100.0**

Source: Primary Data.

Out of the 100 sample respondents 26.0 per cent of them have come to know about the household appliances their Self Experience, 22.0 per cent of the consumers expressed that they have come to know about investment avenue through their Friend, Colleagues and Relatives, 21.0 per cent of the mentioned that they have come to know through Television advertisements, 19.0 per cent of the consumer asserted that they have come to know through the Sales People, 8.0 per cent of the respondents stated that they have come to know through Magazines and Newspapers, 4.0 per cent of the consumer stated that they have come to know through Dealers. It is concluded that around 26.0 per cent of the consumers have come to know about the household appliances through the Self Experience.

From your point of view which of the following is the best medium to popularize a particular brand. The answers for those questions have been tabulated below.

TABLE: 6

	No. of Respondents	Percentage (%)
Television	69	69.0
Radio	05	5.0
Newspapers	13	13.0
Others	13	13.0
Total	**100**	**100.0**

Source: Primary Data.

From the above table it is crystal clear that the majority (69 per cent) of the respondents has come to know about the household appliances through television.

From whom did you purchase your household appliances. The answers to those questions have been tabulated below.

TABLE: 7

	No. of Respondents	Percentage (%)
Dealers	37	37.0
Company Show Rooms	26	26.0
Any Other Stores	37	37.0
Total	**100**	**100.0**

Source: Primary Data.

Out of the 100 respondents, 37 per cent consumers have purchased their household appliances through dealers and any other stores.26.0 per cent of the respondents have purchased through company show rooms.

Did you consider all other competitive brands before purchasing that particular brand. The answers for those questions have been tabulated below.

TABLE: 8

	No. of Respondents	Percentage (%)
Yes	58	58.0
No	42	42.0
Total	**100**	**100.0**

Source: Primary Data.

Out of the 100 sample respondents, 58 per cent of the consumers have considered all brands before selecting a particular brand and 42 per cent of the respondents have not considered all the brands before selecting a particular brand.

Mention the mode of payment for purchase of household appliances. The responses have been given in the following Table.

TABLE: 9

	No. of Respondents	Percentage (%)
Cash Basis	57	57.0
Instalment	22	22.0
Credit Cards	13	13.0
Debit Cards	8	8.0
Total	**100**	**100.0**

Source: Primary Data.

The majority of the sample respondents (57.0 per cent) have preferred cash basis as the mode of payment for the household appliances purchased by them.

Did you make a through analysis before purchasing that particular household item. The answers for those questions have been tabulated below.

TABLE:10

	No. of Respondents	Percentage (%)
Yes	73	73.0
No	27	27.0
Total	**100**	**100.0**

Source: Primary Data.

From the above table it is crystal clear that the majority of the consumers 73.0 per cent of the respondents have made through analysis before purchasing the household appliances.

How many dealers did you approach before purchase particular appliances. The responses have been given in the following Table.

TABLE: 11

	No. of Respondents	Percentage (%)
1 Dealer	44	44.0
2-3 Dealers	43	43.0
4-6 Dealers	13	13.0
Total	**100**	**100.0**

Source: Primary Data.

The above table reveals that out of the 100 respondents, 44.0 per cent of the consumers have approached 1 dealers and 43.0 per cent of the consumers have approached 2-3 dealers before purchasing a particular brand of household appliances.

Before purchasing the appliances how many brands did you compare respondents is presented in the following Table.

TABLE: 12

	No. of Respondents	Percentage (%)
1 Brand	21	21.0
2-4 Brands	57	57.0
5-7 Brands	04	4.0
More than 7 Brands	18	18.0
Total	**100**	**100.0**

Source: Primary Data.

Out of the 57 respondents have stated that they have compared 2-4 brands before purchasing a particular brand of household appliances.

While purchasing the household appliances for which of the followings did you give importance is presented in the following Table.

TABLE: 13

	No. of Respondents	Percentage (%)
Price	12	12.0
Quality	44	44.0
Design	04	4.0
ISI Mark	09	9.0
Brand Name	08	8.0
Guarantee and Warrantee	23	23.0
Total	**100**	**100.0**

Source: Primary Data.

Out of the 100 sample respondents44. 0 per cent of the consumers are purchasing the house appliances to consider 'Quality' of the product.

FINDINGS

- The above table shows that out of the 100 sample respondents (1) 63 per cent of them belong to male category; (2) 57 per cent of the respondents fall in the age group of 26-35 years; (3) A considerable number of consumers (29) have Post Graduate level educational qualification; (4) 25 per cent of them are private employed; (5) 39 percent of the individual investors fall in the monthly income group of below Rs.10, 000 and (6) majority of them (62 per cent) are married.

- Out of the 100 individual investors, 25 per cent of the respondents are having Sony brand televisions, 52 per cent of the respondents are having LG brand refrigerators, 29 per cent of the respondents are having whirlpool brand washing machines. 40 per cent of the respondents have preferred LG brand air conditioners. The majority (62 per cent) of the respondents is having sony brand DVD players/Home Theater, 24 per cent of the respondents are having IFB brand microwave ovens. The majority (73 per cent) of the respondents is having Preethi brand mixes, 41 per cent of the respondents are having Laxmi brand wet Grinders. 47 per cent of the respondents are having Prestige brand Electric cookers. The majority (60 per cent) of the respondents is having Usha brand fans.

- Out of the 100 sample investors, 48 respondents have been motivated by the factor "Quality" to prefer a particular appliance. Similarly 22, 13, 12 respondents have been motivated by the factors and also have been given much weightage by the consumers are "Safety", "Price", "Convenience". The remaining factors "Durability", "Comfort", "Seasonal Discount", "To Aid Household Members" have motivated the sample respondents to some extent only. They have not been seriously considered by the respondents. It is to be noted here that the factors "Design and Style" and "Replacement Value" have not been given much weight by the sample respondents.

- The table depicts that majority of the consumers have the satisfaction (when the responses under the heads "Satisfied" and "Highly Satisfied" are put together) with the factors 'Quality' (100.0 per cent), ' Price', 'Colour' (71.0 per cent), 'Design' (83.0 per cent), 'After Sales Services' (41.0 per cent), 'Guarantee and Warrantee' (86.0 per cent), 'Advertisement' (65.0 per cent), 'Brand' (95.0 per cent), 'Information Provided by People' (36.0 per cent). 29.0 per cent, 21.0 per cent, 17.0 per cent, 16.0 per cent, 21.0 per cent, 14.0 per cent, 27.0 per cent, 5.0 per cent, 56.0 per cent, of the consumers have expressed that they neither satisfied nor dissatisfied with factors are Price, Colour, Design, Durability, After Sales Services, Guarantee and Warrantee, Advertisement, Brand, Information Provided by People. But the majority of the consumers (38.0 per cent) has expressed that they have disagreed with the factor 'After Sales Services'.

- Around 26.0 per cent of the consumers have come to know about the household appliances through the Self Experience.
- From the above table it is crystal clear that the majority (69 per cent) of the respondents has come to know about the household appliances through television.

- Out of the 100 respondents, 37 per cent consumers have purchased their household appliances through dealers and any other stores.26.0 per cent of the respondents have purchased through company show rooms.
- Out of the 100 sample respondents, 58 per cent of the consumers have considered all brands before selecting a particular brand and 42 per cent of the respondents have not considered all the brands before selecting a particular brand.

- The majority of the sample respondents (57.0 per cent) have preferred cash basis as the mode of payment for the household appliances purchased by them.
- From the above table it is crystal clear that the majority of the consumers 73.0 per cent of the respondents have made through analysis before purchasing the household appliances.

- The above table reveals that out of the 100 respondents, 44.0 per cent of the consumers have approached 1 dealer and 43.0 per cent of the consumers have approached 2-3 dealers before purchasing a particular brand of household appliances.

- Out of the 57 respondents have stated that they have compared 2-4 brands before purchasing a particular brand of household appliances.
- Out of the 100 sample respondents44. 0 per cent of the consumers are purchasing the house appliances to consider 'Quality' of the product.

CONCLUSION

In the modern, fast moving world, household appliances play a vital role. In this regard, marketers of household appliances should consider the conditions of environment and also the ever changing needs and tastes of consumers. Hence the household appliance manufacturers before producing the household appliances have to give considerable attention to pre-purchase and post- purchase behaviour and perception of the consumers. Besides these, the advertisements published by the household appliance manufacturers should give the true picture about their products. Not only that the manufacturers of these essential appliances whether they are producing white goods or brown goods should give much importance for other sales service also. By this they can retain their consumers and create brand loyalty.

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A STUDY OF THE DIFFERENCE OF LEADERSHIP STYLES OF ZUARI CEMENTS LIMITED

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***Abstract:** This paper attempts to study the differences in the leadership styles asperceived by the leaders and sub-ordinates in a public-sector enterprise. The study has revealed that differences do exist in different leadership styles - authoritarian, participative, bureaucratic, task-oriented and nurturant, as perceived by the leader himself and perceived by the subordinates in Zuari Cements Limited (ZCL). Inthis paper, the authors made an attempt to identify the differences in leadership styles as perceived by the leaders and subordinates in ZCL.*

Introduction

The essentials of leadership are the same to all leaders in all positions due to the variation in the skills required, roles played, functions performed, issues tackled and the relationships promoted, different leaders have different perceptions of leadership. And, several attributes have been made both for the success and failure of leadership in the form of properties and processes or traits and styles of leaders. Further, even these attributes cannot provide a totally satisfactory guidance for the success of leadership. Hence, theoreticians and practitioners of leadership have developed the 'contingency approach'.

Concept of Leadership

The word 'leader' stems from the root *leden* meaning 'to travel' or 'show the way'. It has been derived from the verb "to lead." This also implies "to advance," "to expel," "to stand out," to guide and govern the actions of others. A leader is a person who leads a group of followers. The common characteristic that can be found in many of the definitions of Leadership is the 'influence' exerted by the leader. That is, he tries to influence the behaviour of others in a specific direction.

Leadership is a process of influencing the behaviour, beliefs and feelings of the members of a group. The functions of leadership however, cover wide range of activities like coordinating, decision-making, policymaking, group representing, controlling, arbitrating, etc. Leadership, not being a single phenomenon, is affected by many variables and involves several skills like technical, human, conceptual, designing, creative, communicative and decision making. The main aspect of influencing people by a leader is the power, which has many sources. The leadership effectiveness covers the personality of leader, past experience, expectations of superiors, the characteristics of subordinates, the requirements of the task, and the organisational climate and policies.

Twentieth century has witnessed several theories on leadership which is a complex concept having a bearing on motivation, morale, organizational climate, human relations, and communication. The ability to influence people in a group is indispensable in organizations. Beginning with scientific management the evolutionary process of leadership can be traced with three theories viz., trait theory, behavioural theory and contingency theory. The trait theory has been put to rigorous research by Byrd, Jennings, Gheselli, Stogdill etc., and resulted in the development of behavioral theory. Likert's system 4 theory, McGregor x and y theory, Continuum theory of Tannenbaum and Schmidt, etc. has opened new vistas on the behavioural dimensions of leadership. The confusion and controversy of trait and behavioural theories have given way to the contingency models of leadership like Fiedler's contingency model, Vroom and Yetton contingency model, path goal theory, life cycle theory, tri-dimensional model, learning model, etc.

REVIEW OF LITERATURE

Several studies made by different authors in both theoretical and empirical spheres of Leadership.Various definitions and concepts of leadership have been reviewed by a number of scholars including Morris and Seeman; Shartle; Carter; Gibb and Bass. From such syntheses the leadership has been defined as an initiation of structure; a locus of group processes; as an art of inducing compliance; as an exercise of influence; as an actor behaviour; as a goal achievement; as an effect of interaction; as a differentiated role, and as a personality and its effects.

Weschler, Kahane and Tannenbaum (1952) studied employees in a naval research laboratory. They found that 63.3 per cent of the members of the division headed by the permissive leader were 'well satisfied' with their job, whereas 39.3 per cent of the members of the division headed by the restrictive leader were 'well satisfied' with their job. In addition, the employees' perceptions of morale in their immediate work group, the division, and the laboratory were considerably higher in the permissively run division than in the restrictively run division.

McCurely and Eber (1953) studied groups composed of authoritarian and democratic subjects. Their leaders were coached in either democratic or authoritarian patterns of behavior. Authoritarian groups were somewhat more effective than the democratic groups in speed of problem solving on a group made, although the differences were not significant.

Spector and Suttell found no difference in group performance under democratic and autocratic leadership.

Calvin, Hoffmann and Harden (1957) conducted a series of three group problem solving experiments, comparing democratic and authoritarian leadership styles. They found that no consistent trend emerged in favour of either style. However, their less intelligent subjects performed better under authoritarian leaders, while the more intelligent ones did a shade better under democratic leaders.

Fox (1957) explored the effects of participative, and autocratic leadership styles (he called these as 'positive' and 'negative' styles) on member satisfaction in conference groups. The participative style created more permissive atmosphere, greater member satisfaction with the leader, and easier acceptance of group decisions, as compared to 'negative' or authoritarian leadership style.

Mullen (1965) compared the leadership styles of managers in three divisions of a large automobile insurance company, and its relationship to each division's efficiency and effectiveness. Each manager showed a distinct leadership style: one was democratic, another laissez faire, and the third was authoritarian. It was concluded that all three divisions were operating at an equally high rate of efficiency. Measures of effectiveness did not show any difference between divisions.

Thiagarajan and Deep (1970) found that authoritarian leaders as more influential than the persuasive, and the persuasive more than participative.

Verma (1977) constructed a Likert type scale to measure authoritarian (F), nurturant-task (NT) and participative (P) styles of student leaders and found the coefficient of correlation between F and NT, NT and P and F and P was 0.31, 0.39, and 0.11 respectively.

Kalra (1980)has studied the pattern of styles of 70 managers and has found that most of the managers have their leadership behaviour guided by the situations in their organizations.

Sinha (1980)in his study lists out three types of leadership styles as 1.Participative. 2. Authoritarian and 3. Nurturant-task leadership.

Omer Bin Sayeed (1990) attempted to examine conflict handling strategies, leadership behaviour and leadership styles (relationship and task-motivated styles) in a common framework.

Syed Vazith Hussain (2002) made an attempt to analyse different leadership styles in small scale industries at micro level. The decision making styles are identified by him are: Style I Benevolent autocrat; Style II Strict autocrat; Style III Prior consultation; Style IV Democratic style and Style V Delegation.

Need of the Study : From the foregoing studies, it can be said that the success and failure of any organization is attributed to the effectiveness of leadership. Thus, the leadership has become indispensable and managers are to be replaced by leaders, despite the argument that leadership is dispensable by another school of thought. As such, the topic of leadership has occasioned research studieswithout limit, and new dimensions are added to leadership theory and practice. The present study attempts to analyze different styles of leadership and its perceptions by their subordinates.

Objectives of the Study:To identify the differences in leadership styles as perceived by the leaders in the ZCL; to find out the differences in leadership styles as perceived by the subordinates; and to find out the differences in leadership styles as perceived by the leaders and the subordinates in the ZCL.

Hypotheses:

(i) There is no significant difference in the leadership styles at the inter levels.

(ii) There is no significant difference in the leadership stylesin the inter levels as perceived by their subordinates.

(iii) There is no significant difference in the leadership styles as perceived by the leader himself and those perceived by his subordinates.

Methodology of the Study:

The study is mainly based on primary data collected. The present study confines itself to Higher, Middle and lower hierarchical levels in ZCL. Theleadership styles were measured as judged by the leader himself (Leader's Self Perception). For the analyses of leadership styles of the Higher and Middle level employees, the leader's self perception was used. Five Leadership Styles as judged by the leader himself viz., Authoritarian, Participative, Bureaucratic, Task-Oriented and Nurturant leadership styles were used. The total sample for the study consists of 168 officers of ZCL. Many studies have been undertaken on leadership styles adopted in different organizations. But relatively only a few attempts have been made to study the leadership styles in ZCL.

Analysis

The analysis of the difference between leadership styles as judged by leader himself and as judged by his subordinates of different levels of employees of ZCL.

The leader's self perception and the subordinate's perception on superior styles reveals about the leadership styles of Top Management, Middle Management and Junior Management of ZCL.Scores on five leadership styles viz., authoritarian, participative, bureaucratic, task-orientation and nurturant were computed from both leader's evaluation of ones own style and subordinates perception on superior's styles.

With a view to find out difference between leadership style of a superior, as judged by the superior himself and as judged by his immediate subordinates, the analysis was done at three levels viz., Top Management, Middle Management and Junior Management. Firstly, for the Top Management level the leader self perception scores were juxtaposed with the average score on subordinates (Middle Management) perception on superior style. Secondly, for the Middle Management level the leader self perception scores were juxtaposed with the average score on subordinates (Junior Management) perception on superior style. Thirdly, for the Junior Management level the leader self perception scores were juxtaposed with the average score on subordinates (Clerks) perception on superior style. For all this 't' test was used to find out the significant difference between the leaders self perception and as perceived by their subordinates.

A. The difference between leadership styles of Top Managements self perception and as perceived by their subordinates of ZCL.

Table 1

Mean, Standard Deviation and 't' values for five Leadership Styles of Top Management as judged by leader himself and as judged by his subordinates of ZCL

S.No.	Leadership Styles	Self judgement			Judged by his subordinates			't' value
		Mean	N	Standard Deviation	Mean	N	Standard Deviation	
1	Authoritarian (A)	22.444	9	4.773	17.204	49	4.449	0.011
2	Participative (P)	24.111	9	1.269	22.204	49	3.247	0.005
3	Bureaucratic	26.667	9	2.784	22.082	49	3.829	0.001

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	(B)							
4	Task-orientation (T)	25.778	9	3.420	23.673	49	3.112	0.115
5	Nurturant (N)	25.556	9	3.321	23.673	49	3.986	0.124

Source: Compiled from field survey

Table 1 presents the difference between leadership styles as judged by the leader himself and as judged by his immediate subordinates of Top Management of ZCL. Mean values of authoritarian, participative, bureaucratic, task-orientation and nurturant styles are higher in self judgement of Top Management than judged by his subordinates. In authoritarian, participative, bureaucratic, task-orientation and nurturant styles of the Top Management self judgement and as judged by his immediate subordinates do not differ significantly as the 't' values of these styles are less than the critical value (A0.011,P<0.05; P0.005, P<0.05; B0.001, P<0.05; T0.115, P<0.05 and N0.124, P<0.05). Hence, the hypothesis of "there is no significant difference in leadership styles of employees of ZCL as judged by leader himself and as judged by his subordinates" is accepted.

A. The difference between leadership styles of Middle Management self perception and as perceived by their subordinates of ZCL.

Table 2

Mean, Standard Deviation and 't' values for five Leadership Styles of Middle Management as judged by leader himself and as judged by his subordinates of ZCL

S.No.	Leadership Styles	Self judgement			Judged by his subordinates			't' value
		Mean	N	Standard Deviation	Mean	N	Standard Deviation	
1	Authoritarian (A)	19.878	49	3.522	16.05	40	5.063	0.001
2	Participative (P)	24.204	49	3.391	23.025	40	4.172	0.154
3	Bureaucratic (B)	23.265	49	5.179	26	40	2.792	0.002
4	Task-orientation (T)	26.000	49	2.492	24.15	40	3.512	0.007
5	Nurturant (N)	25.347	49	3.212	23.325	40	4.002	0.012

Source: Compiled from field survey

Table 2 presents the difference between leadership styles as judged by the leader himself and as judged by his immediate subordinates of Middle Management of ZCL. Mean values of authoritarian, participative, task-orientation and nurturant styles are higher in self judgement of Middle Management than judged by his subordinates whereas mean values of bureaucratic style is higher in judged by Middle Management subordinates than self judgement. In authoritarian, participative, bureaucratic, task-orientation and nurturant styles of the Middle Management self judgement and as judged by his immediate subordinates do not differ significantly as the 't' values of these styles are less than the critical value (A0.001,P<0.05; P0.154, P<0.05; B0.002, P<0.05; T0.007, P<0.05 and N0.012, P<0.05).Hence, the hypothesis of "there is no significant difference in leadership styles of employees of ZCL as judged by leader himself and as judged by his subordinates" is accepted.

A. The difference between leadership styles of Junior Management self perception and as perceived by their subordinates of ZCL.

Table 3

Mean, Standard Deviation and 't' values for five Leadership Styles of Junior Management as judged by leader himself and as judged by his subordinates of ZCL

S.No.	Leadership Styles	Self judgement			Judged by his subordinates			't' value
		Mean	N	Standard Deviation	Mean	N	Standard Deviation	
1	Authoritarian (A)	21.200	40	4.937	18.03	202	4.361	0.001
2	Participative (P)	25.575	40	3.637	22.520	202	3.923	0.001
3	Bureaucratic (B)	23.250	40	3.888	23.426	202	4.423	0.806
4	Task-orientation (T)	26.325	40	2.401	23.020	202	3.007	0.001
5	Nurturant (N)	27.375	40	2.250	23.257	202	3.080	0.001

Source: Compiled from field survey

Table 3 presents the difference between leadership styles as judged by the leader himself and as judged by his immediate subordinates of Junior Management of ZCL. Mean values of authoritarian, participative, bureaucratic, task-orientation and nurturant styles are higher in self judgement of Junior Management than judged by his subordinates. In authoritarian, participative, bureaucratic, task-orientation and nurturant styles of the Junior Management self judgement and as judged by his immediate subordinates do not differ significantly as the 't' values of these styles are less than the critical value (A0.001,P<0.05; P0.001, P<0.05; B0.806, P<0.05; T0.001, P<0.05

and N0.001, P<0.05). Hence, the hypothesis of "there is no significant difference in leadership styles of employees of ZCL as judged by leader himself and as judged by his subordinates" is accepted.

Findings:

No significant difference is found in leadership styles at Higher, Middle, Lower Level Managers as judged by leader himself and as judged by his immediate subordinates in ZCL.

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Woody species diversity of Melkalpoondi Sacred Grove in Tittakudi Taluk of Cuddalore District, Tamil Nadu

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Abstract: **Sacred groves are ecologically and genetically very important. They possess a great diverse gene pool of many forest species having religious attachment and medicinal values. The present study was conducted in Melkalpoondi, Tittakudi taluk of Cuddalore district, Tamil Nadu, South India. The study aimed at documenting the plant wealth and diversity. Many sacred groves constitute pristine vegetation, and are particularly rich in climax vegetation with riched flora and fauna. This paper deals with the woody plant diversity in the Melkalpoondi sacred grove. A survey was conducted to record the species richness and diversity of woody species such as trees and lianas. This grove is dedicated to Kayilpirantha Aiyanar with an area of over 9 hectares and is situated in the Tittakudi taluk of Cuddalore district, Tamil Nadu, South India. About 46 woody plant species representing 40 genera and 29 families exist in this grove. Of these, 30 species were trees and 16 species were lianas. The dominant families are Mimosaceae (6 species), Fabaceae (4 species), Capparaceae (3 species) and Moraceae (3 species). Apocynaceae, Ebenaceae, Loganiaceae, Rubiaceae and Rutaceae have 2 species in each respectively. Alangiaceae, Anacardiaceae, Arecaceae, Asclepiadaceae, Boraginaceae, Caesalpiniaceae, Celastraceae, Combretaceae, Convolvulaceae, Cucurbitaceae, Meliaceae, Menispermaceae, Myrtaceae, Oleaceae, Salvadoraceae, Santalaceae, Sapotaceae, Simaroubaceae, Verbenaceae and Vitaceae have only one species in each of the families.Density, species richness and diversity of trees were recorded for the detailed study of plant diversity. The vegetation types indicate that this grove is to be considered as of the inland tropical deciduous forest type.**

Keywords: **Melkalpoondi, sacred groves, plant biodiversity, conservation, cultural tradition.**

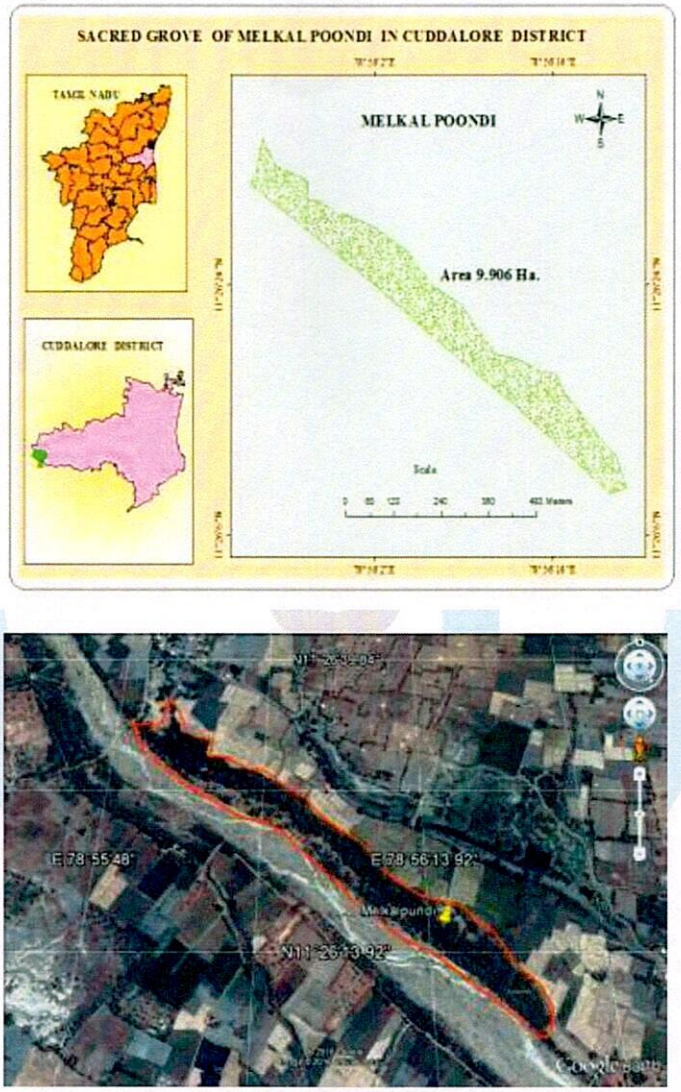
INTRODUCTION

Ancient societies such as those of Greece, Rome, Asia and Africa had long practiced preserving patches of forests in their original state due to the belief that they were the abodes of gods and goddesses (Gadgil and Vartak, 1975). Sacred groves may be defined as patches of climax vegetation protected on religious grounds and buttressed by cultural mores. Fortunately, in many parts of the world, including India, there are many patches of pristine forests which have been preserved in their original state due to the prevalence of religious beliefs and social customs. These patches of forests are known as sacred groves and are considered to be the abode of ancestral deities and village gods. The names of the sacred groves vary from place to place in various regions of the country (Malhotra *et al*., 2001). These groves are the repositories of varied biodiversity and thus play an important role in its conservation (Amirthalingm, 2012). The important role played by the sacred groves in preserving biodiversity has long been recognized (Khan *et al.*2008). Sacred groves are thus veritable natural museums of rare medicinal plants, balancers of the watershed, a gene bank of economic species and a laboratory for environmentalists (Vartak and Kumbhojakar, 1984; Amirthalingam, 1998; Ramanujam, 2000; Sukumaran and Raj,2010). These sacred groves are kept in a state of good preservation as pockets of native species of plants, animals, insects and micro-organisms. Hence it is necessary to make a detailed study of the Melkalpoondi sacred grove and its plant diversity.

METHODOLOGY

Study Area

Plate 1: Base map and Google earth photo of Melkalpoondi sacred grove



The present study conducted in Melkalpoondi sacred grove which is an inland Tropical Dry Evergreen Forest type which is situated in Tittakudi taluk of Cuddalore district, Tamil Nadu, South India. The total area of the grove is 9.90 hectares. It lies between the latitude 11°26'16.07"N and longitude 78°56'14.89"E. Lord Aiyanar is the main deity who is worshipped in the grove. The grove also accommodates various other minor deities like Lord Akashakaruppu, Muthukarupaiya and Kannimargal. The practice of *pooja* is existing in the grove. Statues of elephant and horses in various forms and sizes can been seen in the grove. In the month of Chithirai (April - May) and Vaikasi (June-July) a nine day festival is organized jointly by the Kelkalpoondi, Melakalpoondi and Vadakarampoondi villagers. The custom of ear piercing and head tonsuring for children is also carried out in the grove. Animals such as goats and fowls are sacrificed to the subordinate deities and lemons and pumpkins are offered to the main deity in the grove (Plate 2).

METHODS

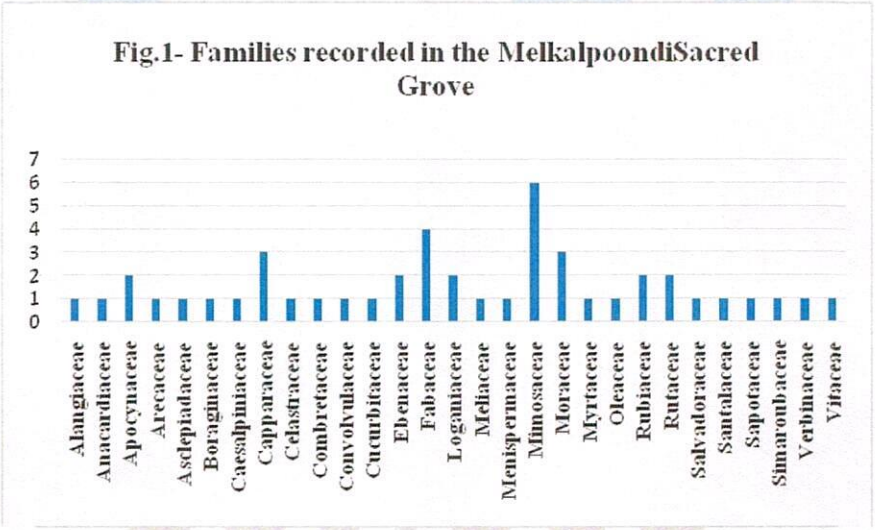
Floristic composition of the grove was analysed during the periodic field visits attempted over different seasons. In this grove, the size of one hectare plot was laid and data collected accordingly. The study plot was further divided into sub-grids of 10 x 10m size to facilitate the inventory. During the inventory, all trees ≥ 10cm girth at breast height (gbh) were measured at 1.5m from ground level and the lianas ≥ 1cm diameter were measured at 1.3 m from the rooting point. Voucher specimens were collected for all the species, methodically processed and identified using regional floras (Gamble and Fischer, 1915–1935; Hooker, 1872–1897; Matthew, 1991) and confirmed with the herbarium repository in the Department of Plant Biology and Plant Biotechnology,

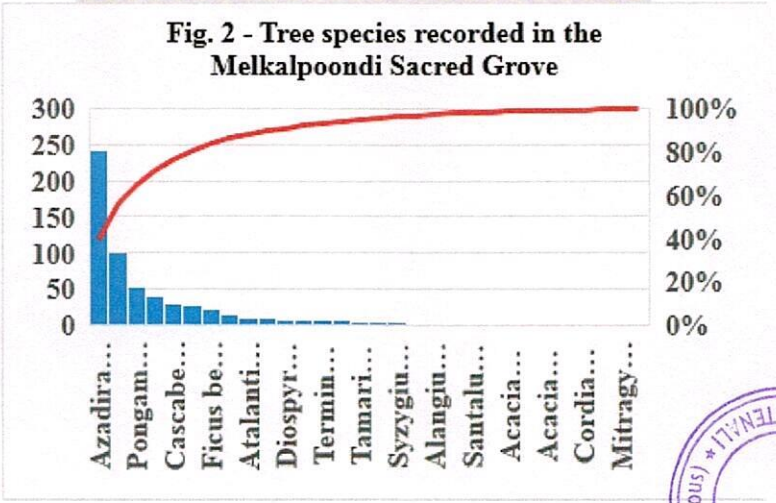
Presidency College, Chennai. The following Diversity indices such as Shannon (H'), Simpson (D) and Fisher's alpha were calculated as per Magurran (2004). Species Importance Value Indices (IVI)was calculated as per Mori *et al.* (1983). A modified Family Importance Value (FIV) was calculated by summing up the relative diversity (number of species in the family/total number of species × 100) and relative density of the individuals (Mori *etal.*, 1983) as it gives the relative contribution of the species to the stand structure.

RESULTS

FLORISTIC ANALYSIS OF MELKALPOONDI SACRED GROVES

In this grove, 46 woody plant species representing 40 genera and 29 families exist (Fig.1). Of these, 30 species are trees (Fig.2) and 16 species are lianas (Fig.3), (Table 1 & 2). The dominant families are Mimosaceae (6 species), Fabaceae (4 species), Capparaceae (3 species) and Moraceae(3 species). Apocynaceae, Ebenaceae, Loganiaceae, Rubiaceae and Rutaceae have 2 species in each respectively. Alangiaceae, Anacardiaceae, Arecaceae, Asclepiadaceae, Boraginaceae, Caesalpiniaceae, Celastraceae, Combretaceae, Convolvulaceae, Cucurbitaceae, Meliaceae, Menispermaceae, Myrtaceae, Oleaceae, Salvadoraceae, Santalaceae, Sapotaceae, Simaroubaceae, Verbenaceae and Vitaceae have only one species in each of the families.





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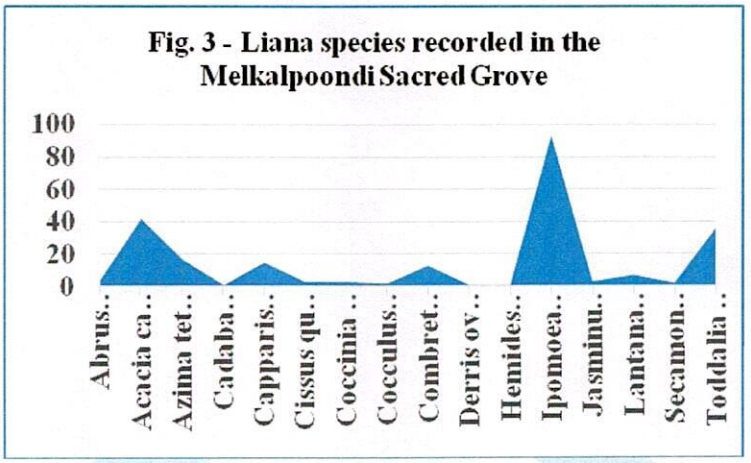

DIVERSITY ANALYSIS

Shannon (H') index for the tree and liana species was 0.71 and the Alpha index was 10.4. This shows more dominant species with almost equal contributions among 857 individuals. The Simpson (1/D) index was 8.3 and the Berger-Parker dominance (1/d) index was 3.5 which are indicating a good diversity in the grove. Hill's number (H1) index for the tree and liana species was 73.25 (Table 1).

Table -1 : Summary of woody species at Melkalpoondi sacred grove

Variables	Number / Value (Number of individuals)
Species richness	46
Number of the Genera	40
Number of families	29
Number of tree species	30 (614)
Number of liana species	16 (243)
Density (ha^{-1})	857
Average tree girth	65.31
Average liana girth	8.22
Diversity indices	
Shannon H' Log Base 10.	1.182
Shannon Hmax Log Base 10.	1.663
Shannon J'	0.711
Alpha	10.404
Simpsons Diversity (D)	0.12
Simpsons Diversity (1/D)	8.322
Berger-Parker Dominance (d)	0.284
Berger-Parker Dominance (1/d)	3.527
Berger-Parker Dominance (d%)	28.355
Hill's Number H0	46
Hill's Number H1	73.257

PHYTOSOCIOLOGY AND COMMUNITY STRUCTURE

SPECIES RICHNESS

The grove has a stand density of 857 ha^{-1}. It is distinctly dominated by *Diospyros montana*, *Ficusreligiosa*, *Borassus flabellifer*, *Santalum album*, *Acacia leucophloea*, *Secamone emetica*, *Cassine glauca*, *Ficus benghalensis*, *Strychnos potatorum*, *Madhuca longifolia*, *Acacia planifrons* and *Acacia nilotica* (Table -2).

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GIRTH CLASS AND STAND DENSITY

The largest GBH observed was *Ficus religiosa* (540.2 cm), followed by *Madhuca longifolia* (510.2 cm), *Terminalia arjuna* (440.8 cm) and *Syzygium cumini* (426.8 cm). Tree species belonging to 31 to 60 cm gbh class percentage was represented by 241 individuals in the grove; 61 to 90 cm gbh was represented by 160 individuals, 10 to 30 cm gbh was represented by 128 individuals and above 91 cm gbh by 85 individuals (Fig. 4).

GBH dominant liana species was *Toddalia asiatica* (40.3 cm) followed by *Ipomoea staphylina* (40.2 cm), *Secamone emetica* (26.6 cm), *Acacia caesia* (20.2 cm) and *Cappariszeylanica* (18.3 cm). Liana species belonging to 3.1 to 5 cm gbh were represented by 113 individuals followed by 5 to 10 cm gbh with 87 individuals and the lowest gbh11 to 15 cm was of 43 individuals (Fig. 5).

Fig. 4: GBH of dominant trees in Kaiyilpirandha Ayyanar grove in Melkalpoondi

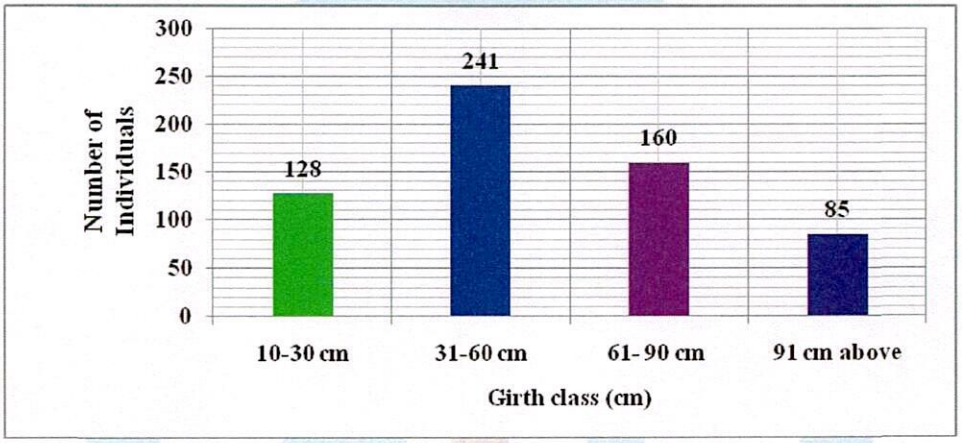
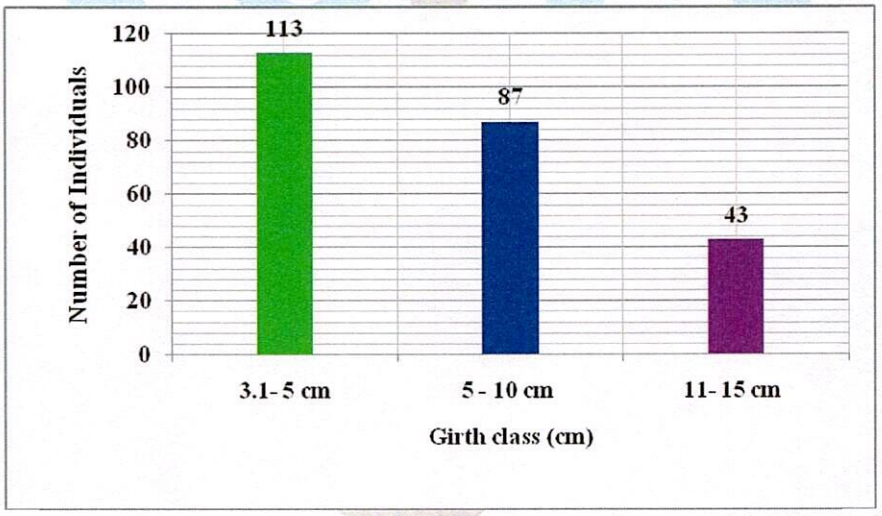


Fig. 5: GBH of dominant lianas in Kaiyilpirandha Ayyanar grove in Melkalpoondi



BASAL AREA OF WOODY SPECIES STANDS

The basal area was 38.8325 m2 ha-1 in the area under study. *Madhuca longifolia* had the largest share in the stand basal area (8.3214 m2 ha-^{1}), followed by *Azadirachtaindca* (6.3295 m2 ha-^{1}), *Borassus flabellifer* (6.0612 m2 ha-^{1}), *Terminalia arjuna* (4.6829 m2 ha-^{1}), *Syzygium cumini* (3.68 m2 ha-^{1}) and *Ficusreligiosa* (2.3234 m2 ha-^{1}). The lowest basal area was represented by *Ailanthus excels* (0.0106 m2 ha-1) (Table -2).

IMPORTANT VALUE INDEX

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Dominant Important Value Index (IVI) was maximum for *Azadirachtaindca* (IVI =63.8947), followed by *Borassus flabellifer* (IVI = 34.4824), *Madhuca longifolia* (IVI =25.9640), *Ipomoea staphylina* (IVI = 19.9825), *Pongamiapinnata* (IVI =17.3530) and *Terminalia arjuna* (IVI = 14.6482). The IVI was minimum for *Derris ovalifolia* (IVI = 0.3701) (Table -2).

Table -2 : Phytosociology of woody species at Melkalpoondi sacred grove

S.No	Botanical name	Count	BA	RBA	RD	RF	IVI
1	*Abrusprecatorius* L.	4	0.0009	0.0023	0.4667	0.7595	1.2285
2	*Acacia leucophloea* (Roxb.) Willd.	1	0.0604	0.1555	0.1167	0.2532	0.5254
3	*Acacia planifrons* Wight &Arn.	1	0.0338	0.0872	0.1167	0.2532	0.4570
4	*Acacia caesia* (L.) Willd.	42	0.0238	0.0612	4.9008	4.8101	9.7722
5	*Acacia nilotica* (L.) Delile	1	0.0594	0.1531	0.1167	0.2532	0.5229
6	*Ailanthus excels* Roxb.	3	0.0106	0.0273	0.3501	0.7595	1.1369
7	*Alangium salviifolium* (L. f.) Wangerin	3	0.0463	0.1191	0.3501	0.7595	1.2287
8	*Albizia lebbeck* (L.) Benth.	7	0.3880	0.9992	0.8168	1.7722	3.5882
9	*Atalantiamonophylla* DC.	10	0.1072	0.2761	1.1669	1.5190	2.9619
10	*Azadirachtaindica* A. Juss.	243	6.3295	16.2995	28.3547	19.2405	63.8947
11	*Azima tetracantha* Lam.	17	0.0085	0.0220	1.9837	3.2911	5.2968
12	*Borassus flabellifer* L.	101	6.0612	15.6085	11.7853	7.0886	34.4824
13	*Cadabafruticosa* (L.) Druce	1	0.0002	0.0006	0.1167	0.2532	0.3704
14	*Cappariszeylanica* L.	15	0.0094	0.0242	1.7503	3.2911	5.0656
15	*Cascabelathevetia* (L.) Lippold	30	0.2162	0.5569	3.5006	4.0506	8.1081
16	*Cassine glauca* (Rottb.) Kuntze	1	0.0073	0.0187	0.1167	0.2532	0.3886
17	*Cissus quadrangularis* L.	3	0.0009	0.0024	0.3501	0.5063	0.8587
18	*Coccinia grandis* (L.) Voigt	3	0.0012	0.0030	0.3501	0.7595	1.1126
19	*Cocculushirsutus* (L.) W.Theob.	2	0.0006	0.0016	0.2334	0.5063	0.7413
20	*Combretumalbidum* G. Don.	13	0.0078	0.0200	1.5169	1.7722	3.3091
21	*CordiaobloqiaWilld.*	1	0.0368	0.0948	0.1167	0.2532	0.4647
22	*Crateva magna* (Lour.) DC	10	0.2379	0.6126	1.1669	1.7722	3.5516
23	*Derris ovalifolia* (Wight &Arn.) Benth.	1	0.0001	0.0003	0.1167	0.2532	0.3701
24	*Diospyrosebenum* J. Koeng. Ex Retz.	3	0.0411	0.1059	0.3501	0.5063	0.9623
25	*Diospyros montana* Roxb.	8	0.1033	0.2660	0.9335	1.5190	2.7184
26	*Ficusreligiosa* L.	1	2.3234	5.9831	0.1167	0.2532	6.3529
27	*Ficus benghalensis* L.	21	1.5787	4.0654	2.4504	0.5063	7.0222

28	*Hemidesmusindicus* (L.) R. Br. ex Schult.	1	0.0002	0.0006	0.1167	0.2532	0.3704
29	*Ipomoea staphylina*Roem. &Schult.	93	0.1048	0.2699	10.8518	8.8608	19.9825
30	*Jasminumangustifolium* (L.) Willd.	3	0.0008	0.0021	0.3501	0.7595	1.1116
31	*Lannea coromandelica* (Houtt.) Merr.	2	0.0449	0.1156	0.2334	0.2532	0.6021
32	*Lantana camara* L.	7	0.0028	0.0071	0.8168	0.7595	1.5834
33	*Madhucalongifolia*(J.Koenig ex L.) J.F.Macbr.	15	8.3214	21.4289	1.7503	2.7848	25.9640
34	*Mitragyna parvifolia* (Roxb.) Korth.	1	0.0409	0.1054	0.1167	0.2532	0.4753
35	*Morindapubescens* J.E. Smith	6	0.0169	0.0435	0.7001	1.0127	1.7562
36	*Pongamiapinnata*(L.) Pierre	53	1.5844	4.0801	6.1844	7.0886	17.3530
37	*Prosopisjuliflora*(Sw.) Dc.	40	0.2047	0.5272	4.6674	6.8354	12.0301
38	*Santalum album* L.	3	0.0216	0.0556	0.3501	0.2532	0.6588
39	*Secamone emetica* (Retz.) R. Br. ex Schult.	2	0.0059	0.0153	0.2334	0.5063	0.7550
40	*Streblus asper* Lour.	4	0.0279	0.0718	0.4667	0.7595	1.2981
41	*Strychnos nux-vomica* L.	28	1.2950	3.3347	3.2672	4.0506	10.6526
42	*Strychnos potatorum* L. f.	1	0.0503	0.1296	0.1167	0.2532	0.4994
43	*Syzygium cumini* (L.) Skeels	4	3.6810	9.4793	0.4667	1.0127	10.9587
44	*Tamarindus indica* L.	5	1.0275	2.6459	0.5834	0.7595	3.9888
45	*Terminalia arjuna* (Roxb.ex DC.) Wt.&Arn	7	4.6829	12.0592	0.8168	1.7722	14.6482
46	*Toddalia asiatica* (L.) Lam.	36	0.0241	0.0621	4.2007	4.5570	8.8197
	Total	**857**	**38.8325**	**100**	**100**	**100**	**300**

BA=Basal Area, RBA = Relative basal area, RD=Relative density, RF =Relative frequency, IVI=Importance value index.

VEGETATION PROFILE

Diospyros montana, *Ficus religiosa*, *Borassus flabellifer*, *Santalum album*, *Acacia leucophloea*, *Secamone emetica*, *Cassine glauca*, *Ficus benghalensis* and *Strychnos potatorum* were the dominant and medium size trees observed here. Tree species like *Ficusreligiosa*, followed by *Madhuca longifolia*, *Terminalia arjuna* and *Syzygium cumini* were present as the upper canopy
level trees in the grove. Slightly short trees such as *Azadirachta indica*, *Ipomoea staphylina* and *Prosopis juliflora* were sparsely distributed in the grove.

DISTURBANCE ANALYSIS

As this grove is situated near by the river Vellar, there has been an uncontrolled encroachment observed. The local people have laid illegal pipelines from the river to fetch water. They have also constructed many concrete pump sheds within the

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grove. Furthermore, they are also cutting the trees and branches in order to lay electricity lines for the purpose of agriculture. Hence necessary action needs to be taken to rectify their illegal activities and to protect the grove.

DISCUSSION

The Tropical Deciduous Forest (TDF) sites scattered along the Coromandel coast of India are invariably protected as sacred forests in which different researches have been carried out on plant biodiversity by the researchers including Meher Homji, 1986; Ramujam and Kadamban (2001), Parthasarathy and Karthikeyan, 1997; Mani and Parthasarathy (2007). However, there is no complete documentation and research on the social and biodiversity values till date. To fulfill this scientific gap, the present study has been carried out in ten inland sacred groves from Cuddalore and Villupuram districts of Tamil Nadu.

The present study has enumerated a total of 46woody plant species representing 40 genera distributed in 29 families. Of these, 30 species are trees and 16 species are lianas, (Table 2). The dominant families are Mimosaceae (6 species), Fabaceae (4 species), Capparaceae (3 species) and Moraceae (3 species). This is closer to the value from India at comparable 1-ha scale.

The total basal area is 38.8325 m2 ha-1 in the study area. *Madhuca longifolia* has the largest share in stand basal area (8.3214 m2 ha-^{1}), followed by *Azadirachta indca* (6.3295 m2 ha-^{1}), *Borassus flabellifer* (6.0612 m2 ha-^{1}), *Terminalia arjuna* (4.6829 m2 ha-^{1}), *Syzygium cumini* (3.68 m2 ha-^{1}) and *Ficus religiosa* (2.3234 m2 ha-^{1}). The lowest basal area was represented by *Ailanthus excels* (0.0106 m2 ha-1). This is closer to the tree diversity (stem ≥ 10 cm gbh) ranged from a low value of 26.3±6.7 with a range from 18-37 species per hectare in TDEF, India (Vivek and Parthasarathy, 2015), Similarly, the mean stands 21±5.5 with a range from 12 - 33 species per ha from Cuddalore and Villupuram districts (Karthik*et al*. 2016) to a higher value of 51.2 ± 9.5 species per ha with a range from 42-66 in the Southern Eastern Ghats (Rao *et al*., 2011) were recorded.

A total of 46woody plant species representing 40 genera distributed in 29 families are enumerated on one hectare. Scale recorded is significant (Table 2). There are 30 in woody speciesand 16 are lianas. The dominant families are Mimosaceae (6 species), Fabaceae (4 species), Capparaceae (3 species) and Moraceae (3 species). Apocynaceae, Ebenaceae, Loganiaceae, Rubiaceae and Rutaceae have 2 species in each respectively. Alangiaceae, Anacardiaceae, Arecaceae, Asclepiadaceae, Boraginaceae, Caesalpiniaceae, Celastraceae, Combretaceae, Convolvulaceae, Cucurbitaceae, Meliaceae, Menispermaceae, Myrtaceae, Oleaceae, Salvadoraceae, Santalaceae, Sapotaceae, Simaroubaceae, Verbenaceae and Vitaceae have only one species in each of the families.

As far as vegetation analysis is concerned, it indicates that the stand density of the grove is ranging from 117 to 285 stems per hectare. It is far below the 1663 stems ha-1 recorded for Shanmuganathapuram which is a nearby sacred grove (Mani and Parthasarathy2007).

Based on the data, the patchy vegetation of the grove has a mixture of Bravi-deciduous and Tropical Dry Evergreen trees forming an apparently two layered forest. *Albiziaamara*, *Prosopisjuliflora*, *Azadirachtaindica, Cascabelathevetia* and *Wrightiat inctoria*are dominant and medium size trees. Tree species like *Tamarindus indica* and *Ficus religiosa* are present as the upper canopy trees in the grove. Slightly short trees such as *Prosopis juliflora*, *Albizia amara*, and *Cascabela thevetia*are sparsely distributed in the grove. This kind of two layered structure is a special type of formation confined only to the south-east coast of India and north-east part of Sri Lanka (Rao and Meher-Homji1993).

CONCLUSION

The analysis showed that the stand density and tree diversity of the grove is on the lower side when compared to the other inland Tropical Dry Evergreen Forest type groves of this area. It was revealed that tree diversity varied according to the biogeography and habitat destruction. Another factor that played an important role in affecting the composition of the grove was anthropomorphic activities. The subject grove is also closely linked with the religious and cultural traditions of the local communities. The grove is also performing a very useful function in conserving the biodiversity and providing the natural habitat for various native plants and animals. However, this study has focused on a Tropical Dry Evergreen Forest as it is essential that this type of forest is to be preserved from species extinction. It is also to be noted that the sacred groves accomplish the function as repositories of genetic diversity of native trees.

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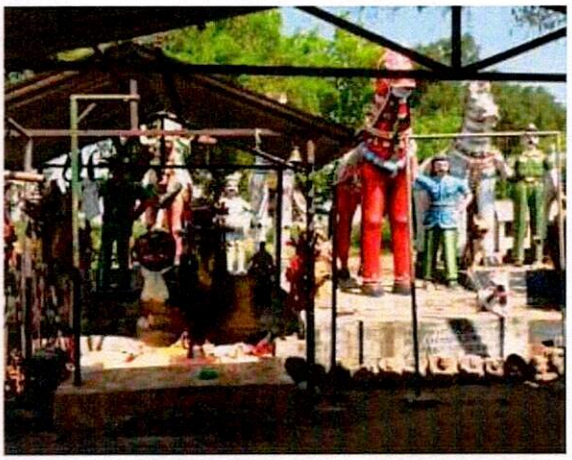
Plate:2- Scenes depicting activity in the Melkalpoondi sacred grove

Forest area cleared for laying road



Main deity of the grove

Cooking pongal inside the grove

Discussing with the poojaris about the use of NTFP

Cattle grazing inside the grove

Paddy fields in the adjoining areas of the groves

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The FM/FM/1 queue with single working vacation and set-up times

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Abstract

Using Fuzzy analysis is technique, a $FM/FM/1$ queue with single working vacation and set-up times is discussed in this paper. Then non-linear programming technique for the mean queue length, mean waiting time of a customer, server is in a set-up period and server is in a close-down period. Finally, numerically results are discussed.

AMS Subject Classification: 68M20, 90B22

Key Words and Phrases: Fuzzy single working vacation; mean queue length; mean waiting time; set-up period and close-down period

1 Introduction

During last two decades, vacation queue have been investigated extensively because of their application in computer systems, communication networks, production managing and so forth. In various vacation queue models, the server completely stops serving customers during a vacation, but many perform other supplementary jobs, proposing of various vacation polices provides more flexibility for optimal design and operation control of the system. The details can be seen in the monographs of Takagi (1991) and Tian and Zhang (2006), the surveys of Doshi (1996) and Teghem(1986).

Working vacation is a kind of semi-vacation policy and is also a new vacation policy that was first introduced by Servi and Finn (2002). Part of the service ability keeps the system operating in a lower speed rather then completely stopping

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the service during a working vacation. If service speed degenerates into zero in a working vacation, the vacation queue becomes a classical vacation queue model. Therefore the working vacation queue is the generalization of the classical vacation queue. Moreover, Kim et al (2003), Wu and Takagi (2006) generalized the work of the Servi and Finn (2002) a $M/G/1$ queue with multiple working vacation.

G.Kannadasan and N.Sathiyamoorthi (2017) investigate the $FM/FM/1$ queue with single Working vacation. They obtain some system characteristic such as the number of customer in the system in study-state, the virtual time of a customer in the system, the server is in idle period, the server is in regular busy period. G.Kannadasan, et.al (2017) also gave Analysis for the $FM/FM/1$ queue with multiple working vacation with N-Policy, using non-linear programming method. They obtain some performance measure of interest such as membership of mean queue length, mean waiting time, with N=2. K.Julia Rose Mery And T.Gokilavani (2011) investigate the performance measure of a $M^X/M/1$ multiple working vacation (MWV) queuing model in a fuzzy environment. Mary George and Jayalakshmi (2013) studied on the analysis of $G/M(n)/1/k$ queuing system with multiple exponential vacations and vacations of fuzzy length. R.Ramesh et.al (2013) constructs the membership function of the system characteristics of a batch-arrival queuing system with multiple servers, in which the batch-arrival rate and customer service rate are all fuzzy numbers.

In this paper, we investigate a $FM/FM/1$ queue with single working vacation and set-up times, if set up time equal to zero, our model becomes a $FM/FM/1$ queue with single working vacation : furthermore, if working vacation time equal zero at the same time, this model becomes as $FM/FM/1$ queue. In section 2, we describe the queue model, section 3 and 4 respectively discuss the fuzzy model with mean queue length, mean waiting time, server is in a closed-down period, the server is in a set-up period are studied in fuzzy environment. In section 5 includes numerical study about the performance measures. Finally, conclusions are gained.

2 The crisp model

We introduce the policy of single working vacation and set-up times into a classical $M/M/1$ queue with arrival rate μ_ν and service rate μ_b. The server begins a working vacation of random length V at the instants when the queue becomes empty, and vacation duration, V follows an exponential distribution with parameter θ. During a working vacation, arriving customers are served at a rate of $\mu_\nu(\mu_\nu < \mu_b)$ according to arrival order. When a vacation ends, if there are customers in the queue, the server changes service rate from μ_ν *to* μ_b, and a regular busy period starts; otherwise, the server begins a closed-down period. During a closed-down period, an arriving customer cannot be served immediately and experiences a period of set-up time, set-up duration S follows an exponential distribution with parameter α and a regular busy period starts after a set-up period. Working vacation V is a operating period in a lower speed. When the number of customers in the system is relatively few, we set a lower speed operating period and a closed-down period to economies operating cost together with serving customers; these two periods have essential differences because customers can be served in the former period and not do so in the

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latter period. Therefore, this working vacation and set-up time policy has practical significance in optimal design of the system.
We assume that inter-arrival times, service times, working vacation times and set-up times are mutually independent. In addition, the service order is First In First Out (FIFO).

$$J(t) = \begin{cases} 0, & \text{the system is in a working vacation period at time } t, \\ 1, & \text{the system is in a set-up period or closed-down period at time } t, \\ 2, & \text{the system is in a regular busy period at time } t. \end{cases}$$

Then $Q(t), J(t)$ is a Markov process with the state space:

$$\Omega = \{(0,0),(0,1)\} \cup (k,j) : k \geq 1, j = 0,1,2.$$

where state $(k,0), k \geq 0$ indicates that the system is in a working vacation period and there are k customers in the queue; state $(k,1), k \geq 1$ indicates that the system is in a set-up period and there are k customers in the queue; state $(0,1)$ indicates that the system is in a closed-down period; state $(k,2), k \geq 1$ indicates that the system is in a regular busy period.

3 The model in fuzzy environment

In this section, the arrival rate λ, service rate μ_b, arriving customers are served at a rate of μ_ν, working vacation θ are assumed to be fuzzy numbers respectively. Now

$$\bar{\lambda} = \left\{w, \mu_{\bar{\lambda}}(w); w \in S(\bar{\lambda})\right\}, \bar{\beta} = \left\{x, \mu_{\bar{b}}(x); x \in S(\bar{\beta})\right\}, \bar{\nu} = \{y, \mu_{\bar{\nu}}(y); y \in S(\bar{\nu})\}$$

and

$$\bar{\theta} = \left\{z, \mu_{\bar{\theta}}(z); z \in S(\bar{\theta})\right\}.$$

where $S(\bar{\lambda})$, $S(\bar{\beta})$, $S(\bar{\nu})$ and $S(\bar{\theta})$ are the universal sets of the arrival rate, service rate , arriving customers are served at a rate of μ_ν, and working vacation respectively. It defines $f(w,x,y,z)$ as the system performance measure related to the above defined fuzzy queuing model, which depends on the fuzzy membership function $f(\bar{\lambda},\bar{\beta},\bar{\nu},\bar{\theta})$.
Applying Zadeh's extension principle (1978) the membership function of the performance measure $f(\bar{\lambda},\bar{\beta},\bar{\nu},\bar{\theta})$ can be defined as:

$$\mu_{\bar{f}(\bar{\lambda},\bar{\beta},\bar{\nu},\bar{\theta})}(H) = \sup_{\substack{w \in S(\bar{\lambda}) \\ x \in S(\bar{\beta}) \\ y \in S(\bar{\nu}) \\ z \in S(\bar{\theta})}} \left\{\mu_{\bar{\lambda}}(w), \mu_{\bar{\beta}}(x), \mu_{\bar{\nu}}(y), \mu_{\bar{\theta}}(z)/H = f(w,x,y,z)\right\} \qquad (1)$$

If the α- cuts of $f(\bar{\lambda},\bar{\beta},\bar{\nu},\bar{\theta})$ degenerate to some fixed value then, the system performance is a crisp number. Otherwise it is a fuzzy number.
The mean queue length

$$E(Q) = \frac{\lambda}{\mu_b - \lambda} + \left[\left[\theta^3 \left(\frac{\alpha}{\alpha+\lambda}\right)^3 \left(\frac{\mu_b - \lambda}{\mu_b}\right)^2 \left(\frac{(2\mu_v - L)^4}{(2\mu_v)^2 \mu_b(\lambda+\alpha)}\right)\right]^{-1}\right.$$

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$$\times\left[\left(\frac{\theta}{\mu_b}\right)+\left(\frac{L\times(\mu_b-\lambda)-\mu_b\lambda+\lambda^2}{2\mu_v-\mu_b^2}\right)+\left(\frac{\theta.2\mu_v-L}{\lambda 2\mu_v}\frac{\mu_b-\lambda+\alpha}{(\lambda+\alpha)\mu_b}\right)\right]\left(\frac{\alpha}{\lambda+\alpha}\right)$$
$$+\frac{L}{2\mu_v-L}.\left[\frac{L-\lambda}{2\mu_v-\mu_b}+\frac{\theta.L}{2\mu_v\mu_b(2\mu_v-L)}\right]\left(\frac{\alpha}{\lambda+\alpha}\right)+\left(\frac{2\lambda-\lambda^2}{\alpha}\right)\times$$
$$\left(\frac{\theta(2\mu_v-L)}{2\mu_v-(\lambda+\alpha)}\right)\Bigg].$$

where $L=\lambda+\theta+\mu_v-\sqrt{(\lambda+\theta+\mu_v)^2-4\lambda\mu_\nu}$.

The mean waiting time

$$E(W)=\frac{1}{\mu_b-\lambda}+\frac{1}{\lambda}\Bigg[\left[\theta^3\left(\frac{\alpha}{\alpha+\lambda}\right)^3\left(\frac{\mu_b-\lambda}{\mu_b}\right)^2\left(\frac{(2\mu_v-L)^4}{(2\mu_v)^2\mu_b(\lambda+\alpha)}\right)\right]^{-1}$$
$$\times\left[\left(\frac{\theta}{\mu_b}\right)+\left(\frac{L\times(\mu_b-\lambda)-\mu_b\lambda+\lambda^2}{2\mu_v-\mu_b^2}\right)+\left(\frac{\theta.2\mu_v-L}{\lambda 2\mu_v}\frac{\mu_b-\lambda+\alpha}{(\lambda+\alpha)\mu_b}\right)\right]\left(\frac{\alpha}{\lambda+\alpha}\right)$$
$$+\frac{L}{2\mu_v-L}.\left[\frac{L-\lambda}{2\mu_v-\mu_b}+\frac{\theta.L}{2\mu_v\mu_b(2\mu_v-L)}\right]\left(\frac{\alpha}{\lambda+\alpha}\right)+\left(\frac{2\lambda-\lambda^2}{\alpha}\right)\times$$
$$\left(\frac{\theta(2\mu_v-L)}{2\mu_v-(\lambda+\alpha)}\right)\Bigg].$$

The server is in a close-down period

$$P_0=\left[\frac{1}{2\mu_v^2-2\mu_v.L}+\frac{\theta}{\lambda}+\frac{\theta}{\alpha\mu_b(\mu_b-\lambda)}+\frac{\theta\mu_b(2\mu_v+L^2-L)(\mu_b-L)}{4\mu_v^2(2\mu_b\mu_v-L)^2(\mu_b-\lambda)}\right]\times\frac{\theta}{\lambda}.$$

The server is in a set-up period

$$P_1=\left[\frac{1}{2\mu_v^2-2\mu_v.L}+\frac{\theta}{\lambda}+\frac{\theta}{\alpha\mu_b(\mu_b-\lambda)}+\frac{\theta\mu_b(2\mu_v+L^2-L)(\mu_b-L)}{4\mu_v^2(2\mu_b\mu_v-L)^2(\mu_b-\lambda)}\right]\times\left[\frac{\lambda\theta}{\alpha\mu_b-\alpha\lambda}\right.$$
$$\left.+\frac{\theta\mu_b(2\mu_v+L^2-L)(\mu_b-L)}{4\mu_v^2(2\mu_b\mu_v-L)^2(\mu_b-\lambda)}\right].$$

Under the study state condition $\rho=\dfrac{\lambda}{\mu_b}$. We obtain the membership function of some performance measure's namely the mean queue length, the mean waiting time, the server is in a close-down period and the server is in a set-up period.
For the system in terms of the membership functions are:

$$\mu_{\overline{E(L)}}(A)=\sup_{\substack{w\in S(\bar{\lambda})\\ x\in S(\bar{\beta})\\ y\in S(\bar{\nu})\\ z\in S(\bar{\theta})}}\left\{\mu_{\bar{\lambda}}(w),\mu_{\bar{\beta}}(x),\mu_{\bar{\nu}}(y),\mu_{\bar{\theta}}(z)/A\right\},\tag{2}$$

Where

$$A=\frac{w}{x-w}+\Bigg[\left[z^3\left(\frac{\alpha}{\alpha+w}\right)^3\left(\frac{x-w}{x}\right)^2\left(\frac{(2y-L)^4}{(2y)^2x(w+\alpha)}\right)\right]^{-1}$$
$$\times\left[\left(\frac{z}{x}\right)+\left(\frac{L\times(x-w)-xw+w^2}{2y-x^2}\right)+\left(\frac{2yz-L}{2wy}.\frac{x+\alpha}{(w+\alpha)x}\right)\right]\left(\frac{\alpha}{w+\alpha}\right)$$

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$$+\frac{L}{2y-L}\cdot\left[\frac{L-w}{2y-x}+\frac{z.L}{2xy(2y-L)}\right]\left(\frac{\alpha}{w+\alpha}\right)+\left(\frac{2w-w^2}{\alpha}\right)\times\left(\frac{2yz-zL}{2y-(w+\alpha)}\right)\Bigg].$$

$$\mu_{\overline{E(W)}}(B)=\sup_{\substack{w\in S(\bar{\lambda})\\ x\in S(\bar{\beta})\\ y\in S(\bar{\nu})\\ z\in S(\bar{\theta})}}\left\{\mu_{\bar{\lambda}}(w),\mu_{\bar{\beta}}(x),\mu_{\bar{\nu}}(y),\mu_{\bar{\theta}}(z)/B\right\},\tag{3}$$

Where

$$B=\frac{1}{x-w}+\frac{1}{w}\Bigg[\left[z^3\left(\frac{\alpha}{\alpha+w}\right)^3\left(\frac{x-w}{x}\right)^2\left(\frac{(2y-L)^4}{(2y)^2x(w+\alpha)}\right)\right]^{-1}$$
$$\times\left[\left(\frac{z}{x}\right)+\left(\frac{L\times(x-w)-xw+w^2}{2y-x^2}\right)+\left(\frac{2yz-L}{2wy}.\frac{x+\alpha}{(w+\alpha)x}\right)\right]\left(\frac{\alpha}{w+\alpha}\right)$$
$$+\frac{L}{2y-L}\cdot\left[\frac{L-w}{2y-x}+\frac{z.L}{2xy(2y-L)}\right]\left(\frac{\alpha}{w+\alpha}\right)+\left(\frac{2w-w^2}{\alpha}\right)\times\left(\frac{2yz-zL}{2y-(w+\alpha)}\right)\Bigg].$$

$$\mu_{\overline{P_0}}(C)=\sup_{\substack{w\in S(\bar{\lambda})\\ x\in S(\bar{\beta})\\ y\in S(\bar{\nu})\\ z\in S(\bar{\theta})}}\left\{\mu_{\bar{\lambda}}(w),\mu_{\bar{\beta}}(x),\mu_{\bar{\nu}}(y),\mu_{\bar{\theta}}(z)/C\right\},\tag{4}$$

Where

$$C=\left[\frac{1}{2y^2-2yL}+\frac{z}{w}+\frac{z}{\alpha x(x-w)}+\frac{zx(2y+L^2-L)(x-L)}{4y^2(2xy-L)^2(x-w)}\right]\times\frac{z}{w}.$$

$$\mu_{\overline{P_1}}(D)=\sup_{\substack{w\in S(\bar{\lambda})\\ x\in S(\bar{\beta})\\ y\in S(\bar{\nu})\\ z\in S(\bar{\theta})}}\left\{\mu_{\bar{\lambda}}(w),\mu_{\bar{\beta}}(x),\mu_{\bar{\nu}}(y),\mu_{\bar{\theta}}(z)/D\right\},\tag{5}$$

Where

$$D=\left[\frac{1}{2y^2-2yL}+\frac{z}{w}+\frac{z}{\alpha x(x-w)}+\frac{zx(2y+L^2-L)(x-L)}{4y^2(2xy-L)^2(x-w)}\right]\times\left(\frac{z}{w}\right)$$
$$\times\left[\frac{wz}{\alpha(x-w)}+\frac{zx(2y+L^2-L)(x-L)}{4y^2(2xy-L)^2(x-w)}\right].$$

Using the fuzzy analysis technique explain, we can find the membership of $\overline{E(L)}$, $\overline{E(W)}$, $\overline{P_0}$ and $\overline{P_1}$ as a function of the parameter α, thus the α-cut approach can be used to develop the membership function of $\overline{E(L)}$, $\overline{E(W)}$, $\overline{P_0}$ and $\overline{P_1}$.

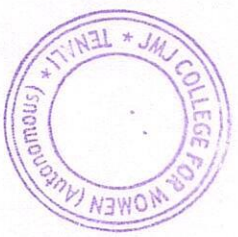
4 Performance of measure

The mean queue length

Based on Zadeh's extension Principle $\mu_{E(L)}(A)$ is the superimum of minimum over $\mu_{\bar{\lambda}}(w)$, $\mu_{\bar{\beta}}(x)$, $\mu_{\bar{\nu}}(y)$, $\mu_{\bar{\theta}}(z)\}$ to satisfying $\mu_{E(L)}(A)=\alpha$, $0<\alpha\leq 1$.

The following four cases arise:

Case$(i)\mu_{\bar{\lambda}}(w)=\alpha,\mu_{\bar{\beta}}(x)\geq\alpha,\mu_{\bar{\nu}}(y)\geq\alpha,\mu_{\bar{\theta}}(z)\geq\alpha$,



Case$(ii)\mu_{\tilde{\lambda}}(w) \geq \alpha, \mu_{\tilde{\beta}}(x) = \alpha, \mu_{\tilde{\nu}}(y) \geq \alpha, \mu_{\tilde{\theta}}(z) \geq \alpha,$
Case$(iii)\mu_{\tilde{\lambda}}(w) \geq \alpha, \mu_{\tilde{\beta}}(x) \geq \alpha, \mu_{\tilde{\nu}}(y) = \alpha, \mu_{\tilde{\theta}}(z) \geq \alpha,$
Case$(iv)\mu_{\tilde{\lambda}}(w) \geq \alpha, \mu_{\tilde{\beta}}(x) \geq \alpha, \mu_{\tilde{\nu}}(y) \geq \alpha, \mu_{\tilde{\theta}}(z) = \alpha.$

For case (i) the lower and upper bound of α- cuts of $\overline{E(L)}$ can be obtained through the corresponding parametric non-linear programs:
$[\overline{E(L)}]_{\alpha}^{L_1} = \min_{\Omega} \{[A]\}$, & $[\overline{E(L)}]_{\alpha}^{U_1} = \max_{\Omega} \{[A]\}$.

Similarly, we can calculate the lower and upper bounds of the α-cuts of $\overline{E(L)}$ for the case $(ii), (iii)$ & (iv). By considering all the cases simultaneously the lower and upper bounds of the α-cuts of $\overline{E(L)}$ can be written as:
$[\overline{E(L)}]_{\alpha}^{L} = \min_{\Omega} \{[A]\}$ & $[\overline{E(L)}]_{\alpha}^{U} = \max_{\Omega} \{[A]\}$
such that $w_{\alpha}^{L} \leq w \leq w_{\alpha}^{U}$, $x_{\alpha}^{L} \leq x \leq x_{\alpha}^{U}$, $y_{\alpha}^{L} \leq y \leq y_{\alpha}^{U}$, $z_{\alpha}^{L} \leq z \leq z_{\alpha}^{U}$.
If both $(\overline{E(L)})_{\alpha}^{L}$and $(\overline{E(L)})_{\alpha}^{U}$ are invertible with respect to α, the left and right shape function, $L(A) = [(E(L))_{\alpha}^{L}]^{-1}$ and $R(A) = [(E(L))_{\alpha}^{U}]^{-1}$ can be derived from, which the membership function $\mu_{\overline{E(L)}}(A)$ can be constructed as:

$$\mu_{\overline{E(L)}}(A) = \begin{cases} L(A), & E(L)_{\alpha=0}^{L} \leq A \leq E(L)_{\alpha=0}^{U} \\ 1, & E(L)_{\alpha=1}^{L} \leq A \leq E(L)_{\alpha=1}^{U} \\ R(A), & E(L)_{\alpha=1}^{L} \leq A \leq E(L)_{\alpha=0}^{U} . \end{cases} \tag{6}$$

In the same way as we said before we get the following results.

The mean waiting time

$$\mu_{\overline{E(W)}}(B) = \begin{cases} L(B), & E(W)_{\alpha=0}^{L} \leq B \leq E(W)_{\alpha=0}^{U} \\ 1, & E(W)_{\alpha=1}^{L} \leq B \leq E(W)_{\alpha=1}^{U} \\ R(B), & E(W)_{\alpha=1}^{L} \leq B \leq E(W)_{\alpha=0}^{U} . \end{cases} \tag{7}$$

The server is in a close-down period

$$\mu_{\overline{P_0}}(C) = \begin{cases} L(C), & (P_0)_{\alpha=0}^{L} \leq C \leq (P_0)_{\alpha=0}^{U} \\ 1, & (P_0)_{\alpha=1}^{L} \leq C \leq (P_0)_{\alpha=1}^{U} \\ R(C), & (P_0)_{\alpha=1}^{L} \leq C \leq (P_0)_{\alpha=0}^{U} . \end{cases} \tag{8}$$

The server is in a set-up period

$$\mu_{\overline{P_1}}(D) = \begin{cases} L(D), & (P_1)_{\alpha=0}^{L} \leq D \leq (P_1)_{\alpha=0}^{U} \\ 1, & (P_1)_{\alpha=1}^{L} \leq D \leq (P_1)_{\alpha=1}^{U} \\ R(D), & (P_1)_{\alpha=1}^{L} \leq D \leq (P_1)_{\alpha=0}^{U} . \end{cases} \tag{9}$$

5 Numerical study

The mean queue length
Suppose the arrival rate $\overline{\lambda}$, the service rate $\overline{\mu_b}$, arriving customers are served at a rate $\overline{\mu_\nu}$ and vacation rate $\overline{\theta}$ are assumed to be trapezoidal fuzzy numbers described

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by:
$\overline{\lambda} = [11, 12, 13, 14]$, $\overline{\mu} = [41, 42, 43, 44]$, $\overline{\nu} = [61, 62, 63, 64]$ and $\overline{\theta} = [71, 72, 73, 74]$ per hours respectively. Then:

$$\lambda(\alpha) = \min\{w \in s(\bar{\lambda}), \begin{cases} w - 11, & 11 \le w \le 12 \\ 11 \quad , & 12 \le w \le 13 \\ 14 - w, & 13 \le w \le 14 \end{cases} \ge \alpha\},$$

$$\max\{w \in s(\bar{\lambda}), \begin{cases} w - 11, & 11 \le w \le 12 \\ 11 \quad , & 12 \le w \le 13 \\ 14 - w, & 13 \le w \le 14 \end{cases} \ge \alpha\}.$$

That is., $\lambda(\alpha) = [11 + \alpha, 14 - \alpha], \mu(\alpha) = [41 + \alpha, 44 - \alpha]$,
$\nu(\alpha) = [61 + \alpha, 64 - \alpha]$ and $\theta(\alpha) = [71 + \alpha, 74 - \alpha]$.
It is clear that, when $w = w_\alpha^U$, $x = x_\alpha^U$, $y = y_\alpha^U$ & $z = z_\alpha^U$, A attains its maximum value and, when $w = w_\alpha^L, x = x_\alpha^L, y = y_\alpha^L$ & $z = z_\alpha^L$, A attains its minimum value. From the generated for the given input value of $\overline{\lambda}$, $\overline{\mu}$, $\overline{\theta}$ & $\overline{\beta}$.
i) For fixed values of w, x & y, A decreases as z increase.
ii) For fixed values of x, y & s, A decreases as w increase.
iii) For fixed values of y, z & w, A decreases as x increase.
iv) For fixed values of z, w & x, A decreases as y increase.
The smallest value of occurs, when w-takes its lower bound.
That is, $w = 11+\alpha$ and x, y and z, take their upper bounds given by $x = 44-\alpha$, *and* $y = 64 - \alpha$, and $z = 74 - \alpha$ respectively. And maximum value of $E(L)$ occurs when $w = 14 - \alpha$, $x = 41 + \alpha$, $y = 61 + \alpha$, $z = 71 + \alpha$. If both $E(L)_\alpha^L$ & $E(L)_U^\alpha$ are invertible with respect to $'\alpha'$ then, the left shape function $L(A) = [E(L)_\alpha]^{-1}$ and right shape function $R(A) = [E(L)_\alpha^L]^{-1}$ can be obtained and from which the membership function $\mu_{\overline{E(L)}}(A)$ can be constructed as:

$$\mu_{\overline{E(L)}}(A) = \begin{cases} L(A), A_1 \le A \le A_2 \\ 1, \quad A_2 \le A \le B_3 \\ R(A), A_3 \le A \le A_4 \, . \end{cases} \tag{10}$$

The values of A_1, A_2, A_3 & A_4 as obtained from (10) are:

$$\mu_{\overline{E(L)}}(A) = \begin{cases} L(A), & 0.3581 \le A \le 0.6251 \\ 1, & 0.6251 \le A \le 17.2943 \\ R(A), & 17.2943 \le A \le 23.6014 \, . \end{cases} \tag{11}$$

In the same way as we said before we get the following results.

The mean waiting time

$$\mu_{\overline{E(W)}}(B) = \begin{cases} L(B), & 0.5854 \le B \le 0.7017 \\ 1, & 0.7017 \le B \le 1.2331 \\ R(B), & 1.2331 \le B \le 1.6276 \, . \end{cases} \tag{12}$$

The server is in a close-down Period

$$\mu_{\overline{P_0}}(C) = \begin{cases} L(C), & 0.4117 \leq C \leq 0.6370 \\ 1, & 0.6370 \leq C \leq 0.7519 \\ R(C), & 0.7519 \leq C \leq 0.8932 \ . \end{cases} \tag{13}$$

The server is in a set-up Period

$$\mu_{\overline{P_1}}(D) = \begin{cases} L(D), & 0.2519 \leq D \leq 0.2974 \\ 1, & 0.2974 \leq D \leq 0.4120 \\ R(D), & 0.4120 \leq D \leq 0.5709 \ . \end{cases} \tag{14}$$

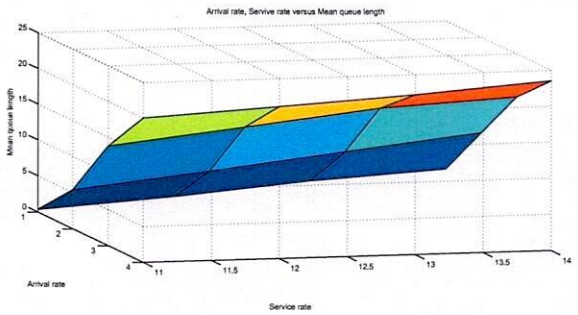

Figure 1: arrival rate, service rate versus the mean queue length

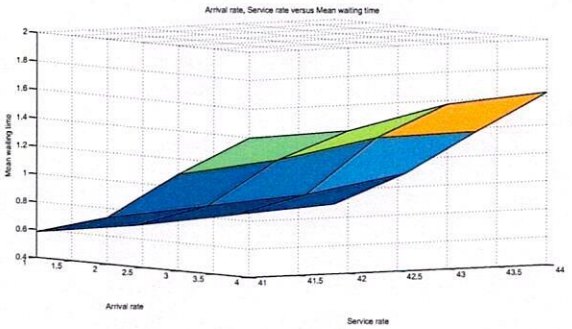

Figure 2: arrival rate, service rate versus the mean waiting time

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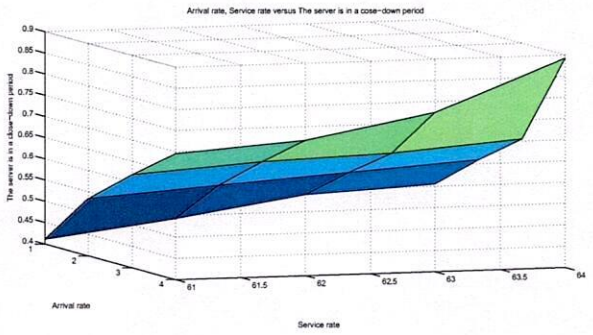

Figure 3: arrival rate, service rate versus the server is in a close-down period

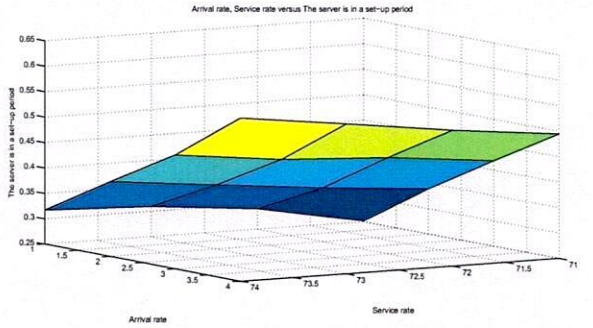

Figure 4: arrival rate, service rate versus the server is in a set-up period

Further by fixed the vacation rate by a crisp value $\bar{\theta} = 71.4$ and $\bar{\nu} = 62.7$ taking arrival rate $\overline{\lambda} = [11, 12, 13, 14]$, service rate both trapezoidal fuzzy numbers the values of the mean queue length are generated and are plotted in the figure 1. It can be observed that as $\overline{\lambda}$ increases the mean queue length increases for the fixed value of the service rate, whereas for fixed value of arrival rate, the mean queue length decreases as service rate increases. Similar conclusion can be obtained for the case $\bar{\theta} = 73.6$ and $\bar{\nu} = 63.8$. Again for fixed values of taking $\overline{\lambda} = [11, 12, 13, 14]$, the graphs of the mean waiting time are drawn in figure 2. The figure shows that as arrival rate increases the mean waiting time also increases, while the mean waiting time decreases as the service rate increases in both the case.
It is also observed from the data generated that the membership value of the mean queue length is 23 and the membership value of the mean waiting time 1.65 when the ranges of arrival rate, service rate, and the vacation rate lie in the intervals$(12, 13.4), (42, 43.4)$,
& $(61.2, 63.7)$ respectively.

6 Conclusion

In this paper, we propose a new fuzzy queue model with single working vacation and set-up times. We are discuses about the performance measure and numerical examples demonstrate the results.

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Research Article

Quantification of Pimavanserin in Bulk and Tablet Dosage Form Using A Stability Indicating High Performance Liquid Chromatographic Method

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ABSTRACT

Background: Pimavanserin, an antipsychotic agent, is used to treat patients suffering with Parkinson's disease. Till now no stability indicating reverse phase HPLC method was reported for the quantification of pimavanserin in bulk and tablet dosage form. Hence in the present study, a new sensitive, precise and accurate stability indicating reverse phase HPLC method with photodiode array detector has been developed for the quantification of pimavanserin in bulk and tablet dosage form.

Methods: Separation and analysis of pimavanserin was achieved on Kromasil C18 (5 µm, 250 mm × 4.6 mm) column using 0.1M NaH_2PO_4, methanol and acetonitrile in ratio of 55:30:15 (v/v/v) as mobile phase at 25°C. The flow rate was 1.0 ml/min. The effluents were monitored with detector set at 239 nm. The method validation was done with regard to the guidelines by the International Conference on Harmonization. Pimavanserin was subjected to acid, alkali and neutral hydrolysis, hydrogen peroxide oxidation, thermal degradation, and photo (sunlight) degradation.

Results: Linear relationship was obtained between the concentration of drug and peak area response in the range of 4.25-34.0 µg/ml. The limits of detection and quantitation were found to be 0.027 µg/ml and 0.089 µg/ml, respectively. All the validation characteristics were within the acceptance criteria. The peaks of degradation products were well resolved from the pimavanserin peak.

Conclusion: The developed and validated method is able to quantify the pimavanserin in the presence of degradation products.

Introduction

Pimavanserin is an antipsychotic drug that acts as a selective antagonist on the serotonin subtype 5-HT2A receptor subtype and 40 fold increased selectivity towards 5-HT2C receptor subtype.[1-4]

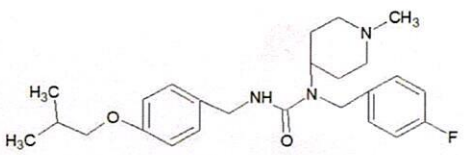

Figure 1. Chemical structure of pimavanserin

Pimavanserin has no considerable affinity or activity towards 5-HT2B or dopamine receptors. Chemically pimavanserin is described as 1-[(4-fluorophenyl) methyl]-1-(1-methylpiperidin-4-yl)-3-[[4-(2-methylpropoxy) phenyl] methyl] urea (Figure 1). United States Food and Drug Administration approved pimavanserin in 2016 for the treatment of delusions and hallucinations allied with psychosis experienced by a few patients suffering with Parkinson's disease.[5-8]

Up to date only one method based on ultra performance liquid chromatography tandem mass spectrometry has been developed for the quantification of pimavanserin and applied to routine pharmacokinetic study of pimavanserin in rats.[9]

Knowledge about the molecule's stability helps in choosing correct formulation and package plus providing appropriate storage conditions, which is vital for regulatory documentation.[10-12] For this purpose a stability indicating analytical method is necessary. The determination of pimavanserin in pharmaceutical dosage form by stability indicating high performance liquid chromatography coupled with photodiode array detector has not been reported. Hence, the current study was proposed to determine the content of pimavanserin in tablet dosage form using stability indicating HPLC method.

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Materials and Methods

Solvents and chemicals

Pimavanserin reference standard was provided kindly by Lara drugs Pvt Ltd., (Hyderabad, India). Nuplzid (Acadia Pharmaceuticals Inc., San Diego) tablets labeled to contain 17 mg of pimavanserin were obtained from a local pharmacy market. HPLC grade acetonitrile and methanol were purchased from Merck India Ltd (Mumbai, India). Analytical reagent sodium dihydrogen orthophosphate, orthophosphoric acid, hydrogen peroxide, hydrochloric acid and sodium hydroxide were supplied by Sd. Fine Chemicals Ltd (Mumbai, India). HPLC grade water was prepared using Milli-Q system (Millipore, USA).

Instrumentation

Waters Alliance HPLC system 2695 Module with a 2998 PDA detector, degasser, auto sample injector and column oven was used in the present analysis. Data acquisition and processing was done with Empower 2 software. Method development and validation was done using Kromasil, C18, 5 µm, 250 mm × 4.6 mm analytical column.

Optimized HPLC conditions

Isocratic elution was performed with a mobile phase comprised of filtered (using a 0.45 µm membrane filter) and degassed 0.1M NaH_2PO_4: methanol: acetonitrile (55:30:15, v/v/v) adjusted to pH 5 with orthophosphoric acid and pumped at a flow rate of 1.0 ml/min. The column temperature was set at 25 °C. The samples were injected at 10 µl injection volume and eluted samples were analyzed at a wavelength of 239 nm. The total runtime was 6 min.

Standard stock and working solutions

The standard stock solution (170 µg/ml) of pimavanserin was prepared by dissolving an accurately weighed 17 mg of pimavanserin reference standard in 100 ml of mobile phase. The pimavanserin working standard solutions (4.25 µg/ml, 8.5 µg/ml, 12.75 µg/ml, 17.0 µg/ml, 21.25 µg/ml, 25.5 µg/ml, 29.75 µg/ml and 34.0 µg/ml) were obtained by appropriately diluting the standard stock solution with mobile phase.

Preparation of placebo blank solution

Accurately weighed common excipients, starch (40 mg), hydroxyl cellulose (35 mg), gum acacia (35 mg), lactose (20 mg), sodium citrate (35 mg), talc (40 mg), sodium alginate (35 mg) and magnesium stearate (35 mg), were made into a homogeneous mixture. An accurately weighed (100 mg) homogeneous mixture was transferred to a 100 mL volumetric flask containing 30 mL of mobile phase. The contents of the flask were sonicated (20 min) and filtered (0.45 µm membrane filter). The filtrate was made upto to 100 mL with mobile phase.

Construction of calibration curve

Aliquots (10 µl) of pimavanserin working standard solutions were injected into the HPLC system and eluted by the mobile phase under the optimum HPLC conditions. The peak area response versus the final concentration of pimavanserin in µg/ml was plotted. On the other hand, the regression equations were derived.

Analysis of pimavanserin in tablet sample solution

Ten tablets were crushed into powder. The tablet powder weight equivalent to 17 mg of pimavanserin was transferred to 100 ml volumetric flask and sonicated with 30 ml of mobile phase for 20 min. The volume was made to 100 ml with mobile phase and filtered through 0.45 µm membrane filter. The stock tablet sample solution was then diluted aptly with mobile phase to get the final concentration of 17 µg/ml of pimavanserin. 10 µl of pimavanserin tablet sample solution (17 µg/ml) prepared was injected into the HPLC system and analyzed the developed method. The nominal content of pimavanserin in the tablet was calculated either using the calibration graph or regression equation.

Forced degradation studies

The forced degradation studies were performed through the analysis of pimavanserin tablet sample solution (17 µg/ml), which was exposed to accelerated degradation conditions as per the International Conference on Harmonization (ICH) guidelines.[13] All results were compared to a reference solution, prepared in the same day.

Acid and alkaline hydrolysis

10 ml of pimavanserin tablet sample solution was mixed with 10 ml of 0.1 N HCl (for acidic degradation acid) or 10 ml of 0.1 N NaOH (for alkaline degradation) in 100 ml volumetric flasks. The solutions were sonicated at room temperature for 30 min. After this period, the acid and alkali degraded solutions were neutralized with apt volume of 0.1 N NaOH and 0.1N HCl, respectively. The resulting solutions were diluted with mobile phase to get a concentration of 17 µg/ml, filtered and injected.

Thermal and photo degradation

10 ml of pimavanserin tablet sample solution was transferred to volumetric flask (100 ml) and exposed to 105°C for 30 min in oven (for thermal degradation) or exposed to sun light for 24 hr (for photo degradation). After the specified period of degradation, the resulting solution was diluted with mobile phase for a concentration of 17 µg/ml, filtered and injected.

Oxidative and neutral degradation

10 ml of 30% hydrogen peroxide solution (for oxidative degradation) or 10 ml of deionised water (for neutral degradation) was added into a 100 ml volumetric flask containing 10 ml pimavanserin tablet sample solution. After sonication for 30 min at room temperature, the solutions were diluted to 100 ml with mobile phase until 17 µg/ml. These solutions were filtered and injected.

Results and Discussion

Method development

Several experimental trials were performed to develop a stability indicating HPLC method for the quantification of pimavanserin in tablets. ODS C18 column (150 mm × 4.6 mm i.d., 5 µm particle size) and Kromasil C18 column (250 mm × 4.6 mm i.d., 5 µm particle size) with different temperatures were tried. Kromasil C18 column (250 mm × 4.6 mm i.d., 5 µm particle size) with 25 °C temperature was found as most suitable column, as it produced symmetrical peaks with high sensitivity within a reasonable analysis time. As a result, the same column was used. Several variations in the mobile phase composition, flow rate and pH were performed to study the possibilities for getting better system performance. 0.1M NaH_2PO_4, methanol and acetonitrile in the ratio of 55:30:15 (v/v/v) with 5.0 pH at a flow rate of 1.0 ml/min was optimal for good peak shape and fine separation in a reasonable time with good sensitivity. The detector response of pimavanserin was studied. At a wavelength of 239 nm, highest sensitivity was obtained. Hence, the same wavelength was used for the detection and analysis. The result of method optimization led to the elution of pimavanserin from the column at 3.897 min (Figure 2).

Method validation

The method validation was done according to the ICH guidelines in terms of system suitability, selectivity, specificity, linearity, sensitivity, precision, accuracy and robustness.[14]

System suitability

System suitability parameters like peak tailing, plate count, and percent relative standard deviation for retention time and peak area response were calculated to demonstrate that the HPLC system performed well. For this study, pimavanserin standard solution (17 µg/ml) was injected into the HPLC system in five replicates. The obtained values were in the acceptable limits as given in Table 1.

Selectivity

The selectivity of the method was evaluated by comparison of chromatograms of mobile phase blank, placebo blank, pimavanserin tablet sample solution (17 µg/ml) with pimavanserin standard solution (17 µg/ml). The representative chromatograms of the four samples are shown in Figure 3. No extra peak or interference peak was observed in the chromatograms of mobile phase blank, placebo blank and tablet sample solution. The retention time of pimavanserin in tablet sample solution and standard solution was same. Hence, the method is selective.

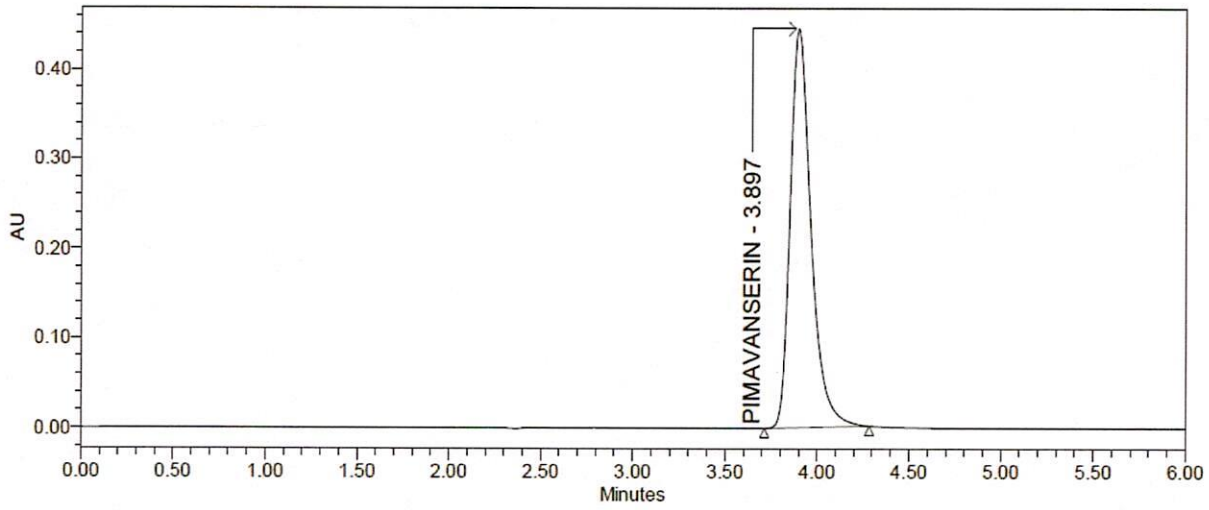

Figure 2. Chromatogram of pimavanserin after method optimization.

Table 1. System suitability parameters of the developed method for pimavanserin.

Injection No.	RT (min)	Peak area (mAU)	Plate Count	Tailing
1	3.896	4134605	5990	1.42
2	3.893	4144584	6035	1.43
3	3.891	4065286	6145	1.45
4	3.889	4165002	6111	1.44
5	3.887	4091773	6113	1.43
Mean	**3.891**	**4120250**	**6078.800**	**1.434**
%RSD	**0.090**	**0.988**	**1.053**	**0.795**
Recommended limit[15]	**RSD ≤ 2**	**RSD ≤ 2**	**> 2000**	**≤ 2**

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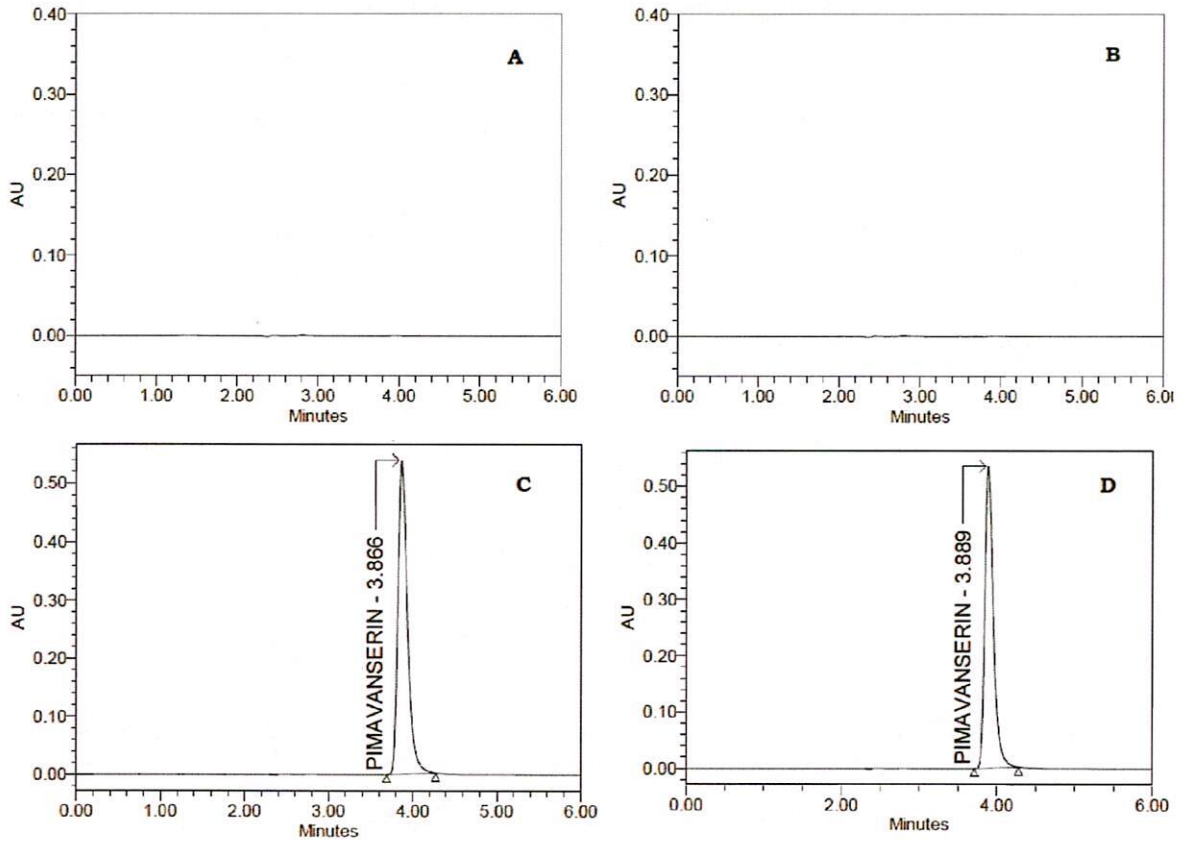

Figure 3. HPLC chromatograms of solutions of (A) mobile phase blank (B) Placebo blank (C) Pimavanserin tablet sample (D) Pimavanserin standard.

Specificity

To prove the specificity and stability indicating nature of the proposed method, forced degradation studies were done. The pimavanserin tablet sample solution was subjected to acid, base, oxidative, thermal, neutral and photo degradation. The chromatograms of pimavanserin treated with acid, base, hydrogen peroxide, heat, sun light and water are shown in Figure 4. Results of the forced degradation studies are summarized in Table 2. Peak of pimavanserin was well resolved from the degradation products produced. The obtained results indicating that the developed method could evaluate pimavanserin in presence of their degradants.

Specificity was also assessed using photodiode array detection to make sure the peak homogeneity and to evaluate peak purity in applied stress conditions for pimavanserin. For this purpose, the peak threshold value and peak purity angles were calculated using Waters empower 2 software. The peak threshold means the minimum purity value which means the peak is pure. These values are based on noise statistical analysis in spectra. If the peak purity angle value is lesser than the peak threshold value, within the noise of the system the peak is considered spectrally homogeneous. The results were shown in Table 2. The peak threshold value was greater than peak purity angle (Table 2), which confirmed the purity and homogeneity of pimavanserin peak in all the degradation conditions applied.

Table 2. Forced degradation results of pimavanserin in tablet sample.

Degradation condition	Peak area (mAU)	Percent of drug		Peak purity		Retention time of degradant
		Recovered (%)	Degraded (%)	Purity angle	Purity threshold	
Undegraded	4120250	100.00	-	-	-	-
Acidic	3597561	87.05	12.95	0.319	0.839	2.412, 2.752
Basic	3764973	91.10	8.9	0.255	0.756	2.408, 2.753
Oxidative	3592725	86.94	13.06	0.311	0.799	2.408, 2.754
Thermal	3464638	83.84	16.16	0.245	0.842	2.417, 2.758
Photo	3694840	89.41	10.59	0.305	0.801	2.407, 2.757
Neutral	3719610	90.01	9.99	0.294	0.766	2.413, 2.754

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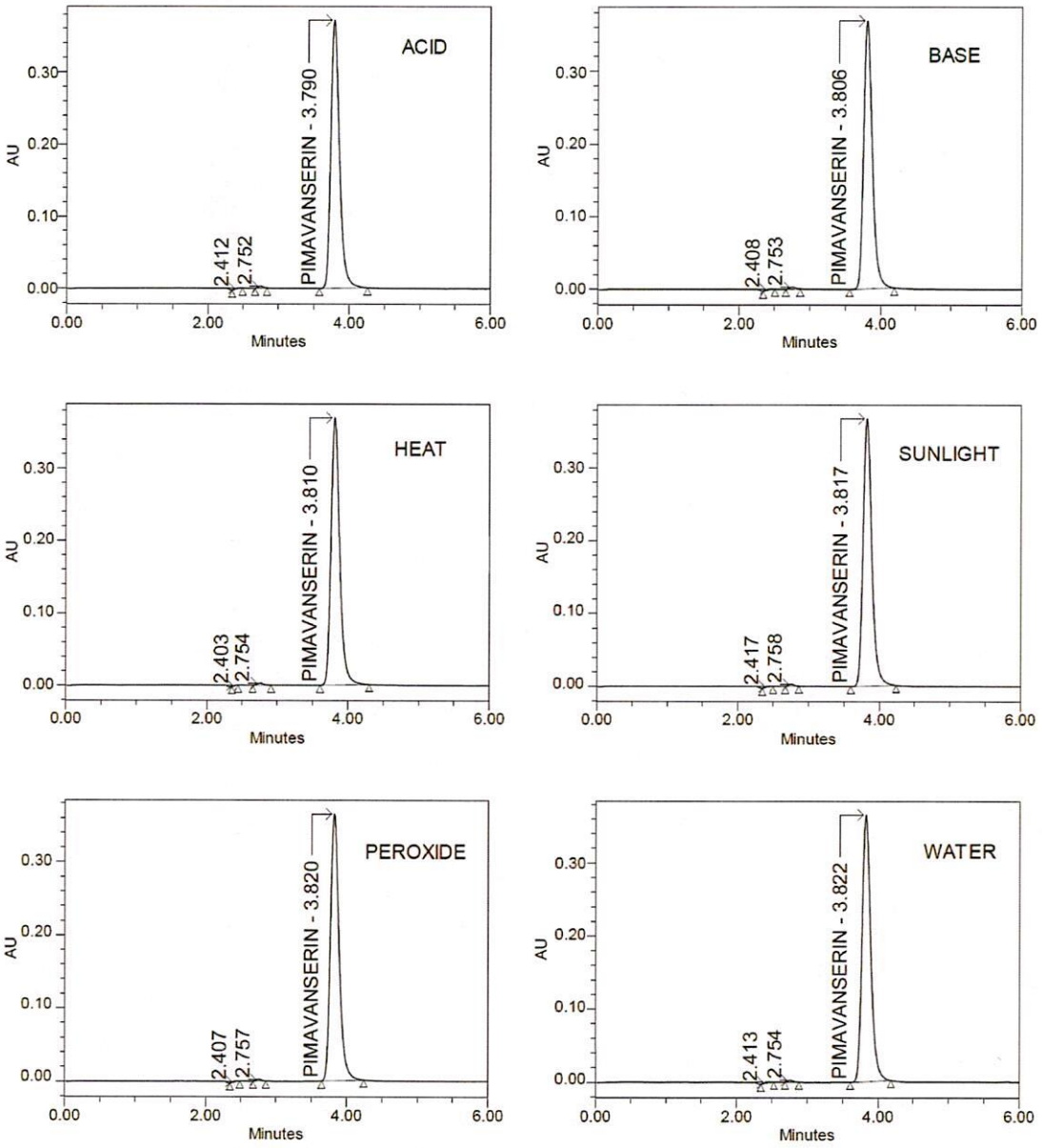

Figure 4. HPLC chromatograms of pimavanserin tablet sample solution after exposed to different forced degradation conditions.

Linearity

The calibration curve was constructed by plotting the peak area response of pimavanserin against the concentration (µg/ml). Calibration curve was linear over a range of concentration 4.25-34.0 µg/ml. Linear regression equation and regression coefficient (R^2) were y = 24239 x + 3715 and 0.9997, respectively for pimavanserin. The results showed excellent correlation exists between the peak area response and concentration.

Sensitivity

The method sensitivity was determined with respect to limit of detection (LOD) and limit of quantitation (LOQ). The LOD and LOQ for pimavanserin were assessed at a signal-to-noise ratio of 3:1 and 10:1, respectively. The determined LOD and LOQ values are 0.027 µg/ml and 0.089 µg/ml, respectively. The values showed that the sensitivity of the method was good.

Precision

The precision of the HPLC method for pimavanserin was evaluated by analyzing standard solution (17 µg/ml) six times. Percentage relative standard deviation (%RSD) of peak area response of pimavanserin was used to assess the precision. The results of precision exhibited %RSD below 2.0% (Table 3), indicating the adequate precision of the method.

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Table 3. Precision and accuracy of the method for pimavanserin.

Precision		Accuracy		
Injection No.	Peak area (mAU)	Concentration of pimavanserin (µg/ml)		Recovery (%)
		Taken	Found	
1	4122502	17	16.96	99.75
2	4129745	17	16.99	99.93
3	4123040	17	16.96	99.77
4	4127866	17	16.98	99.88
5	4127814	17	16.98	99.88
6	4124015	17	16.96	99.79
Mean	**4125830**	**-**	**16.97**	**99.83**
RSD (%)	**0.073**	**-**	**0.073**	**0.073**

Table 4. Recovery of pimavanserin by the proposed method.

Spiked level (%)	Concentration of pimavanserin (µg/ml)		Recovery (%)	Mean recovery (%)
	Spiked	Found		
50	8.5	8.48	99.81	
	8.5	8.47	99.71	99.77
	8.5	8.48	99.78	
100	17.0	16.98	99.86	
	17.0	16.97	99.81	99.86
	17.0	16.98	99.90	
150	25.5	25.46	99.83	
	25.5	25.44	99.75	99.80
	25.5	25.45	99.81	

Table 5. Robustness of the method.

Parameter varied	Plate count	Peak tailing
Column temperature - 23 °C	4458	1.30
Column temperature - 27 °C	5173	1.34
Flow rate – 0.9 ml/min	4539	1.32
Flow rate – 1.1 ml/min	5566	1.33
Mobile phase ratio (0.1 M NaH_2PO_4: methanol: acetonitrile) - 55:35:10 *v/v/v*	6010	1.41
Mobile phase ratio (0.1 M NaH_2PO_4: methanol: acetonitrile) - 55:25:20 *v/v/v*	5954	1.34
Mobile phase pH – 4.8	5973	1.48
Mobile phase pH – 5.2	5982	1.31
Detection wavelength – 237 nm	6008	1.39
Detection wavelength – 241 nm	6011	1.41
Recommended limit	> 2000	≤ 2

Accuracy

The method accuracy for pimavanserin was determined by analyzing standard solution (17 µg/ml) six times. The accuracy of the results was demonstrated by calculating the percent recovery. The results showed adequate accuracy performance for the determination of pimavanserin (Table 3).

Recovery

The newly developed HPLC method was further evaluated for its accuracy by the analysis of the placebo spiked with pure pimavanserin at three different concentration levels. Recovery of the spiked pimavanserin was determined by the proposed method thrice. The recovery values (Table 4), indicating that the developed method ensure the acquisition of reliable accurate data for pimavanserin at different concentrations.

Robustness

Method robustness was established by deliberately varying the experimental conditions such as flow rate (±0.1 ml/min), column oven temperature (± 2°C), mobile phase components ratio (±5%), pH of mobile phase (±0.2 units) and detection wavelength (±2 nm). The study was carried out on the same day with pimavanserin standard solution of concentration 17 µg/ml. In each case, plate count and peak tailing were calculated. The calculated values were within the acceptance limits (Table 5). Therefore the method is considered as robust.

Conclusion

For the first time, a stability indicating HPLC with photodiode array detector method has been developed and validated for the assay of pimavanserin in bulk and tablet dosage form. Analysis of pimavanserin in vitro by the proposed method was valid. All parameters satisfied the acceptance criteria of the ICH guidelines. The stability indicating nature of the developed method indicated that the pimavanserin could be assayed in the presence of their degradation products. Therefore, the developed and validated stability indicating method can be employed for the routine estimation of pimavanserin in quality control laboratories.

Conflict of interests

The authors claim that there is no conflict of interest.

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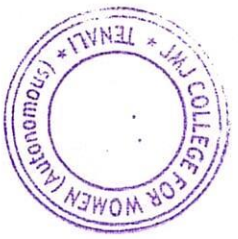

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Theoretical and Spectral Investigation of Some Schiff Bases

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ABSTRACT

Complex (experimental and computational) investigation of the spectral and conformational analysis of N^1,N^2-bis(-3-phenylallylidene)ethane-1,2-diamine based schiff bases. Assignments were made in accordance with the calculated and experimental spectra. The experimental geometry is compared with the results of theoretical calculations.

Keywords: Schiff base, N^1,N^2-bis(-3-phenylallylidene)ethane-1,2-diamine, Spectra and theoretical studies, Conformational analysis.

INTRODUCTION

Schiff bases are well-known demanding area of research due to their simple synthesis, adaptability and different range of applications. These types of chemical ligands are wide use in food industry, dye industry analytical chemistry, catalysis, fungicidal, agrochemical and biological activities [1-5], DNA cleavage activity [6], biomimetic enzyme models [7-9], tumor growth inhibitors, and ability to reversibly binding oxygen [10], liquid crystal [11,12]. Lastly, we expected to find how far experimental findings are reflected in theoretical predictions and what kind of information can be extracted from spectroscopic investigations. However, the usefulness of electronic spectroscopy in studies of tautomeric phenomena of this group of compounds can be studied [13-16]. The tools of computational chemistry have been used to investigate the chemical behavior and different reactivity parameterized of synthetic derivatives [17,18]. Chemical synthesis reactions required optimized structures of their chemical species and their transition states of synthesis reaction. The structural properties are elementary keys to understand the chemical reactivity during the potential energy surface calculations [19,20].

In present work, synthesis reaction for Schiff's base compound, using theaddition product of different aldehyde and amine components and confirm the possible conformations and structure by theoretical and spectral studies.

MATERIAL AND METHODS

Synthesis of N^1, N^2-*Bis*(3-phenylallylidene)ethane-1,2-diamine and its derivatives (3-6)

Trans-cinnamaldehyde 1a-b (0.02 mol) was mixed withethylenediamine 2a-b (0.01 mol) in ethanol and catalytic amount of Potassium hydroxide (0.01 mol, 0.39 g) was added and allowed to reflux at 75°C for 5 h. The progress of the reaction was monitored by using TLC-technique. After completion of the reaction, the condensed material was then poured into ice-cold water; the precipitate was filtered and dried, then purified with column chromatography in petroleum ether elution.

Preparation of N^1, N^2-*Bis*(3-phenylallylidene)ethane-1,2-diamine (3)

Yield 2.42 g (85%) Brown semisolid, IR (KBr): 3410, 3028, 2923, 2858, 1632, 1450 cm^{-1}; ^{1}H-NMR (500 MHz, $CDCl_3$): 8.05 (*d*, 2H, C_9 & C_{14}-H_a), 7.46 (*m*, 4H, C_2, C_6, C_{18} & C22-H_{ortho}), 7.36 (*m*, 4H, C_3, C_5, C_{19} & C_{21}-H_{meta}), 7.26 (*m*, 2H, C_4 & C_{20}-H_{para}), 6.93 (*d*, 4H, C_7 & C_{16}-H_γ), 6.89 (*d*, 4H, C_8 & C_{15}-H_β), 3.85(*d*, 4H, C_{11} & C_{12}-H); ^{13}C-NMR (125 MHz, $CDCl_3$): 164.2, 141.8, ^{135}.7, 129.1, 128.1, 127.2, 61.70. Mass *m/z*: 288 Hz.

Preparation of N^1, N^2-*Bis*(2-methyl-3-phenylallylidene)ethane-1,2-diamine (4)

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Yield 2.39 g (76%) Brown semisolid, IR (KBr): 3420, 3026, 2917, 2855, 1621, 1452 cm^{-1}; ^{1}H-NMR (500 MHz, $CDCl_3$): 7.98 (*d*, 2H, C_9& C_{14}-H_a), 7.37 (*m*, 4H, C_2, C_6, C_{18} & C22-H_{ortho}), 7.36 (*m*, 4H, C_3, C_5, C_{19} & C_{21}-H_{meta}), 7.26 (*s*, 2H, C_4& C_{20}-H_{para}), 6.78 (*s*, 4H, C_7 & C_{16}-H_7), 3.87 (*s*, 4H, C_{11}& C_{12}-H), 2.13 (*d*, 6H,*J*=1.24*Hz*, C_{23}& C_{24}-H); ^{13}C-NMR (125 MHz, $CDCl_3$): 167.6, 139.0, 138.9, 136.9, 129.4, 128.3, 127.6, 61.5, 13.2. Mass *m/z*: 317 Hz.

Preparation of *N*^{1}, *N*^{2}-*Bis(3-phenylallylidene)*propane-1,2-diamine (5)

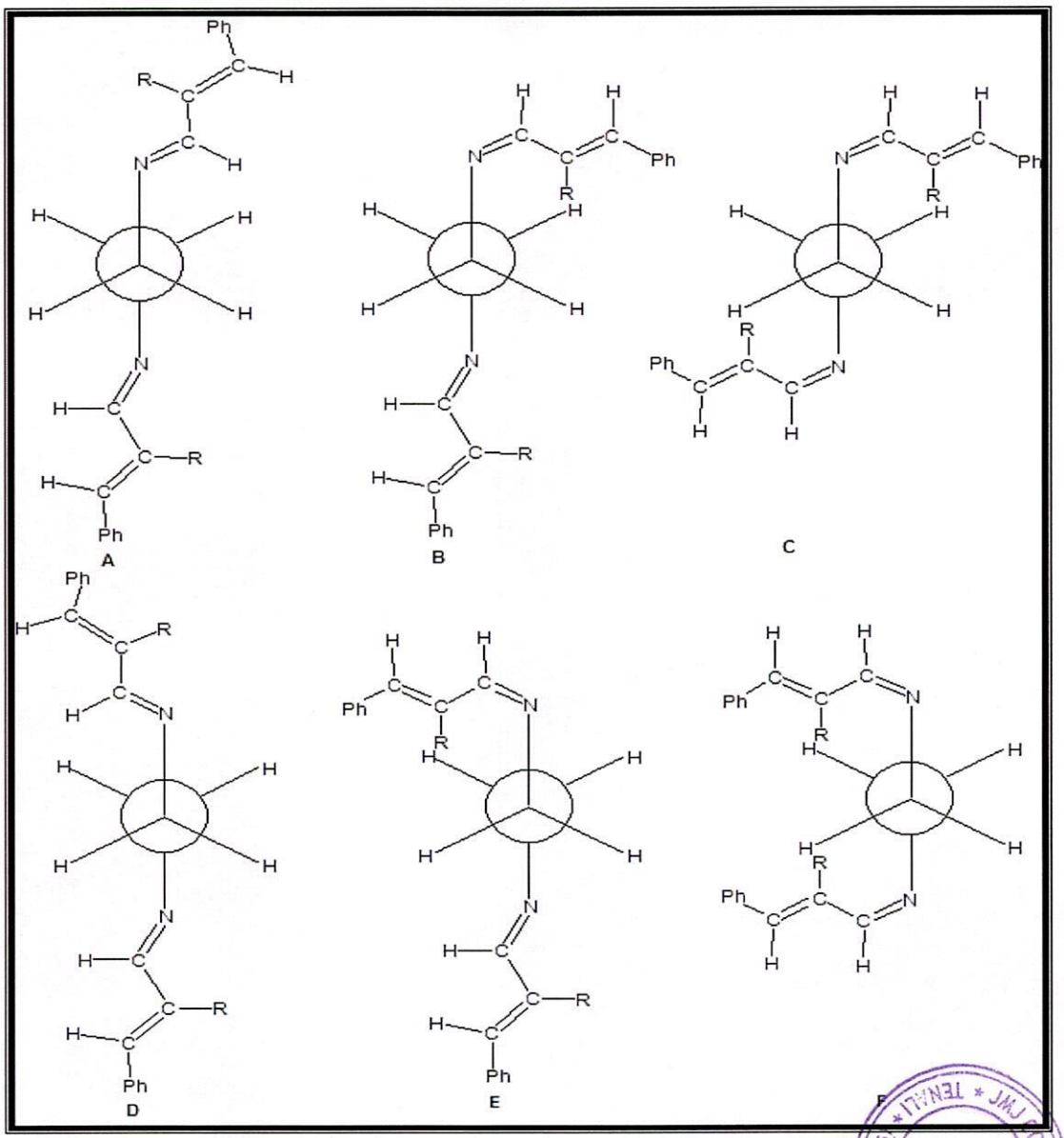
Yield 2.09 g (76%) Brown semisolid, IR (KBr): 3419, 3028, 2922, 2849, 1635, 1449 cm^{-1}; ^{1}H-NMR (500 MHz, $CDCl_3$): 8.03 (*d*, 1H, C_{14}-H_a), 7.99(*d*, 1H, C_9-H_a), 7.47.43(*d*, 4H, Ar-C_2, C_6 C_{18} & C_{22}-H)7.38-7.28 (*m*, 6H, Ar-C_3, C_4, C_5,C_{19},C_{20} & C_{21}-H), 6.88-6.91 (*m*, 8H, C_8, C_{15} H_b & C_7 & C_{16}-H_7), 3.86-3.56 (*m*, 3H, C_{11}& C_{12}-H), 1.31 (*d*, 3H, *J*=6.15 *Hz* C_{23}-H); ^{13}C-NMR (125 MHz, $CDCl_3$): 164.2, 162.2, 141.7, 136.3, 135.7, 130.5, 129.1, 128.7, 128.5, 128.1, 128.0, 127.2, 68.0, 66.3, 20.6. Mass *m/z*: 275 Hz.

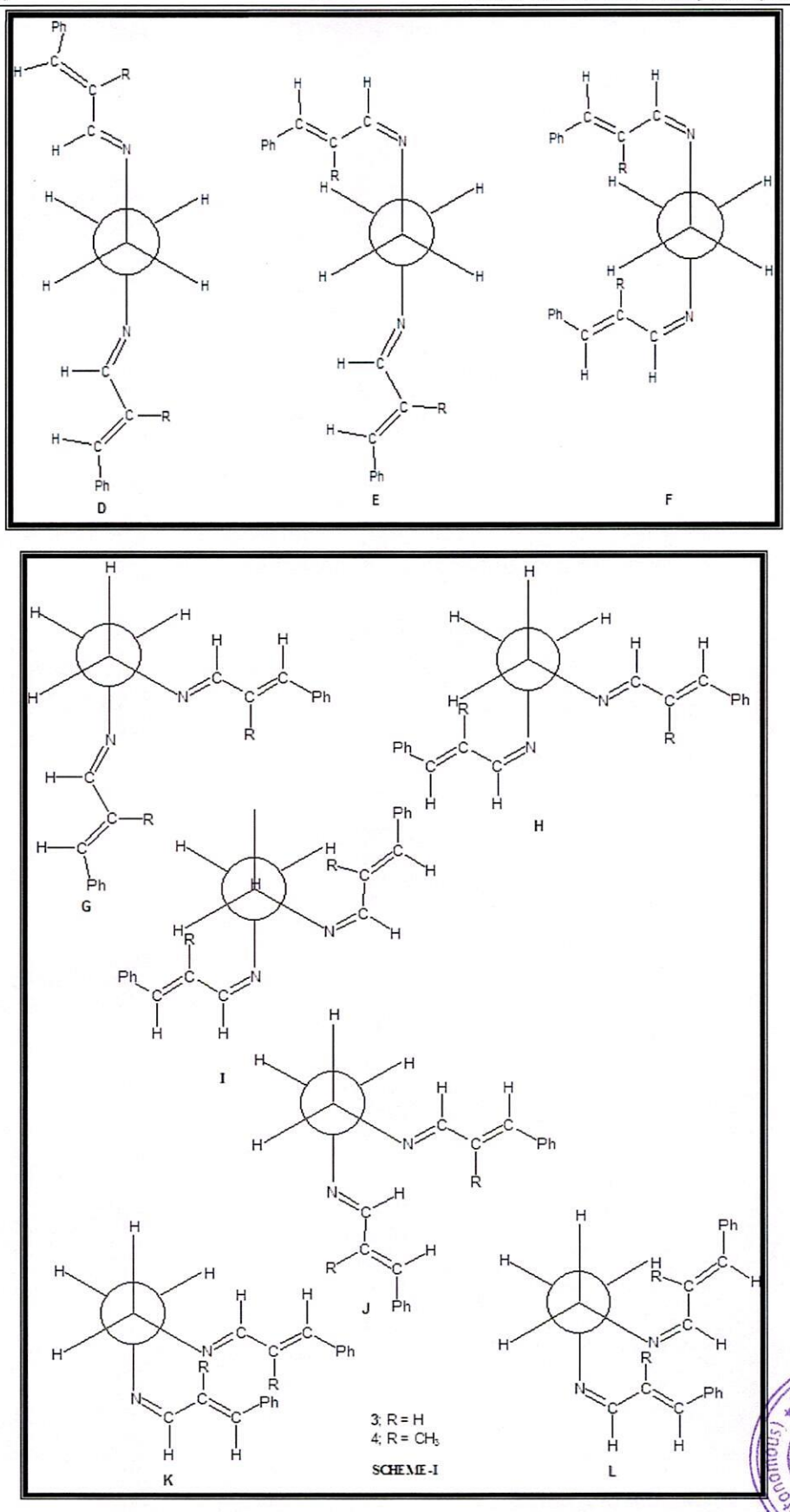
Preparation of *N*^{1}, *N*^{2}-*Bis(*2-methyl-3-phenylallylidene)propane-1,2-diamine (6)

Yield 2.13 g (65%) Brown semisolid, IR (KBr): 3397, 3025, 2923, 2853, 1624, 1446 cm^{-1}; ^{1}H-NMR (500 MHz, $CDCl_3$): 7.97 (*d*, 1H, *J*=3.92*Hz* C_{14}-H_a), 7.92 (*s*, 1H,*Hz* C_9-H_a), 7.60-7.77 (*m*, 4H, C_2, C_6, C_{18} & C22-H_{ortho}), 7.39-7.35 (*m*, 4H, C_3, C_5, C_{19} & C_{21}-H_{meta}), 7.25 (*s*, 2H, C_4 & C_{20}-H_{para}), 6.75 (*d*, 4H, C_7 & C_{16}-H_7), 3.86-3.79 (*m*, 2H, C_{11}-H), 3.75-3.59 (*m*, 1H, C_{12}-H), 1.31(*d*, 3H, *J*=6.19 *Hz*, C_{23}-H); ^{13}C-NMR (125 MHz, $CDCl_3$): 167.4, 165.4, 138.9, 138.6, 136.8, 136.7, 130.5, 130.4, 129.3, 128.5, 128.2, 128.0, 127.5, 67.7, 66.2, 20.5, 13.4, 13.2. Mass *m/z*: 332 Hz.

Theoretical studies

The molecular structures of Schiff bases 3-6 are optimized by HF and B3LYP with the 6-31G (d) basis set. The calculations are performed by using Gauss-View molecular visualization program and Gaussian 03 program package on personal computer.





Scheme 1: Possible conformations of Schiff bases 3 and 4

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Table 1: SCF energy values for the Schiff bases 3 and 4

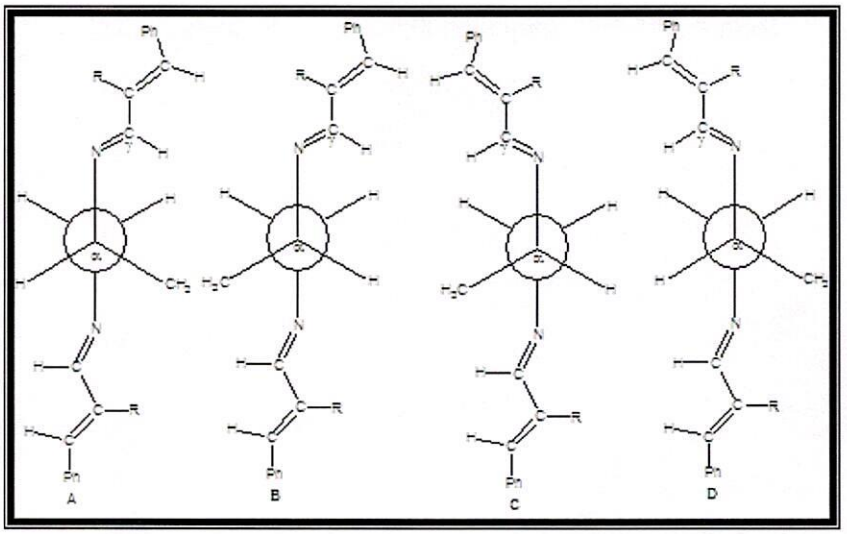
Conformers	SCF energy (Kcal/mol)	
	3	4
A	0	0
B	3.31	8.35
C	6.41	16.29
D	0	0
E	3.29	8.35
F	6.42	17.43
G	3.53	3.23
H	7.67	12.93
I	11.68	23.5
J	1.02	1.01
K	4.25	10.03

Table 2: Selected geometric parameters of N^1, N^2-*bis*(3-phenylallylidene)ethane-1,2-diamine 3

Bond length (Å)		Bond angle (°)		Torsional angle (°)	
C1-C7	1.46	C1-C7-C8	127.6	C6-C1-C7-C8	179.9
C7-C8	1.35	C7-C8-C9	122.6	C2-C1-C7-C8	-0.1
C8-C9	1.45	C8-C9-N10	121.7	C1-C7-C8-C9	-179
C9-C10	1.29	C9-N10-C11	119.3	C7-C8-C9-N10	179.8
N10-C11	1.46	N10-C11-C12	109.7	C8-C9-N10-C11	-179
C11-C12	1.54			C9-N10-C11-C12	-126
				N10-C11-C12-N13	-171

Table 3: Selected geometric parameters of N^1, N^2-*bis*(2-methyl-3-phenylallylidene)-ethane-1,2-diamine 4

Bond length (Å)		Bond angle (°)		Torsional angle (°)	
C1-C7	1.46	C1-C7-C8	131	C6-C1-C7-C8	-159
C7-C8	1.36	C7-C8-C9	116.6	C2-C1-C7-C8	21.5
C8-C9	1.46	C7-C8-C23	126.4	C1-C7-C8-C9	-179
C8-C23	1.5	C23-C8-C9	116.9	C1-C7-C8-C23	1.59
C9-C10	1.28	C8-C9-N10	123	C7-C8-C9-N10	-178
N10-C11	1.46	C9-N10-C11	119.5	C23-C8-C9-N10	179.7
C11-C12	1.5	N10-C11-C12	109.8	C8-C9-N10-C11	0
				C9-N10-C11-C12	-125
				N10-C11-C12-N13	-172
				C11-C12-N13-C15	-125
				C12-N13-C14-C15	179.7
				N13-C14-C15-C24	0
				N13-C14-C15-C16	-178



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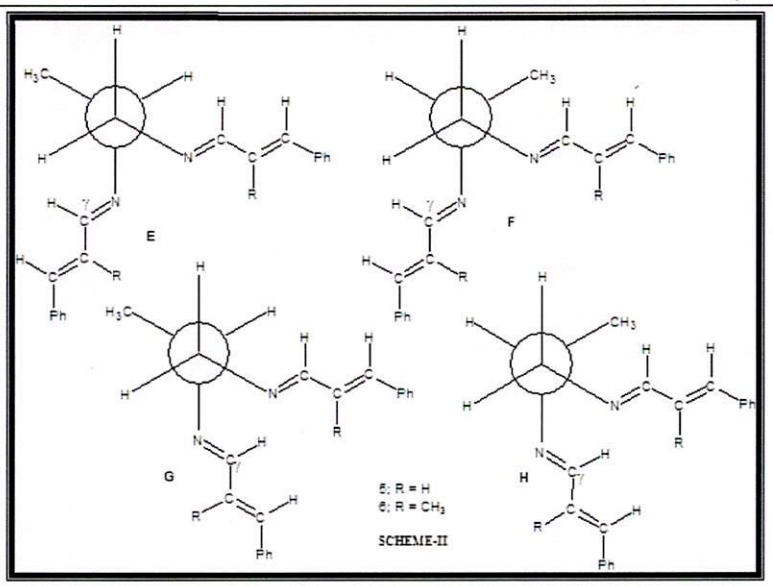


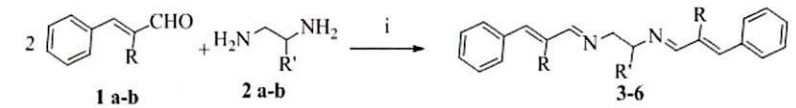
Scheme 2: Possible conformations of Schiff bases 5 and 6

Table 4: SCF energy values for Schiff bases 5 and 6

Conformers	SCF energy (Kcal/mol)	
	5	6
A	1.76	1.75
B	0	0
C	1.76	1.75
D	0	0
E	6.29	5.84
F	3.53	3.14
G	0.93	3.33
H	3.31	3.25

RESULTS AND DISCUSSION

Treatment of ethylenediamine and 1,2-diaminopropane with trans-cinnamaldehyde and trans-methylcinnamaldehyde (mol ratio 1: 2) yielded the corresponding Schiff bases 3-6.



1 a-b **2 a-b** **3-6**

Compound	R
1a	H
1b	CH3

Compound	R'
2a	H
2b	CH3

Compound	R	R'
3	H	H
4	CH3	H
5	H	CH3
6	CH3	CH3

i) KOH, EtOH, 75°c, 5h.

Scheme 3: Synthesis of Schiff bases 3-6

IR, mass and high resolution ^{1}H and ^{13}C-NMR spectra of *N^1,N^2-bis*(3-phenylallylidene)-ethane-1,2-diamine and its derivatives (3-6) have been recorded and analyzed.

In IR Spectra the prominent peaks around 1600 cm^{-1} in the IR spectra are attributed to $\nu_{C=N}$ mode. The C=C stretching vibration of the aromatic ring appeared around 1500 and 1450 cm^{-1}. The peaks around 750-650 cm^{-1} are attributed to aromatic C-H out of plane bending vibration. The peaks around 1350 cm^{-1} in the Schiff bases 5 and 6 are due to the symmetric bending vibration of methyl group. In ^{1}H-NMR, The most downfield doublet centered at 8.05 ppm in the Schiff base 3 is assigned to azomethine protons [H(9) and H(14)]. The coupling constant extracted from this signal is found to be 7.71 Hz. In the ^{1}H-^{1}H COSY spectrum, this doublet exhibits cross peaks with the signals in the region 6.96-6.86 ppm. From this it is concluded that H(8) and H(15) [β-protons i.e., β with respect to azomethine nitrogen] resonate in this region (6.96-6.86 ppm). From the integral

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values and from the absence of extra correlation in ^{1}H-^{1}H COSY spectrum it is concluded that the γ protons [H(7) and H(16)] are also observed in the same region. Careful analysis of the signals in this region reveals that for γ-protons a doublet at 6.93 ppm with spacing 15.93 Hz is observed and for β protons a doublet of doublet at 6.89 ppm was observed. From the comparison of the chemical shifts of Schiff base 3 with those of N(1), N(2) bis(cinnamylidene) azine [21,22], it is found that the ortho-protons in the cinnamylidene ring resonate at 7.46 ppm (doublet with spacing 7.23 Hz) and for meta and para-protons of the cinnamylidene ring signals are observed at 7.36 and 7.26 ppm in 3. The upfield sharp singlet at 3.85 ppm, is assigned to methylene protons attached to the azomethine nitrogen [H(11) and H(12)].

^{13}C-NMR spectrum shows an upfield signal at 61.70 ppm and this is assigned to the methylene carbon attached to azomethine nitrogen [C(11) and C(12)]. The most downfield signal at 164.2 ppm is obviously due to azomethine carbons [C(9) and C(14)]. From the correlation peaks observed in the ^{1}H-^{13}C COSY spectrum, it is found that β [C(8) and C(15)] and γ [C(7) and C(16)] carbons resonate at 128.8 and 141.8 ppm respectively. The less intense signal at 135.7 ppm is assigned to *ipso* carbons [C(1) and C(17)] of the phenyl ring of the cinnamylidene moiety. The remaining signals are due to aromatic carbons of the phenyl ring of the cinnamylidene moiety.

The ^{1}H-NMR spectrum of the Schiff base 4 reveals a sharp singlet at 7.98 ppm for azomethine protons. The upfield sharp singlet at 3.87 ppm is assigned to methylene protons attached to azomethine nitrogen. The spectrum also reveals a doublet with spacing 1.24 Hz at 2.13 ppm. The small spacing indicates the long range coupling observed with this proton and this is assigned to the methyl protons present in the side chain of the cinnamylidene moiety. From the comparison of chemical shifts of Schiff base 4 with those of Schiff base 3 it is predicted that the γ protons resonate at 6.78 ppm. The ortho and meta protons of the phenyl ring of the cinnamylidene moiety are observed at 7.37 and 7.36 ppm. The signal at 7.26 ppm is assigned to the para-proton of the phenyl ring of the cinnamylidene moiety. ^{1}H-^{1}H COSY spectrum, exhibits a weak cross peak between the methyl signal at 2.13 ppm with a signal at 6.78 ppm which corresponds to H(7) and H(16) [H(γ)] protons. The ^{13}C NMR spectrum of the Schiff base 4 reveals signals at 61.5 and 13.2 ppm for the methylene carbons attached to azomethine nitrogen [C(11) and C(12)] and methyl carbons [C(23) and C(24)] present in the side chain respectively. The most downfield signal at 167.6 ppm is obviously due to azomethine carbons [C(9) and C(14)]. The signal at 139.0 ppm is assigned to the γ carbon [C(7) and C(16)] of the side chain moiety. The signal at 138.9 ppm is assigned to β carbons [C(8) and C(15)] The less intense signal at 136.9 ppm is due to *ipso* carbons [C(1) and C(17)] of the phenyl rings of the cinnamylidene moiety. The remaining signals in the spectrum are due to the remaining aromatic carbons. This assignment is further confirmed from the results derived from ^{1}H-^{13}C COSY spectrum. The signal for azomethine protons (7.98 ppm) exhibits cross peak with the signal at 167.6 ppm, thus confirming the assignment of signal at 167.6 ppm to azomethine carbons. The signal centered at 6.78 ppm which is assigned to γ proton shows correlation with the signal at 139.0 ppm. From this it is confirmed that γ carbon signal was observed at 139.0 ppm. The upfield sharp singlet at 3.87 ppm exhibits cross peak with the signal at 61.5 ppm. From this it is confirmed that methylene carbons of the ethane moiety resonate at 61.5 ppm. The signal centered at 2.13 ppm, which is assigned to methyl protons shows correlation with the signal at 13.2 ppm, thus confirming the signal at 13.2 ppm to methyl carbons [C(23) and C(24)].

^{1}H-NMR spectrum reveals the presence of two doublets at 1.31 and 1.37 ppm for methyl protons of 1,2-diaminopropyl moiety and four signals for azomethine protons in the region 8.0-8.4 ppm. This clearly shows that the Schiff base 5 exists in two isomeric forms. The signals of the azomethine protons and the methyl protons of the diaminopropyl moiety in the major isomer can be differentiated from the minor isomer based on intensities. However, for other protons overlapping of signals for the major and minor isomer occurs. In the major isomer, the doublets observed at 8.03 and 7.99 ppm are assigned to azomethine protons [H(9) and H(14)]. The coupling constants extracted from these signals are found to be 7.55 and 8.05 Hz respectively. The doublet at 1.31 ppm is assigned to the methyl protons of the 1,2-diaminopropyl moiety. The coupling constant extracted from this signal is found to be 6.15 Hz. Among the signals for azomethine protons at 8.03 and 7.99 ppm the one at higher frequency i.e. 8.03 ppm is assigned to H(14). This assignment is based on the following observations. Among the azomethine carbons C(14) is γ with respect to the CH_3 group at C(12) whereas C(9) is δ. Generally γ carbon is expected to resonate at lower frequency [23]. Therefore, the signals for azomethine carbons are first assigned and from the ^{1}H-^{13}C COSY spectrum, the corresponding proton resonances are assigned. Obviously, the remaining azomethine proton signal at 7.99 ppm is due to H(9) only.

In the minor isomer, the azomethine protons resonate at 8.29 ppm (doublet) [H(14)] and 8.24 ppm (singlet) [H(9)]. The coupling constant extracted from the doublet centered at 8.29 ppm is found to be 3.60 Hz. The methyl protons are observed at 1.37 ppm. The coupling constant extracted from this signal is found to be 6.20 Hz. The ^{1}H-NMR spectrum reveals overlapping of signals of the other protons of major isomer with the minor isomer. The signals in the region 3.86-3.56 ppm are due to methine and methylene protons of the 1,2-diaminopropyl moiety [N-CH and N-CH_2]. The signals in the region 6.88-6.91 ppm are due to β [H(8) and H(15)] and γ [H(7) and H(16)] protons of the side chain of cinnamylidene moiety. The spectrum reveals a triplet at 1.31 ppm (two doublets overlapped with each other) and this is assigned to the methyl protons of 1,2-diaminopropyl moiety of the dimer of 5A. The signals of other protons in the dimer are however overlapped with the signals of the Schiff base 5. ^{13}C-NMR spectrum of the Schiff base 5 reveals signals at 20.6 and 29.7 ppm for the methyl carbons of the 1,2-diaminopropyl moiety. The most downfield signals at 164.2, 162.3, 162.2 and 160.5 ppm are obviously due to azomethine carbons present in the major and minor isomer. The β-carbon signals are overlapped with the aromatic signals in the region 128.1-130.6 ppm. The signals at 141.8 and 141.7 ppm are assigned to γ carbons of the cinnamylidene moiety. The remaining signals in the region 137-127 ppm are due to aromatic carbons. The signals in the region 68-66 ppm are due to methine and methylene carbons of the 1,2-diaminopropyl moiety. The signals for the major isomer can be differentiated from the minor isomer based on intensities. This assignment is further confirmed from the results derived from ^{1}H-^{13}C COSY spectrum. The signals for azomethine protons centered at 8.03 and 7.99 ppm in the major isomer exhibit cross peaks with the signals at 162.2 and 164.2 ppm respectively. The signals for azomethine protons in the minor isomer (8.29 and 8.24 ppm) show cross peaks with the signals at 160.5 and 162.3 ppm. From the correlation peaks it is confirmed that azomethine carbons resonate at 164.2 and 162.2 ppm in the major isomer and 160.5 and 162.3 ppm in the minor isomer. The signals in the region 6.88-6.91 ppm which are assigned to β and γ protons show correlation with the signals at 141.8 and 141.7 ppm and the signals in the region 128.1-130.6 ppm. From this it is confirmed that γ carbons resonate at 141.8 and 141.7 ppm and β carbons resonate in the region 128.1-130.6 ppm. The signals in the region 3.86-3.56 ppm which are assigned to methine and methylene protons of the diaminopropyl moiety show correlation with the signals at 68.0, 67.9, 66.3 and 66.2 ppm. From these correlations it is established that methine carbons of the diaminopropyl moiety absorb at 68.0 ppm in the major isomer and 67.9 ppm in the minor isomer. The remaining two signals at 66.3 and 66.2 ppm are assigned to methylene carbons of the diaminopropyl moiety in the major and minor isomer respectively. The methyl carbons of the diaminopropyl moiety absorb at 20.6 ppm in the major isomer and 29.7 ppm in the minor isomer and this is confirmed by the cross peaks observed with the doublets at 1.31 (major) and 1.37 ppm (minor). Two doublets at 1.31 and 1.35 ppm for methyl protons of 1,2-diaminopropyl moiety and four signals for azomethine protons in the region 7.9-8.3 ppm are observed in the ^{1}H-NMR spectrum. From this it is concluded that the Schiff base 6 also exists in two isomeric forms. Based on intensities the signals corresponding to major isomer can be differentiated from the minor isomer. The doublet at 7.97 ppm and a singlet at 7.92 ppm observed in the major isomer are assigned to azomethine protons. The coupling constant extracted from the doublet is found to be 3.92 Hz. The spectrum shows a doublet at 1.31 ppm with

spacing 6.19 Hz for the methyl protons of 1,2-diaminopropyl moiety in the major isomer. However, the methyl protons of cinnamylidene moiety absorb at 2.12 ppm. Among the signals for azomethine protons at 7.97 and 7.92 ppm the one at higher frequency i.e., 7.97 ppm is assigned to H (14).

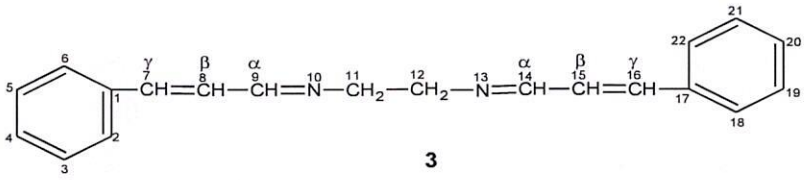
In the minor isomer the azomethine protons absorb at 8.28 (doublet, J=6.13 Hz) [H(14)] and 8.23 ppm (singlet) [H(9)] and methyl protons resonate at 1.35 ppm (J_{H,CH_3}=6.34 Hz). The methyl protons of cinnamylidene moiety resonate at 2.09 ppm. From the comparison of the chemical shifts of 6 with those of 3-5 it is suggested that the γ protons resonate at 6.75 (major) and 6.71 ppm (minor). The signals in the region 3.59-3.75 ppm and 3.79-3.86 ppm are assigned to methine and methylene protons of diaminopropyl moiety in both the major and minor isomers. This assignment is based on the results obtained in ^{1}H-^{1}H COSY spectrum. In the ^{1}H-^{1}H COSY spectrum cross peaks are observed between the doublets at 1.31 and 1.35 ppm (methyl protons) with the multiplet in the region 3.59-3.75 ppm. From this it is confirmed that the methine protons resonate in the region 3.59-3.75 ppm. Obviously the other multiplet (3.79-3.86 ppm) is due to methylene protons. The spectrum reveals additional signals for the dimer of trans-α-methyl cinnamaldehyde in the region 2.1 ppm and aromatic regions. The downfield signals observed at 167.4 and 165.4 ppm (high intense signals) and at 162.4 and 160.5 ppm (less intense signals) in the ^{13}C-NMR spectrum are assigned to azomethine carbons in the major and minor isomer respectively. The signals observed at 138.9 and 138.6 ppm are assigned to γ carbons in the major isomer. In the minor isomer γ carbons resonate at 139.0 and 138.6 ppm. The β carbons resonate at 136.7 and 136.8 ppm in the major isomer and at 136.9 and 137.0 ppm in the minor isomer. The high intense signals resonating at 66.2 and 67.7 ppm are assigned to the methylene and methine carbons of diaminopropyl moiety in the major isomer and in the minor isomer these carbons resonate at 66.5 and 67.5 ppm. The spectrum also reveals signals at 13.4 and 13.2 ppm. These signals are due to methyl carbons of the cinnamylidene moiety and both the major and minor isomers absorb in the same region. The signals at 20.5 and 20.4 ppm are obviously due to methyl carbons of the diaminopropyl moiety. These assignments were further confirmed from the results derived from ^{1}H-^{13}C COSY spectrum. The signals for azomethine protons centered at 7.97 and 7.92 ppm in the major isomer exhibit cross peaks with the signals at 165.4 and 167.4 ppm respectively. The signals for azomethine protons in the minor isomer (8.28 and 8.23 ppm) show cross peaks with the signals at 160.5 and 162.4 ppm respectively. From this it is confirmed that azomethine carbons resonate at 165.4 and 167.4 ppm in the major isomer and 160.5 and 162.4 ppm in the minor isomer. The signals at 6.75 and 6.71 ppm, which were assigned to γ–protons in the major and minor isomer show correlation with the signals in the region 138.6-139.0 ppm thus confirming the γ-carbon signals at 138.9 and 138.6 ppm in the major isomer and at 139.0 and 138.6 ppm in the minor isomer. The signals in the region 3.59-3.75 ppm and 3.79-3.86 ppm which were assigned to methine and methylene protons of diaminopropyl moiety exhibit correlation peaks with the signals in the region 67.7 to 66.2 ppm, thus confirming the methine and methylene carbon signals in the region 67.7-66.2 ppm. The signals at 20.5 (major) and 20.4 ppm (minor) are assigned to methyl carbons of diaminopropyl moiety based on the correlation peaks observed with the doublets at 1.31 and 1.35 ppm. The remaining signals in the region 13 ppm are due to methyl carbons of the cinnamylidene moiety.

Conformation of schiff bases

Spectral studies

In the Schiff base 3 the azomethine proton is associated with the coupling of 7.71 Hz which is closer to the value observed in trans-cinnamaldehyde 1a [21]. There are two possible ways of attaching the ethylene moiety to the nitrogen (i) syn to azomethine proton, (ii) anti to azomethine proton.

Comparison of the chemical shifts of aldehydic proton in cinnamaldehyde (9.66 ppm) with the azomethine protons in the Schiff base 3 (8.05 ppm) reveals that conversion of the aldehyde to Schiff base shields –CH proton by 1.61 ppm. Such a large shielding magnitude suggests that the azomethine proton should be syn to the N-C(H_2) bond in the Schiff base. This conclusion is based on the following observations.



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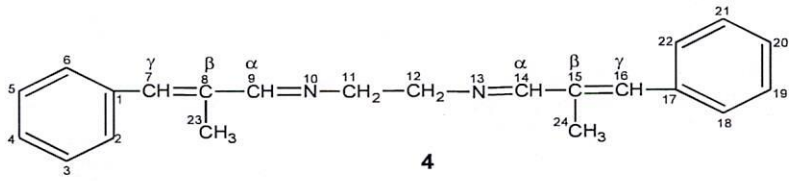

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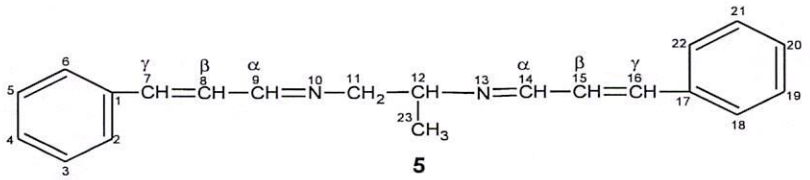

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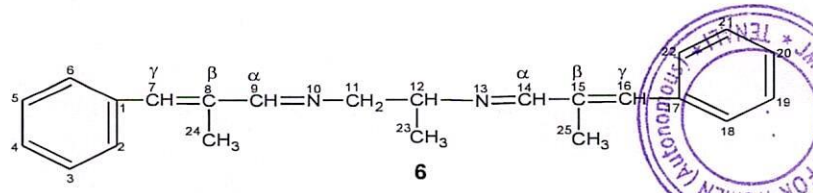

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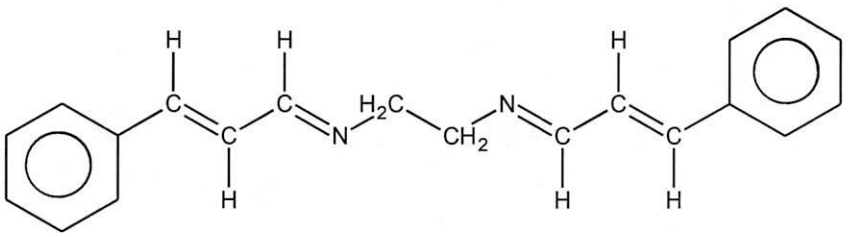
Generally in Schiff bases and azines protons which are syn to N-C/N-N bond are expected to resonate at lower frequency relative to anti protons. For example in acetone azine [24] methyl protons which are syn to N-N bond (1.83 ppm) resonate at lower frequency compared to methyl protons anti to N-N bond (2.00 ppm) and the chemical shifts of antiprotons are closer to the values observed in acetone (2.09 ppm). Moreover, comparison of chemical shifts of aldehydic proton in salicylaldehyde (9.89 ppm) [21,22] with that of azomethine proton in the Schiff base (8.70 ppm) [25] reveals considerable shielding (-1.19 ppm) due to conversion of aldehyde to Schiff base. The crystal structure of the Schiff base reveals that the azomethine proton is syn to C-aryl bond only. Therefore, the favored conformation of Schiff base 3 is predicted to be the trans conformation as shown below.



One can visualize three possible conformations of the Schiff base 3 due to C-C rotation about $-N-CH_2-CH_2-N$ moiety. The two gauche forms A and C are destabilized due to severe interaction between the substituent attached to azomethine nitrogen. Therefore, the stable conformation of the Schiff base is predicted to be the antiform. Similar comparison of the chemical shifts of azomethine protons in the Schiff bases 4-6 with those of aldehydic protons in trans-cinnamaldehyde (9.66 ppm) and *trans*-α-methylcinnamaldehyde [24] (9.56 ppm) reveals considerable shielding of CH protons due to conversion of aldehyde to Schiff bases. The shielding magnitude observed ware closer to the values observed in the Schiff base 3. Hence, it is reasonably concluded that the conformations of Schiff base 4 and major isomers of 5 and 6 are similar to the conformation of Schiff base 3. The minor isomers of the Schiff bases 5 and 6 probably exist in the gauche conformation. In 5 both the gauche conformations are expected to be of the same energy and hence equally populated. However in the Schiff base 6, the gauche conformation C′ is ruled out since in this confirmation two gauche interactions exists. Hence, the favored conformation of the minor isomer is predicted to be A′. The major isomer exists in conformation B′.

Theoretical studies of the Schiff bases 3 and 4

There are several conformations possible for the Schiff bases 3 and 4. Since, trans-cinnamaldehydes are used for synthesis the conformations derived from cis-cinnamaldehydes are ruled out in the present study. In conformations G-L in Scheme 1 the two C-N bonds are gauche with respect to each other, whereas in conformations A-F, the two C-N bonds are anti to each other. In the gauche conformation the torsional angle is close to 60°, whereas in the anti-conformation, the angle is close to 180°. In the conformations A-C the two C=N bonds are on opposite side to each other whereas in conformations D-F the two C=N bonds are on same side. Same trend is also seen in conformations G-I relative to J-L. Both the azomethine protons are *syn* to N-C(H_2) bond in the conformations A, D, G and J i.e., syn-syn arrangement, whereas they are *anti* in conformations C, F, I and L i.e., anti-anti arrangement. In conformations B, E, H and K one of the azomethine protons is syn to N-C(H_2) bond and the other azomethine proton is anti to N-C(H_2) bond i.e., syn-anti arrangement. Density functional theory calculations available in Gaussian-03 package were carried out using the basis set B_3LYP/6-31G [26,27]. The relative SCF energy values determined for the Schiff bases 3 and 4 are shown in Table 1. Tables 2 and 3 report the selective bond length, bond angle and torsional angles in the optimised structures 3A and 4A.

All the bond angles are closer to 120°, except N(10)-C(11)-C(12) or N(13)-C(12)-C(11) in the Schiff bases 3 and 4. Comparison of bond angles in Schiff base 3 with those of 4 reveals that introduction of methyl substituent in the cinnamylidene moiety influences the bond angle considerably. The torsional angles C(6)-C(1)-C(7)-C(8) (179.9°) and C(2)-C(1)-C(7)-C(8) (0.1°) reveals the coplanar nature of the phenyl ring with the conjugated side chain carbons C(7) and C(8) in the Schiff base 3. However, the corresponding bond angles in the Schiff base 4 (-159.0° and +21.5°) reveals that this planarity is deviated considerably due to the introduction of methyl substituent in the cinnamylidene moiety. However, the torsional angle N(10)-C(11)-C(12)-N(13) is not affected due to the introduction of CH_3 substituent (171° in 3; 172° in 4). The other torsional angles are closer to 180° in both the Schiff bases 3 and 4 except C(9)-N(10)-C(11)-C(12)/C(11)-C(12)-N(13)-C(14) (126° in 3 and 125° in 4). These values suggest nearly coplanar nature of other moieties with the nearby nitrogen and the adjacent sp^2 hybridized carbons except the ethylenic moiety. Thus, the theoretical study predicts the same conformations as the one derived from solution studies. Similar conformation has also been reported in a closely related N,N′-bis-(4-methoxybenzylidene)-ethylenediamine by Unaleroglue, et al. [28].

Theoretical studies of the Schiff bases 5 and 6

From the theoretical study of the conformations of the Schiff bases 3 and 4 it is inferred that conformations in which both the azomethine protons syn to N-C(H_2) bond are more stable when compared to syn-anti and anti-anti arrangements. Therefore, for the Schiff bases 5 and 6 calculations were performed only for conformations in which both the azomethine protons are syn to N-C(H_2) bond. The possible conformations for the Schiff bases 5 and 6 are shown in Scheme 2. Calculations were performed for all the conformations shown in Scheme 3 and the relative SCF energies calculated for the Schiff bases 5 and 6 are displayed in Table 4. For the Schiff base 5 theoretical calculations predict 5B or 5D as the minimum energy conformer and it is found to be the favored conformation of the major isomer. The optimized structure corresponding to 5B is similar to 5D. The argument given for Schiff bases 3 and 4 is applicable for the Schiff base 5 also. Therefore, in the favorable conformer of the major isomer of 5 (5B or 5D) the plane of the cinnamylidene moiety at one nitrogen is nearly perpendicular to the plane of the cinnamylidene moiety at the other nitrogen. The next favorable conformer is predicted to be 5G in which the two C=N bonds are gauche with respect to each other and methyl group is anti to azomethine nitrogen. It is seen from Table 4, that the favorable conformer for the major isomer of the Schiff base 6 is predicted to be 6B or 6D. The next favorable conformer (conformation of the minor isomer) is predicted to be 6A or 6C. Similar to the Schiff base 5 the optimized structure corresponding to 6B is similar to 6D and 6A is similar to 6C. In these conformers the plane of the cinnamylidene moiety at one nitrogen is nearly perpendicular to the plane of the cinnamylidene moiety at the other nitrogen. The conformation of the minor isomer of the Schiff base 6 (6A/6C) is different from the conformation of the minor isomer of the Schiff base 5. The gauche conformer of the Schiff base 6, i.e., 6G is expected to be of higher energy compared to the gauche conformer 5G due to severe interaction between the methyl group in the cinnamylidene moiety with the nearby azomethine proton at the other end and hence it is destabilized in the Schiff base 6.

CONCLUSION

It is conclude that, Calculation reveals that the stable conformer is predicted to be either 3A or 3D. The optimised structure corresponding to 3A is similar to 3D. Table 1 inferred that the conformations in which both the azomethine protons syn to N-C(H_2) bond i.e., syn-syn arrangement (3A, 3D, 3G and 3J) are more stable when compared to syn-anti (3B, 3E, 3H and 3K) and anti-anti arrangements (3C, 3F, 3I and 3L). The order of stability is syn-syn>syn-anti >anti-anti. For the Schiff base 4 also the stable conformers is predicted to be 4A or 4D similar to the Schiff base 3. The Schiff base 5 exists as an equilibrium mixture of conformer 5B/5D (major isomer) and 5G (minor isomer) only. The Schiff base 6 exists as an equilibrium mixture of conformations of 6B/6D (major isomer) and 6A/6C (minor isomer). Thus, the conformations of Schiff bases 3-5 predicted from theoretical calculations are in good agreement with the conformations predicted from spectral data. The conformation of the major isomer of Schiff base 6 predicted in solution is the same as that observed by theoretical calculation. However, for the minor isomer there is a discrepancy between the conformations predicted in solution (gauche conformation) and by theoretical studies (trans conformation).

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A STUDY OF RELATIONSHIP BETWEEN LEADERSHIP STYLES AND SOCIO-ECONOMIC AND ORGANIZATIONAL POSITION VARIABLES AS PERCEIVED BY SUBORDINATES IN ZUARI CEMENTS LIMITED

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ABSTRACT

The changing environment of leaders in different roles in different functions in different settings starting from leadership of the family to the top positions in multinational organizations because Leadership means many things to many people. However, the essentials of leadership are the same to all leaders in all positions. The objective of the study is to examine the relationship of Leadership Styles with certain Socio Economic and Organization Position (SEOP) variables of the employees as perceived by subordinates in ZCL. The study found in Middle Level Managers, 'education' was significantly but negatively correlated with 'bureaucratic' style, 'Economic Status' was significantly but negatively correlated with 'task-orientation' style, whereas in Lower Level Managers, none of the socio-economic and organisational position variables, however, were found to be significantly correlated with leadership styles.

KEYWORDS

Zuari cements ltd., Leadership styles.

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INTRODUCTION

The Oxford English Dictionary (1933) notes that the word "leader" appeared in the English language as early as 1300 A.D. However, the word "leadership" did not appear until about 1800 A.D. Albeit, leadership appears to be a rather sophisticated concept, words meaning 'chief' or 'king' are the only ones found in many languages to differentiate the ruler from other members of society.

RESEARCH METHODOLOGY AND DESIGN

The understanding of leadership has ever been very difficult due to the complexities involved in it. As such the concept of leadership creates more puzzles than solutions. The specific objectives of the study is to examine the relationship of Leadership Styles with certain Socio Economic and Organization Position (SEOP) variables of the employees as perceived by the subordinates in ZCL.

HYPOTHESES

The hypotheses formulated for the study is

H0: There is no significant relationship between Leadership Styles and the SEOP variables of employeesas perceived by subordinates in ZCL.

METHODOLOGY

The study is mainly based on primary data collected. The present study confines itself to Higher, Middle and lower hierarchical levels in ZCL. The variables considered for the study are the SEOP variables viz., designation, age, length of service, education and economic status. For the analyses of leadership styles of the Higher and Middle level employees, the subordinates perception was used. Five Leadership Styles are viz., Authoritarian, Participative, Bureaucratic, Task-Oriented and Nurturant leadership styles were used. The total sample for the study consists of 168 officers of ZCL. Many studies have been undertaken on leadership styles adopted in different organizations. But relatively only a few attempts have been made to study the leadership styles and SEOP variables in ZCL.

INTER-CORRELATION OF SEOP VARIABLES

TABLE 1: INTER-CORRELATIONS AMONG SEOP VARIABLES FOR HIGHER LEVEL MANAGERS OF ZCL (N=47)

Sl. No.	SEOP Variables	Designation	Age	Experience	Education	Economic Status
1	Designation		0.128	-0.125	-0.036	0.171
2	Age			0.226	-0.27	0.149
3	Experience				0.163	*-0.014*
4	Education					-0.033
5	Economic Status					

Source: Compiled from field survey

Table 1 presents the inter-correlations among socio-economic and organizational position variables viz., designation, age, experience, education and economic status for Higher Level Managers of ZCL. None of the socio-economic and organizational position variables, however, were found to be significantly inter-correlated. They are rather, independent of each other. Hence, the hypothesis that "there is no significant inter relationship among socio-economic and organizational position variables of employees in ZCL" is accepted in all cases.

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TABLE 2: INTER-CORRELATIONS AMONG SEOP VARIABLES FOR MIDDLE LEVEL MANAGERS OF ZCL (N=70)

S.No	SEOP Variables	Designation	Age	Experience	Education	Economic Status
1	Designation		0.024	-0.041	-0.094	-0.057
2	Age			**0.596	0.121	*0.241
3	Experience				0.159	*0.252*
4	Education					0.188
5	Economic Status					

Source: Compiled from field survey

Table 2 presents the inter-correlations among socio-economic and organizational position variables viz., designation, age, experience, education and economic status for Middle Level Managers of ZCL. The variable 'age' was significantly and positively correlated with 'experience'(r=0.596, P<0.01) indicating that the higher the age, the greater the 'experience'. 'age' was also significantly and positively correlated with 'economic status'(r=0.241, P<0.01) indicating that higher the age, greater the 'economic status'. The variable 'experience' was significantly and positively correlated with 'economic status' (r= 0.252, P<0.05) indicating that the persons who have higher experience are with higher economic status. None of the other socio-economic and organizational position variables, however, were found to be significantly inter-correlated. They are rather, independent of each other. Hence, the hypothesis that "there is no significant inter relationship among socio-economic and organizational position variables of employees in ZCL" is rejected in the case of age vs experience; age vs economic status and experience vs economic status, and is accepted in all other cases.

Comparison of Higher Level Managers and Middle Level Managers of ZCL

In Higher Level Managers, any of the SEOP variables were not significantly correlated whereas in Middle Level Managers, 'age' was significantly and positively correlated with 'experience' and 'economic status'; and 'experience' was significantly and positively correlated with 'economic status'.

C. Lower Level Managers of ZCL

TABLE 3: INTER-CORRELATIONS AMONG SEOP VARIABLES FOR LOWER LEVEL MANAGERS OF ZCL (N=51)

S. No.	SEOP Variables	Designation	Age	Experience	Education	Economic Status
1	Designation		-0.08	0.026	-0.058	0.003
2	Age			**0.702	-0.022	-0.051
3	Experience				-0.051	0.16
4	Education					0.067
5	Economic Status					

Source: Compiled from field survey

Table 3 presents the inter-correlations among socio-economic and organizational position variables viz., designation, age, experience, education, and economic status for Lower Level Managers of ZCL. The variable 'age' was significantly and positively correlated with 'experience'(r=0.702, P<0.01) indicating that the higher the age, the greater the 'experience. None of the other socio-economic and organizational position variables, however, were found to be significantly inter-correlated. They are rather, independent of each other. Hence, the hypothesis that "there is no significant inter relationship among socio-economic and organizational position variables of employees in ZCL" is rejected in the case of age vs experience, and is accepted in all other cases.

Comparison of Middle Level Managers and Lower Level Managers of ZCL

In Middle Level Managers, 'age' was significantly and positively correlated with 'experience' and 'economic statuses; and 'experience' was significantly and positively correlated with 'economic statuses. Whereas, in Lower Level Managers 'age' was significantly and positively correlated with 'experience'.

Analysis of relationship between leadership styles and SEOP variables as perceived by subordinates in Zuari Cements Limited:

This research paper discusses the leadership styles as perceived by the subordinates of ZCL. In ZCL the total sample of the study belonging to three functional levels. The subordinates perception reveals about the styles of Higher level and Middle level officers of ZCL. Scores on five leadership styles were computed from subordinates evaluation of leaders leadership style. The correlations of socio-economic and organizational position variables with leadership styles were computed. In this section the presentation and discussion of the data pertains to the relationship of SEOP variables with leadership styles of officers in ZCL viz., Higher and Middle level Managers.

SUBORDINATES PERCEPTION OF LEADERS OF ZCL

This analysis presents the leadership styles perceived by subordinates viz., Middle Level Managers and Lower Level Managers of ZCL. The correlations of socio-economic and organizational position variables with leadership styles were computed. Following this, correlations were computed among five leadership styles viz., authoritarian, participative, bureaucratic, task-orientation and nurturant. Now, the presentation and discussion of the data pertains to the following:

1. Relationship of SEOP variables with leadership styles for officers of ZCL viz., Middle Level Managers and Lower Level Managers.
2. Inter-correlation of leadership styles for officers of ZCL viz., Middle Level Managers and Lower Level Managers.

INTER-CORRELATION BETWEEN SEOP VARIABLES AND LEADERSHIP STYLES

TABLE 4: INTER-CORRELATION BETWEEN SEOP VARIABLES AND LEADERSHIP STYLES OF MIDDLE LEVEL MANAGERS OF ZCL (N=70)

Sl.No	SEOP Variables	Leadership Styles				
		Authoritarian	Participative	Bureaucratic	Task-orientation	Nurturant
1	Designation	0.178	-0.172	-0.05	0.123	-0.154
2	Age	-0.176	0.006	-0.001	-0.183	0.025
3	Experience	-0.133	0.145	-0.135	0.12	*0.096*
4	Education	0.085	-0.224	*-0.283	-0.051	-0.077
5	Economic Status	0.109	-0.217	0.057	**-0.302	-0.15

Source: Compiled from field survey

Table 4 presents the inter-correlation between socio-economic and organizational position variables and five leadership styles of Middle Level Managers of ZCL. 'Education' was significantly but negatively correlated with 'bureaucratic' style (r= -0.283, p<0.01) indicating that 'bureaucratic' style decreases with the increase of 'education'. 'Economic Status' was significantly but negatively correlated with 'task-orientation' style (r= -0.302, p<0.05) indicating that 'task-orientation' styles decreases with the increase of 'Economic Status'. None of the other socio-economic and organisational position variables, however, were found to be significantly correlated with leadership styles. Hence, the hypothesis that "there is no significant relationship between socio-economic and organisational position variables and leadership styles of employees in ZCL" is rejected in the case of 'education' vs bureaucratic and Economic Status vs 'task-orientation' style and is accepted in all other cases.

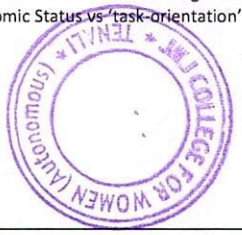

TABLE 5: INTER-CORRELATION BETWEEN SEOP VARIABLES AND LEADERSHIP STYLES OF LOWER LEVEL MANAGERS (N=51)

Sl. No	SEOP Variables	Leadership Styles				
		Authoritarian	Participative	Bureaucratic	Task-orientation	Nurturant
1	Designation	-0.066	0.217	-0.042	0.241	0.122
2	Age	-0.019	-0.17	0.179	-0.132	-0.098
3	Experience	0.153	-0.142	-0.055	0.024	-0.17
4	Education	0.005	0.170	0.043	0.16	0.072
5	Economic Status	0.054	-0.047	-0.262	0.036	0.211

Source: Compiled from field survey

Table 5 presents the inter-correlation between socio-economic and organizational position variables and five leadership styles of Lower Level Managers of ZCL. None of the socio-economic and organisational position variables, however, were found to be significantly correlated with leadership styles. Hence, the hypothesis that "there is no significant relationship between socio-economic and organisational position variables and leadership styles of employees in ZCL" is accepted.

FINDINGS

Comparison of Middle Level Managers and Lower Level Managers of ZCL

In Middle Level Managers, 'education' was significantly but negatively correlated with 'bureaucratic' style, 'Economic Status' was significantly but negatively correlated with 'task-orientation' style, whereas in Lower Level Managers, none of the socio-economic and organisational position variables, however, were found to be significantly correlated with leadership styles.

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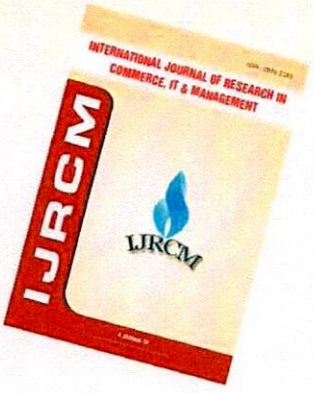

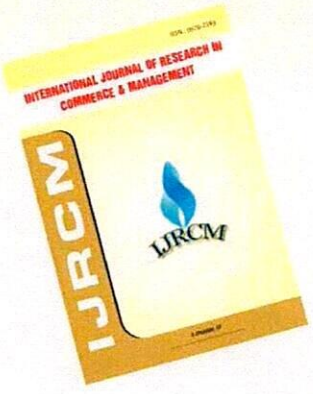

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Studies on effect of temperature on fertilization and hatching rate of *Pangasianodon hypophthalmus* (Sauvage, 1878) eggs

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Abstract
Pangasius fish (*P. hypopthalamus*) is an exotic striped catfish, introduced in India during the year 1997. Farming of *P. hypopthalamus* is an important aquaculture Andhra Pradesh. The present study is carried out to determine the effect of temperature on fertilization and hatching rates of *P. hypopthalamus* eggs. This experiment was investigated under controlled temperature hatchery. Stripping was done 6 and 9 hours after hormonal injection with crude pituitary gland extract and Ovatide respectively. The water temperature was controlled with an adjustable electric thermostat heater empowered by a generator while other water quality parameters were kept constant in acceptable ranges. The eggs were mixed with the milt using chicken feather and the fertilized eggs were transferred to hatching pool. The temperature for fertilization and hatching maintained in the range of 24-34°C with 2°C intervals. Fertilization and hatchability of the eggs were significantly highest ($p < 0.05$) at 28°C and 30°C compared to other tested temperatures. The results also reveal that the hatching time decrease when the temperature increases, which indicates a positive correlation between incubation temperature and embryonic development rate. Fertilization and hatchability of *P. hypopthalamus* eggs are best achieved at temperature range of 28 - 30°C.

Keywords: *P. hypopthalamus,* fertilization, temperature, hatching, hatching time

1. Introduction
Pangasianodon hypophthalmus is native of Mekong Basin and Chao Phraya River in Thailand, Cambodia and Vietnam. It has been introduced in Singapore, Philippines, Taiwan, Malaysia, China, Myanmar, Bangladesh, Nepal and India. The fish was introduced to India in the State of West Bengal probably in 1997 from Bangladesh where this fish is largely cultured in monoculture as well as polyculture (Mukai, 2011) [7].
Pangasianodon hypophthalmus is the important fresh water aquaculture species in Andhra Pradesh and is popular and profitable after carp culture. In Andhra Pradesh, the culture of P. *hypopthalamus* farms are located in Krishna and West Godavari districts of Andhra Pradesh.West Bengal is major source for *Pangasius* seed production and supply in India. However, its culture is affected by both abiotic and biotic factors.
Sexual cycle related to the environment, Changes in environmental condition will influence the growth, survival and reproduction and egg hatching (Cacot, P., 1999) [3]. Temperature is a fundamental physical regulatory factor in the lives of fishes and this effect is expressed particularly strongly in the control of all reproductive processes from gamete development and maturation, ovulation and spermiation, spawning, embryogenesis and hatching, to larval and juvenile development and survival. In reproductively mature adults, temperature is generally considered to be a secondary due to photoperiod in phasing reproductive seasonality but it has a major role in synchronising the final stages of reproductive maturity, and also in truncating reproductive episodes (reviewed in Pankhurst and Porter 2003) [10]. The effects of temperature can be differentially expressed depending on when in the annual thermal cycle spawning normally occurs, with increasing spring temperatures being required to cue maturation in spring and early summer spawners (Stacey (1984) [16]; Scott and Pankhurst (1992) [13] and Shimizu (2003) [14], but elevated temperatures delaying the onset of maturation and ovulation in autumn-spawning species (reviewed in Pankhurst and King 2010) [10]. Temperature has a similarly important role in the modulation of post-fertilization processes both through its rate-determining effects on embryogenesis and hatching (Pauly and Pullin 1988) [11]. and subsequent larval development (Howell *et al.* 1998) [5], growth (Jobling 1997) [6] and survival (Sponaugle and Cowen 1996) [15].
The present study was conducted to detect the influence of temperature on fertilization and hatching in *P. hypophthalmus.*

2. Materials and methods
Breeding and hatching experiments were carried out at government issued fish seed farms, Penamaluru, Vijayawada. Male and female brooders of *P. hypophthalmus (*Family Pangasiidae) were collected from same center. Adult *Pangassius* fish males and females having age of 3 years, showed signs of sexual maturation and a total of 120 No. of both sex fish; average weight and length of male were 2.4 kg, 53 cm, and female 2.9 kg, 50 cm were used for breeding studies. Brood fish selected visually based on secondary

sexual characteristics, condition and experience.

The six temperature treatments were based on a pilot study that recorded 100% mortality at <21°C and >39°C. The treatments here were: 24°C, 26°C, 28°C, 30°C, 32°C, 34°C. For the 24°C, 26°C treatment, tanks were set up in a cold room using an air conditioner to maintain the desired temperature. Individuals assigned to higher temperature treatments (28°C, 30°C, 32°C, 34°C) were acclimated gradually to their individual treatment temperatures before the experiment commenced using thermostats in a stepwise fashion at 2°C per day until all tanks had reached their target temperatures.

Selected males and females were injected with a crude pituitary gland extracts (CPGE) and Ovatide, a synthetic hormone according to recommended dose and dosage depending upon the physiological status of fishes. Male brooders were also given CPGE at the time of second injection to females, whereas in studies with Ovatide, single recommended dose is given at same time to male and female fish. Injected brooders were kept in cemented breeding tanks of size (3 x 2 x 1 m) with flowing water. Physicochemical parameters of the water during the breeding and hatching experiments were analyzed as per APHA (1998). Fish responded positively and ovulated, later gametes are collected by gentle squeezing of the abdomen. The gametes of ripe male fish (n=1.5) and a female fish (n=1) were combined in a clean, dry container and gentle mixing of both using a chicken feather for a 1-minute period and stickiness of eggs is removed by milk treatment, immediately after fertilization the diameter of egg increased owing to slight swelling and size is 1.12-1.18 mm with a transparent layer. Fertilized and un-fertilized eggs were distinguishable with naked eye. Fertilized egg were transferred to hatching pool.

Highest temperature treatment acclimations began first and in sequence such that all treatments achieved their respective experimental temperatures on the same day. The time interval from transfer fertilized egg in hatching pool to egg just hatching was recorded. Brood fish pond adjacent pond water is used for hatchery operation

Statistical analysis

All the experiments were performed in quintuplicate and results are presented as mean ± SEM (Standard Error of Mean). The results are considered to be significant at $P<0.05$. All statistical analysis was performed in MS-Excel and the graphs were drawn using Graph Pad prism5 software.

3. Results and discussion

Physico-chemical parameters of the water during the breeding experiments were found to be within the optimum range (Table 1).

The influence of temperature on fertilization, hatching rates and hatching time of CPGE and Ovatide injected *P. hypophthalmus* eggs are represented in table 2 and 3 respectively. The graphical representations of these results were also given in figure 1 to figure 3. Results of fertilization rate in CPGE and Ovatide induced fish, at 28°C and 30°C treatments showed values higher than 80% and were not significantly different ($p>0.05$) from each other, whereas 24, 26, 32°C and 34°C treatments showed the lowest percentages ($p<0.05$). Hatchability of the fish eggs at 28°C and 30°C were not significantly higher between each other although they were significantly higher than those of 24, 26, 32°C and 34°C. The same results are observed in fish group induced by Ovatide. The results also suggest that the difference in temperature as a single parameter could adopt the egg development rate. Incubation temperature leads to a significant difference in time to hatch. The observations reveal that the hatching time decrease when the temperature increases, which indicates a positive correlation between incubation temperature and embryonic development rate.

Table 1: Physico-chemical parameters during the breeding experiments.

S. No.	Parameters	
1	Dissolved Oxygen mg/l	8.4 – 8.6
2	pH	7.2
3	Total Alkalinity mg/l	185
4	Total Hardness mg/l	280
5	Free carbon dioxide	--
6	Iron (mg/l)	0.1-0.2
7	Water temperature °C	24- 34

Table 2: Effect of temperature on fertilization and hatching rate (%) of CPGE induced *P. hypophthalmus* eggs.

Weight of fish		Crude pituitary gland extract (mg/Kg)		Eggs produced In lacks	Temperature (° C)	% of fertilization	%of hatching	Time taken for hatching (h)
Female	Male	Female	Male					
2.82±0.054	2.42±0.036	5,14	5	4.2±0.179	24	64	62	20±0.360
2.84±0.040	2.38±0.054			4.5±0.089	26	72	70	19±0.434
2.81±0.058	2.39±0.080			4.4±0.134	28	92	84	18±0.481
2.79±0.107	2.42±0.054			4.4±0.268	30	89	88	16±0.420
2.81±0.062	2.40±0.063			4.5±0.179	32	78	72	15±0.540
2.78±0.035	2.41±0.067			4.2±0.268	34	62	58	14±0.250

*Each value is represented as mean ± SEM (n=5); Values are significant at $p<0.05$.

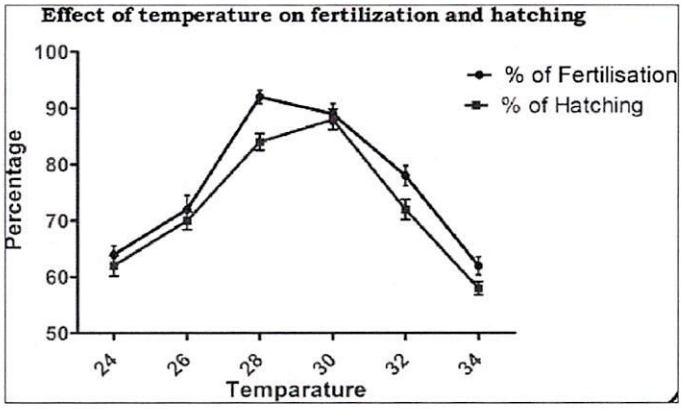

Fig 1: Effect of temperature on fertilization and hatching rate (%) of CPGE induced *P. hypophthalmus* eggs

Table 3: Effect of temperature on fertilization and hatching rate (%) of Ovatide induced *P. hypophthalmus* eggs.

Weight of fish		Ovatide (ml/Kg)		Eggs produced In lacks	Temperature (° C)	% of fertilization	%of hatching	Time taken for hatching (h)
Female	Male	Female	Mle					
2.88±0.035	2.62±0.089	0.2	0.1-0.2	4.0±0.017	24	62	57	20±0.510
2.85±0.053	2.58±0.035			4.2±0.536	26	70	70	18±0.432
2.86±0.035	2.49±0.080			4.3±0.357	28	90	81	17±0.340
2.82±0.107	2.48±0.098			4.3±0.268	30	86	84	16±0.420
2.83±0.107	2.50±0.062			4.3±0.089	32	74	68	15±0.520
2.82±0.089	2.49±0.080			4.1±0.357	34	60	58	14±0.120

*Each value is represented as mean ± SEM (n=5); Values are significant at $p<0.05$.

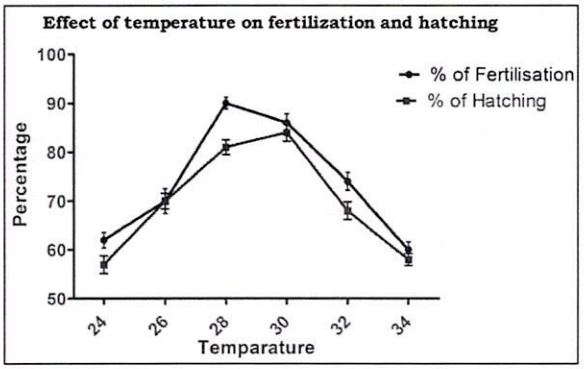

Fig 2: Effect of temperature on fertilization and hatching rate (%) of Ovatide induced *P. hypophthalmus* eggs

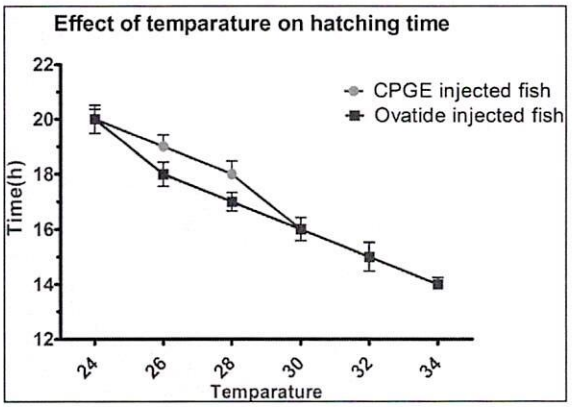

Fig 3: Effect of temperature on hatching time of CPGE and Ovatide induced *P. hypophthalmus* eggs

The study of the effect of temperature on fertilization and hatching rate of *P. hypophthalmus* eggs shows an interesting water temperature range that can be established for the culture of this specie, with some considerations. Fertilization and hatching rates showed values above 80%. Fertilization rate of *P. hypophthalmus* eggs at 28°C and 30°C was significantly not different from each other in the various treatments because this selected range of temperature support fertilization of fish eggs as one of the warm water fishes. The results of hatchability also show that temperature treatments of 28 – 30°C significantly improve the hatchability of the fish eggs as temperature has main effect on hatching of fish eggs. It was reported that growth of larvae increased at the optimum temperature range of 28-30°C and no eggs hatched at 20°C and 38°C for *Cyprinus carpio* (El-gamal, 2009) [4]. It is most likely that temperature affects the tolerance level of viable eggs as documented by (El-gamal, 2009) [4]. The optimum range for good hatchability of catfish eggs was proved to be 28-30°C as this temperature range is reported to be an acceptable water temperature range for warm water fishes (El-gamal, 2009) [4].

The results in this study indicated that the optimum temperature for hatchability of the eggs lies between 28°C and 30°C. Similar results were also obtained by S.A. Okunsebor (2015) [12] in their study of on *Heterobranchus bidorsalis*. The present finding also agrees with the results found for other fish species according to Nwosu and Holzlohner (2000) [8]. At 24, 26, 32 and 34°C, hatchability was found highly reduced indicating that the temperature was very low or very high, influence the development of egg in hatchery. In addition, when temperature becomes super optimal, it influences negatively the efficiency of yolk utilization (Brett JR and

Groves, 1979) [1]. Temperature also affects physiological processes (Brett, 1979) [2] in fish hatchlings.

Temperature influence is the single most important factor that determines growth rates in fish (Brett, 1979) [2]. Above 55-70% survival rate of hatchlings, found at 24-26°C seems reasonable but in this study 28- 30°C gave above 80% survival of hatchlings during yolk sac larval stage optimum temperature range of 28-30°C plays an important role for improving fertilization, hatchability and embryonic development within a limited period. This finding is very important as 40- 45% mortality at this stage can affect directly fish production.

4. Conclusion

Temperature has significant effect on fertilization and hatching rate of *Pangasius hypophthalmus.* Temperature range of 28-30°C significantly supported fertilization and hatchability rates of *P. hypophthalmus* eggs while 80% survival of hatchlings during yolk sac stage was achieved at 28- 30°C. High rate of fertilization and hatchability of the Pangasisus eggs was achieved at 28- 30°C is highly recommendable for fry production.

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A Study of the Difference of Leadership Styles of Bharathi Cement Corporation Private Limited

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Dr. G. Haranath*

Abstract
This paper attempts to study the differences in the leadership styles as perceived by the leaders and sub-ordinates in a private sector enterprise. The study has revealed that differences do exist in different leadership styles - authoritarian, participative, bureaucratic, task-oriented and nurturant, as perceived by the leader himself and perceived by the subordinates in **Bharathi Cement Corporation Private Limited** (BCCPL). In this paper, the authors made an attempt to identify the differences in leadership styles as perceived by the leaders and subordinates in BCCPL.

I) Introduction

The essentials of leadership are the same to all leaders in all positions due to the variation in the skills required, roles played, functions performed, issues tackled and the relationships promoted, different leaders have different perceptions of leadership. And, several attributes have been made both for the success and failure of leadership in the form of properties and processes or traits and styles of leaders. Further, even these attributes cannot provide a totally satisfactory guidance for the success of leadership. Hence, theoreticians and practitioners of leadership have developed the 'contingency approach'.

II) Concept of Leadership

Twentieth century has witnessed several theories on leadership which is a complex concept having a bearing on motivation, morale, organizational climate, human relations, and communication. The ability to influence people in a group is indispensable in organizations. Beginning with scientific management the evolutionary process of leadership can be traced with three theories viz., trait theory, behavioural theory and contingency theory. The trait theory has been put to rigorous research by Byrd, Jennings, Gheselli, Stogdill etc., and resulted in the development of behavioral theory. Likert's system 4 theory, McGregor x and y theory, Continuum theory of Tannenbaum and Schmidt, etc. has opened new vistas on the behavioural dimensions of leadership. The confusion and controversy of trait and behavioural theories have given way to the contingency models of leadership like Fiedler's contingency model, Vroom and Yetton contingency model, path goal theory, life cycle theory, tri-dimensional model, learning model, etc.

III) Review of Literature

Several studies made by different authors in both theoretical and empirical spheres of Leadership. Such as Weschler, Kahane and Tannenbaum, McCurely and Eber, Spector and Suttell, Calvin, Hoffmann and Harden, Fox, Mullen, Thiagarajan and Deep, Verma, Kalra, Sinha, Omer Bin Sayeed, Syed Vazith Hussain,etc. they studied the leadership in various views.

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IV) Need of the Study: The previous research studies do not make any attempt to study the differences in the leadership styles from the leader point of view and subordinates point of view. The present study attempts to analyze different styles of leadership and its perceptions by their subordinates.

V) Objectives of the Study is to find out the differences in leadership styles as perceived by the leaders and the subordinates in the BCCPL.

Hypotheses

H0: There is no significant difference in the leadership styles as perceived by the leader himself and those perceived by his subordinates.

VI) Methodology of the Study

The study is mainly based on primary data collected. The present study confines itself to Higher, Middle and lower hierarchical levels in BCCPL. The leadership styles were measured as judged by the leader himself (Leader's Self Perception). For the analyses of leadership styles of the Higher and Middle level employees, the leader's self perception was used. Five Leadership Styles as judged by the leader himself viz., Authoritarian, Participative, Bureaucratic, Task-Oriented and Nurturant leadership styles were used. The total sample for the study consists of 260 officers of BCCPL. Many studies have been undertaken on leadership styles adopted in different organizations. But relatively only a few attempts have been made to study the leadership styles in BCCPL.

VII) Analysis

The analysis of the difference between leadership styles as judged by leader himself and as judged by his subordinates of different levels of employees of BCCPL.

The leader's self perception and the subordinate's perception on leader leadership styles reveals about the leadership styles of Top Level Leaders, Middle Level Leaders and Junior Level Leaders of BCCPL.

The various scores on five leadership styles such as 'dictatorial leadership style', 'participative leadership style', 'bureaucratic leadership style', 'task-orientation leadership style' and 'nurturant leadership style's were computed from both leader's evaluation of ones own leadership style and followers judgment on superior's leadership styles.

With a view to find out difference between leadership style of a superior, as judged by the Top Level Leaders themselves and as perceived by his immediate followers, the analysis is done at three levels viz., Higher Level Leaders, Middle Level Leaders and Junior Level Leaders. Firstly, for the Top Level Leaders, the leader self perception scores were juxtaposed with the average score on subordinates (Middle Level Leaders) perception on superior leadership style. Secondly, for the Middle Level Leaders, the leader self perception scores were juxtaposed with the average score on subordinates (Junior Level leaders) perception on superior leadership style. Thirdly, for the Junior Level Leaders, the leader self perception scores were juxtaposed with the average score on subordinates (Clerks) perception on superior leadership style. For all this 't' test is useful to discover the substantial difference among the leaders self perception and as perceived by their immediate subordinates.

a) The difference between leadership styles of Top Level Leaders self perception and as perceived by their subordinates of BCCPL.

The degree of freedom (df) for the 't' value is N_1+N_2-2. Top Level Leaders of BCCPL stood 9, where $N_1= 9$, Top level Leaders subordinates stood at 49, where $N_2=40$, the $df=N_1+N_2-2=>9+49-2=57$. By linear interpolation for 57 degree of freedom (df) for the

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entries at 0.01 and 0.05 are 2.704 and 2.021 respectively. The calculated 't' value as per one star is at 0.05 level of significance and the calculated correlation value as per two stars is at 0.01 level of significance.

Table 1: Scores of 't', Standard Deviation and Mean values for five Leadership Styles in self-perception of Top Level Leaders and as perceived by their immediate subordinates of BCCPL

S.No.	Leadership Styles	Self perception of Top Level Leaders			perceived by his subordinates			't' value
		Mean	N	Standard Deviation	Mean	N	Standard Deviation	
1	Authoritarian Leadership Style (A)	22.4	9	4.8	17.2	49	4.5	0.01
2	Participative Leadership Style (P)	24.1	9	1.3	22.2	49	3.3	0.01
3	Bureaucratic Leadership Style (B)	26.7	9	2.8	22.1	49	3.8	0.01
4	Task-orientation Leadership Style (T)	25.8	9	3.4	23.7	49	3.1	0.12
5	Nurturant Leadership Style (N)	25.6	9	3.3	23.7	49	4	0.12

Source: Data collected from field study

The results of the difference between leadership styles in terms of mean, standard deviation and 't' values as perceived by the leader himself i.e., Top Level leaders of BCCPL about their leadership styles and as perceived by their immediate subordinates about their superior leadership styles are given in Table 1

At BCCPL, the mean values of 'dictatorial leadership style', 'bureaucratic leadership style', 'task-orientation leadership style', 'participative leadership style', and 'nurturant leadership style' are higher as perceived by leaders at Top level Leaders than as perceived by Top level Leaders subordinates At BCCPL, the standard deviation values of participative leadership style is high in as perceived by leaders at Top level Leaders than as perceived by Top level Leaders subordinates signifying that the difference of opinions in self perception and followers judgment of leadership styles.

At BCCPL, the 't' values of the leadership styles as perceived by leaders subordinates are less than the critical value (A 0.01, $P < 0.05$; P 0.01, $P < 0.05$; B 0.01, $P < 0.05$; T 0.12, $P < 0.05$ and N 0.12, $P < 0.05$) in 'dictatorial leadership style', 'bureaucratic leadership style', 'participative leadership style', 'task-orientation leadership style' and 'nurturant leadership style' as perceived by leaders at Top level Leaders than as perceived by Top level Leaders subordinates signifying that the perceptions of leaders about their leadership styles and subordinates perceptions of leaders leadership styles do not differ significantly.

As a result, the statement of null hypothesis "there is no significant difference in leadership styles of employees of BCCPL as judged by leader himself and as judged by his subordinates" is accepted.

b) The difference between leadership styles of Middle Level Leaders self perception and as perceived by their subordinates of BCCPL.

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The degree of freedom (df) for the 't' value is N_1+N_2-2. Middle Level Leaders of BCCPL stood 49, where N_1= 49, Middle level Leaders subordinates stood at 40, where N_2=40, the df=N_1+N_2-2=>49+40-2=87. By linear interpolation for 87 degree of freedom (df) for the entries at 0.01 and 0.05 are 2.660 and 2.000 respectively. The calculated 't' value as per one star is at 0.05 level of significance and the calculated correlation value as per two stars is at 0.01 level of significance.

Table 2: Scores of 't', Standard Deviation and Mean values for five Leadership Styles in self-perception of Middle Level Leaders and as perceived by their immediate subordinates of BCCPL

S.No.	Leadership Styles	Self perception of Top Level Leaders			perceived by his subordinates			't' value
		Mean	N	Standard Deviation	Mean	N	Standard Deviation	
1	Authoritarian Leadership Style (A)	19.9	49	3.5	16.1	40	5.1	0.01
2	Participative Leadership Style (P)	24.2	49	3.4	23	40	4.2	0.15
3	Bureaucratic Leadership Style (B)	23.3	49	5.2	26	40	2.8	0.01
4	Task-orientation Leadership Style (T)	26	49	2.5	24.2	40	3.5	0.01
5	Nurturant Leadership Style (N)	25.4	49	3.2	23.3	40	4	0.01

Source: Data collected from field study

The results of the difference between leadership styles in terms of mean, standard deviation and 't' values as perceived by the leader himself i.e., Middle Level Leaders of BCCPL about their leadership styles and as perceived by their immediate subordinates about their superior leadership styles are given in Table 2

At BCCPL, the mean values of 'dictatorial leadership style', 'task-orientation leadership style', 'participative leadership style', and 'nurturant leadership style' are higher as perceived by leaders at Middle level Leaders than as perceived by Middle level Leaders subordinates whereas the mean values of bureaucratic leadership style is lesser as perceived by leaders at Middle level Leaders than as perceived by Middle level Leaders subordinates. At BCCPL, the standard deviation values of 'authoritarian leadership style' and 'bureaucratic leadership style' is high in as perceived by leaders at Middle level Leaders than as perceived by Middle level Leaders subordinates signifying that the difference of opinions in self perception and subordinates perception of leadership styles.

At BCCPL, the 't' values of the leadership styles as perceived by leaders subordinates are less than the critical value (A 0.01, $P < 0.05$; P 0.15, $P < 0.05$; B 0.01, $P < 0.05$; T 0.01, $P < 0.05$ and N 0.01, $P < 0.05$) in 'dictatorial leadership style', 'bureaucratic leadership style', 'participative leadership style', 'task-orientation leadership style' and 'nurturant leadership style' as perceived by leaders at Middle level Leaders than as perceived by Middle level Leaders subordinates signifying that the perceptions of leaders about Middle level Leaders

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leadership styles and subordinates judgments of their leaders leadership styles do not differ significantly.

As a result, the statement of null hypothesis "there is no significant difference in leadership styles of employees of BCCPL as judged by leader himself and as judged by his subordinates" is accepted.

c) The difference between leadership styles of Junior Level Leaders self perception and as perceived by their subordinates of BCCPL.

The degree of freedom (df) for the 't' value is N_1+N_2-2. Junior Level Leaders of BCCPL stood 40, where $N_1= 40$, Junior level Leaders subordinates stood at 202, where $N_2=40$, the $df=N_1+N_2-2=>40+202-2=240$. By linear interpolation for 240 degree of freedom (df) for the entries at 0.01 and 0.05 are 2.576 and 1.960 respectively. The calculated 't' value as per one star is at 0.05 level of significance and the calculated correlation value as per two stars is at 0.01 level of significance.

Table 3: Scores of 't', Standard Deviation and Mean values for five Leadership Styles in self perception of Junior Level Leaders and as perceived by their immediate subordinates of BCCPL

S.No.	Leadership Styles	Self perception of Junior Level Leaders			perceived by Junior Level Leaders subordinates			't' value
		Mean	N	Standard Deviation	Mean	N	Standard Deviation	
1	Authoritarian Leadership Style (A)	21.2	40	4.9	18	202	4.4	0.01
2	Participative Leadership Style (P)	25.6	40	3.6	22.5	202	3.9	0.01
3	Bureaucratic Leadership Style (B)	23.3	40	3.9	23.4	202	4.4	0.81
4	Task-orientation Leadership Style (T)	26.3	40	2.4	23	202	3.1	0.01
5	Nurturant Leadership Style (N)	27.4	40	2.3	23.3	202	3.1	0.01

Source: Data collected from field study

The results of the difference between leadership styles in terms of mean, standard deviation and 't' values as perceived by the leader himself i.e., Junior Level Leaders of BCCPL about their leadership styles and as perceived by their immediate subordinates about their superior leadership styles are given in Table 3

At BCCPL, the mean values of 'dictatorial leadership style', 'bureaucratic leadership style', 'task-orientation leadership style', 'participative leadership style', and 'nurturant leadership style' are higher as perceived by leaders at Junior level Leaders than as perceived by Junior level Leaders subordinates. At BCCPL, the standard deviation values of 'dictatorial leadership style', 'bureaucratic leadership style', 'task-orientation leadership style', 'participative leadership style', and 'nurturant leadership style's is less in as perceived by leaders at Junior level Leaders than as perceived by Junior level Leaders

subordinates signifying that there is no difference of opinions in self perception and followers judgment of leaders styles.

At BCCPL, the 't' values of the leadership styles as perceived by leaders subordinates are less than the critical value (A 0.01, $P < 0.05$; P 0.01, $P < 0.05$; B 0.81, $P < 0.05$; T 0.01, $P < 0.05$ and N 0.01, $P < 0.05$) in 'dictatorial leadership style', 'bureaucratic leadership style', 'participative leadership style', 'task-orientation leadership style' and 'nurturant leadership style' as perceived by leaders at Junior level Leaders than as perceived by Junior level Leaders subordinates signifying that the perceptions of leaders about Junior level Leaders leadership styles and subordinates judgments of leaders leadership styles do not differ significantly.

As a result, the statement of null hypothesis "there is no significant difference in leadership styles of employees of BCCPL as judged by leader himself and as judged by his subordinates" is accepted.

VIII) Findings

No significant difference is found in leadership styles at Higher, Middle, Lower Level Managers as judged by leader himself and as judged by his immediate subordinates in BCCPL.

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A Study Of Relationship Between Leadership Styles As Perceived By Leaders In Bharathi Cement Corporation Private Limited

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Abstract
The understanding of leadership has ever been very difficult due to the complexities involved in it. As such the concept of leadership creates more puzzles than solutions. The objective of the study is to examine the relationship betweenLeadership Styles of the employees in BCCPL. The study found at Higher Level Managers, Middle Level Managers and Lower Level Managers the leadership styles were correlated among themselves in BCCPL.

I) Introduction

Leadership means many things to many people. This is due to the changing environment of leaders in different roles in different functions in different settings starting from leadership of the family to the top positions in multinational organizations. Twentieth century has witnessed several theories on leadership which is a complex concept having a bearing on motivation, morale, organizational climate, human relations, and communication. The ability to influence people in a group is indispensable in organizations. Beginning with scientific management the evolutionary process of leadership can be traced with three theories viz., trait theory, behavioural theory and contingency theory. The trait theory has been put to rigorous research by Byrd, Jennings, Gheselli, Stogdill etc., and resulted in the development of behavioral theory. Likert's system 4 theory, McGregor x and y theory, Continuum theory of Tannenbaum and Schmidt, etc. has opened new vistas on the behavioural dimensions of leadership. The confusion and controversy of trait and behavioural theories have given way to the contingency models of leadership like Fiedler's contingency model, Vroom and Yetton contingency model, path goal theory, life cycle theory, tri-dimensional model, learning model, etc.

II) Research Methodology and Design

The understanding of leadership has ever been very difficult due to the complexities involved in it. As such the concept of leadership creates more puzzles than solutions.
The specific objectives of the study are to examine the relationship of Leadership Styles of the employees in BCCPL.
HYPOTHESES: The hypotheses formulated for the study is
H0: There is no significant relationship among Leadership Styles of employees in BCCPL.

Methodology

The study is mainly based on primary data collected. The present study confines itself to Higher, Middle and lower hierarchical levels in BCCPL. The leadership styles were

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measured as judged by the leader himself (Leader's Self Perception). For the analyses of leadership styles of the Higher and Middle level employees, the leader's self perception was used. Five Leadership Styles as judged by the leader himself viz., Authoritarian, Participative, Bureaucratic, Task-Oriented and Nurturant leadership styles were used. The total sample for the study consists of 260 officers of BCCPL. Many studies have been undertaken on leadership styles adopted in different organizations. But relatively only a few attempts have been made to study the leadership styles in BCCPL.

III Analysis of relationship among leadership styles as perceived by leaders in BCCPL

This research paper discusses the leadership styles as perceived by the leaders themselves of BCCPL

In BCCPL the total sample of the study belonging to three functional levels. The leader's self perception reveals about the styles of higher level and Middle level officers of BCCPL. Scores on five leadership styles were computed from leader's evaluation of ones own style. In this section the presentation and discussion of the data pertains to the relationship among leadership styles of officers in BCCPL.

Inter-Correlation of Leadership Styles of Bccpl

Table 1: Inter-correlation of Leadership Styles for Top Level Leaders of BCCPL (N=9)

Leadership Styles	Authoritarian leadership style	Participative leadership style	Bureaucratic leadership style	Task-orientation leadership style	Nurturant leadership style
Authoritarianleadership style		-0.34	0.01	-0.21	-0.24
Participative leadership style			0.33	**0.93	0.55
Bureaucratic leadership style				0.46	*0.71
Task-orientation leadership style					*0.78
Nurturant leadership style					

Source: Data collected from field study

The results of inter correlations among Leadership Styles (such as authoritarian leadership style, participative leadership style, bureaucratic leadership style, task-orientation leadership style and nurturant leadership style) for Top level leaders of BCCPL are given in Table 1

Event 'task-orientation' leadership style is significantly correlated and progressively correlated as per 'participative' leadership style ($r = 0.93$, $P < 0.01$) signifying 'participative' leadership style rises by the rise of 'task-orientation' leadership style. Event 'nurturant' leadership style is significantly correlated and progressively correlated as per 'bureaucratic' leadership style ($r = 0.71$, $P < 0.05$) signifying that 'bureaucratic' leadership style increases by the rise of 'nurturant' leadership style. Event 'nurturant' leadership style

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is significantly correlated and progressively correlated as per 'task-orientation' leadership style ($r = 0.78$, $P < 0.05$) signifying 'task-orientation' leadership style rises by the rise of 'nurturant' leadership style. The other leadership styles are found not to be significantly inter correlated with any other leadership styles. The other leadership styles are rather, not dependent on each other leadership styles.

As a result, the statement of null hypothesis "there is no significant relationship among leadership styles of employees of BCCPL" is not accepted in the event of case of 'task-orientation' vs 'participative leadership style', 'nurturant leadership style' vs 'bureaucratic leadership style' and 'nurturant leadership style' vs 'task-orientation leadership style' and the above null hypothesis is accepted in all other events.

Middle Level Managers

The degree of freedom for the inter-correlation is N-2. Middle Level leaders of BCCPL stood 49, where N=9, the df=49-2=47. By linear interpolation for 47 degree of freedom the table values at 0.01level of significance is 0. 365 and at 0.05 level of significance is 0.282. The calculated correlation value as per one star is at 0.05 level of significance and the calculated correlation value as per two stars is at 0.01 level of significance.

Table 2: Inter-correlation of Leadership Styles for Middle Level Leaders of BCCPL (N=49)

Leadership Styles	Authoritarian leadership style	Participative leadership style	Bureaucratic leadership style	Task-orientation leadership style	Nurturant leadership style
Authoritarianleadership style		0.01	*0.31	0.12	*-0.36
Participative leadership style			0.25	0.21	*0.36
Bureaucratic leadership style				**0.46	0.14
Task-orientation leadership style					**0.47
Nurturant leadership style					

Source: Data collected from field study

The results of inter correlations among Leadership Styles (such as authoritarian leadership style, participative leadership style, bureaucratic leadership style, task-orientation leadership style and nurturant leadership style) for Middle level leaders of BCCPL are given in Table 2

The 'authoritarian' leadership style is significantly correlated and progressively correlated as per 'bureaucratic' leadership style ($r = 0.31$, $P < 0.05$) signifying that 'authoritarian' leadership style rises by the intensification of 'bureaucratic' leadership style. 'authoritarian' leadership style is also significantly correlated but adversely correlated with 'nurturant' leadership style ($r = -0.36$, $P < 0.05$) signifying 'bureaucratic' leadership style declines by the proliferation of 'authoritarian' leadership style . The 'participative' leadership style is significantly correlated and positively correlated as per 'nurturant'

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leadership style ($r = 0.36$, $P < 0.05$) signifying 'nurturant' leadership style rises by the upturn of 'participative' leadership style. The 'task-orientation' leadership style is expressively correlated and progressively correlated as per 'bureaucratic' leadership style ($r = 0.46$, $P < 0.01$) signifying 'bureaucratic' leadership style upturns with the proliferation of 'task-orientation' leadership style. The 'task-orientation' leadership style is considerably correlated and progressively correlated as per 'nurturant' leadership style ($r = 0.47$, $P < 0.01$) signifying that 'nurturant' leadership style intensifications by the rise of 'task-orientation' leadership style. The other leadership styles are found not to be significantly inter correlated with any other leadership styles. The other leadership styles are rather, not dependent on each other leadership styles.

As a result, the statement of null hypothesis "there is no significant relationship among leadership styles of employees of BCCPL" is not accepted in the event of case of 'bureaucratic leadership style' vs 'authoritarian leadership style', 'nurturant leadership style' vs 'authoritarian leadership style', 'nurturant leadership style' vs 'participative leadership style', 'task-orientation leadership style' vs 'bureaucratic leadership style' and 'nurturant leadership style' vs 'task-orientation' leadership styles and the above null hypothesis is accepted in all other events.

Comparison of Inter-Correlation of Leadership Styles of BCCPL between Top Level Leaders and Middle Level Leaders

In Top level leaders of BCCPL, the event 'task-orientation' leadership style is significantly correlated and progressively correlated as per 'participative' leadership style; the event 'nurturant' leadership style is significantly correlated and progressively correlated as per 'bureaucratic' leadership style; the event 'nurturant' leadership style is considerably correlated and confidently correlated with 'task-orientation' leadership style whereas in Middle level leaders of BCCPL, the 'authoritarian' leadership style is considerably correlated and progressively correlated as per 'bureaucratic' leadership style ; 'authoritarian' leadership style is also considerably correlated but adversely correlated as per 'nurturant' leadership style; the 'participative' leadership style is significantly correlated and progressively correlated with 'nurturant' leadership style; and the 'task-orientation' leadership style is significantly correlated and progressively correlated as per 'bureaucratic' leadership style; the 'task-orientation' leadership style is considerably correlated and progressively correlated with 'nurturant' leadership style.

Junior Level Leaders

The degree of freedom (df) for the inter-correlation is N-2. Junior Level leaders of BCCPL stood 40, where N=40, the df=40-2=38. By linear interpolation for 7 degree of freedom the table values at 0.01level of significance is 0. 434 and at 0.05 level of significance is 0.315. The calculated correlation value as per one star is at 0.05 level of significance and the calculated correlation value as per two stars is at 0.01 level of significance.

Table 3: Inter-correlation of Leadership Styles for Junior Level Leaders of BCCPL (N=40)

Leadership Styles	Authoritarian leadership style	Participative leadership style	Bureaucratic leadership style	Task-orientation leadership style	Nurturant leadership style
Authoritarianleade		0.18	**0.73	**0.5	**0.44

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rship style					
Participative leadership style			0.14	**0.49	*0.37
Bureaucratic leadership style				**0.59	**0.49
Task-orientation leadership style					**0.83
Nurturant leadership style					

Source: Data collected from field study

The results of inter correlations among Leadership Styles (such as authoritarian leadership style, participative leadership style, bureaucratic leadership style, task-orientation leadership style and nurturant leadership style) for Junior Level Leaders of BCCPL are given in Table 3

The 'bureaucratic' leadership style is significantly correlated and progressively correlated as per 'authoritarian' leadership style ($r = 0.73$, $P < 0.01$); and 'task-orientation' leadership style is significantly correlated and positively correlated as per 'authoritarian' leadership style ($r = 0.5$, $P < 0.01$) and also 'nurturant' leadership style is significantly correlated and progressively correlated as per 'authoritarian' leadership style ($r = 0.44$, $P < 0.05$) signifying 'authoritarian' leadership style increases by the rise of, 'task-orientation' leadership style, 'nurturant' leadership style and 'bureaucratic' leadership style. The 'task-orientation' leadership style is significantly correlated and progressively correlated with 'participative' leadership style ($r = 0.49$, $P < 0.01$) and 'nurturant' leadership style is significantly correlated and progressively correlated as per 'participative' leadership style ($r = 0.37$, $P < 0.05$) signifying 'participative' leadership style increases with the escalation of 'task-orientation' leadership style and 'nurturant' leadership style. The 'task-orientation' leadership style is significantly correlated and progressively correlated as per 'bureaucratic' leadership style ($r = 0.59$, $P < 0.01$) and 'nurturant' leadership style is significantly correlated and progressively correlated as per 'bureaucratic' leadership style ($r = 0.49$, $P < 0.05$) signifying that 'bureaucratic' leadership style increases with the proliferation of 'nurturant leadership style' and 'task-orientation' leadership style. The 'nurturant' leadership style is significantly correlated and progressively correlated as per 'task-orientation' leadership style ($r = 0.83$, $P < 0.01$) signifying that 'task-orientation' leadership style intensifications by the rise of 'nurturant' leadership style. The other leadership styles are found not to be considerably inter correlated with any other leadership styles. The other leadership styles are rather, not dependent on each other leadership styles.

As a result, the statement of null hypothesis "there is no significant relationship among leadership styles of employees of BCCPL" is not accepted in the event of case of 'bureaucratic leadership style' vs 'authoritarian leadership style', 'task-orientation leadership style' vs 'authoritarian leadership style', 'nurturant leadership style' vs 'authoritarian leadership style', 'task-orientation leadership style' vs 'participative leadership style', 'nurturant leadership style' vs 'participative leadership style', 'task-orientation leadership style' vs 'bureaucratic leadership style', 'nurturant leadership style'

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vs 'bureaucratic leadership style', and 'nurturant leadership style' vs 'task-orientation leadership style' and is accepted in all other cases.

Comparison of Inter-Correlation of Leadership Styles of BCCPL between Middle Cadre Managers and Junior Cadre Managers

In Middle cadre managers of BCCPL, the 'authoritarian' leadership style is considerably correlated and progressively correlated as per 'bureaucratic' leadership style ; 'authoritarian' leadership style is also significantly correlated but negatively correlated with 'nurturant' leadership style; the 'participative' leadership style is significantly correlated and progressively correlated as per 'nurturant' leadership style; and the 'task-orientation' leadership style is significantly correlated and progressively correlated as per 'bureaucratic' leadership style; the 'task-orientation' leadership style is considerably correlated and progressively correlated as per 'nurturant' leadership style, whereas in Junior Level Leaders of BCCPL, the 'bureaucratic' leadership style is expressively correlated and progressively correlated with 'authoritarian' leadership style and 'task-orientation' leadership style is considerably correlated and positively correlated with 'authoritarian' leadership style and also 'nurturant' leadership style is considerably correlated and positively correlated as per 'authoritarian' leadership style; the 'task-orientation' leadership style is considerably correlated and progressively correlated as per 'participative' leadership style and 'nurturant' leadership style is considerably correlated and progressively correlated as per 'participative' leadership style; the 'task-orientation' leadership style is considerably correlated and progressively correlated with 'bureaucratic' leadership style and 'nurturant' leadership style is considerably correlated and positively correlated as per 'bureaucratic' leadership style; the 'nurturant' leadership style is considerably correlated and progressively correlated as per 'task-orientation' leadership style.

IV) Findings

In BCCPL, the correlation among leadership styles exists at various levels in various leadership styles at various significant levels.

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NATIONAL SEMINAR PAPER

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FILM PROVIDES AUTHENTIC AND VARIED LANGUAGE

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ABSTRACT

"Art is not a mirror held up to society, but a hammer with which to shape it."

-Leon Trotsky.

CINEMA and LITERATURE are connected and related to each other but still they are different in their own ways. It has always been one of the most fascinating forms of knowledge which has made great impact on human psyche.

From the early magical experiments till the recent release of Ron Howard's Angels & Demons the relationship between cinema and literature has always been closely intertwined. It has proved on the whole a successful symbiosis, a relationship that remains to this day as inextricable as it is fruitful. Some half century ago, even one French film critic proposed the question as to whether the cinema was capable of surviving without the twin crutches of literature and theatre and the answer was "no". Cinema is a nascent art, and as such, it has sought in its most vulnerable years succour from the previous generations of theatre and literature. This Borgesian library traversing ages, cultures and continents, written in a thousand languages, incorporating multitudinous philosophies and wildly incompatible theologies is the rich and fertile soil in which cinema has firmly planted its roots and has ever since flourished because it has recourse to the literature of millennia. Cinema has been a thousand years in the making. Language teachers have been using films in their classes for decades, and there are a number of reasons why film is an excellent teaching and learning tool.

Keywords: *Film as Language learning tool- Motivation- Culture- Second Language.*

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LEARNING FROM FILMS IS MOTIVATING AND ENJOYABLE

Motivation is one of the most important factors in determining successful second-language acquisition. Films and TV shows are an integral part of students' lives so it makes perfect sense to bring them into the language classroom. Film, as a motivator, also makes the language learning process more entertaining and enjoyable.

Another benefit of using film is that it provides a source of authentic and varied language. Film provides students with examples of English used in 'real' situations outside the classroom, particularly interactive language – the language of real-life conversation. Film exposes students to natural expressions and the natural flow of speech. If they are not living in an English-speaking environment, perhaps only film and television can provide learners with this real-life language input.

FILM GIVES A VISUAL CONTEXT

The visuality of film makes it an invaluable language teaching tool, enabling learners to understand more by interpreting the language in a full visual context. Film assists the learners' comprehension by enabling them to listen to language exchanges and see such visual supports as facial expressions and gestures simultaneously. These visual clues support the verbal message and provide a focus of attention.

VARIETY AND FLEXIBILITY

Film can be used to develop all four LSRW communicative skills. For example, a whole film or sequence can be used to practise listening and reading, and as a model for speaking and writing. Film can be used among the students for discussions, debates on social issues, role plays, reconstructing a dialogue or summarising. Given the benefits of using film in the language learning classroom, it is not surprising that many teachers are keen to use film with their students, and an increasing number of them are successfully integrating film into the language-learning syllabus. Until quite recently it was difficult to find pedagogically sound film material to help students improve their language through watching film, and teachers had to spend many hours creating their own materials. However, with the advent of the internet there is now a wealth of online resources for both language teachers and their students. With so many resources, it's sometimes difficult for teachers to see the wood for the trees.

LESSON PLANS

One can find many websites and blogs which provide detailed and well-structured lesson plans based on film and television clips, short films and viral videos, which save the busy teacher a lot of time. These lesson plans engage the student in a challenging, imaginative study of contemporary debates which are shown in films. They create fascinating fields of study and explore the brain of the students.

HOW CINEMA AND LITERATURE ARE RELATED

It is said that if you're going to see a movie based on a book you think is worth reading, read the book first, you can never read the book with the same imaginative responsiveness to the author once you have seen the movie.

Cinema is also used in a response to poetry. The tapes and films were chosen out of the American experimental tradition to exemplify various techniques of marrying the two arts. Poetry as the art of utterance and cinema the art of showing, both whole on their own, don't easily make a good couple. But these film and video makers have taken up the challenge anyway by responding to the spirit and the letter of the poet, creating an original cinematic writing. Cinema and language meet head on, not unified as in conventional film, but remaining distinct and dancing, stepping on toes, wooing each other with the charms of mouth and eye and mind. You'll see images' own syntax shuffled, blended, chafing and dovetailing with language; you'll hear and read poets' work while seeing and hearing filmmakers'.

CONCLUSION

In the beginning stages, literature and films both provide good thoughts and Religious beliefs. Later stage, Film became fully commercial and Literature is hanging between good thoughts and commercial elements.

SOURCES

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ESTRANGED IDENTITY IN *THE IMMIGRANT*

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ABSTRACT

Indian literature in English has journeyed a long way to achieve its glory and grandeur through its various forms like poetry, prose, drama and fiction. In the realm of fiction literature has heralded a new era and has earned many laurels. The genre of fiction encompasses the entire gamut of life and society, its expressions, beliefs, and aspirations. The fictions treatment of life and its problem are realistic. It is realism that distinguishes novel from the earlier prose romances. The novel does not provide escape from life and its problem, but rather a better understanding of them.it also reflects the very spirit of the age in which it is written. Women writers in India are moving forward with their strong and sure strides matching the pace of the world. They are bursting out in full bloom spreading their own individual fragrances. They are recognized for their originality, versatility and the indigenous flavor of the rich soil that they bring out to the world.

Keywords: *Immigrants- Quest for Identity- Adjustment- Post colonial world.*

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INTRODUCTION

Manju Kapur's *The Immigrant* (2008) deals with the cultural conflict and the havoc that western culture is creating on the lives of Indian Immigrants by tearing them apart between traditional and western norms. She is one of the most accomplished and highly acclaimed contemporary Indian English Women Novelists. The main content of the paper refers to marital bliss and women's role at home, particularly in the culture where Individualism and prated are often considered as alien ideas. Contemporary women authors are now communicating themselves candidly and courageously on multiple themes without adhering feminist perspectives.

Immigrants are usually caught between the traditional culture and the cultures of the alien land. *The Immigrant*, by Manju Kapur as the title suggests, divides its fictional locals between India and Canada in the vexed context of globalization with far greater emphasis than any earlier Kapur's novel. However, the conflict between western and eastern cultures, the twisting of family cords when people leave for a foreign country and India's unvarying class system in contrast to the more slacken social customs of the west. Different from its predecessors, the novel is only to a limited extent set in India. The major characters, Nina and Ananda are both NRI (Non-resident Indians) engaged to new lifestyles in Canada in the seventies.

The novel begins with the descriptions of Nina's mundane life that appears to have forgone all the chances of spousal bliss. The conventional notion that a girl's ultimate goal is to marry someone subdues her line of thought and prepares her to feel empty. Though thirty she didn't accept for any "*humdrum marriage*" (3). Nina's search and longing ends with the introduction of Ananda made to her, a Canada based Dentist. Their steady living for each other and their resolution to marry brings change in Nina's life. It is an opportunity for Nina as she has almost lost her hope. She gains totally a new identity by marrying Ananda, who is an expatriate. Thus the story is concerned with the Indian couple - Nina and Ananda, the difficulties that are associated with their arranged marriage, and Nina's conversion into the role of an immigrant. Primarily the paper is constructed on the idea of migration through an arranged marriage. It also explores common themes like multinational habitus, cultural predicaments, selfhood and patriarchy. The paper extends across the spaces of the host nation, Canada and the home land, India.

The migration strategy and custom climate in Canada at that period of story setting, was indicative of a proliferating Indian immigrant category. It was almost over a decade from 1960s to early 1970s that immigrants from non-European nations were licensed to migrate under the '*skilled worker class - an immigrant class based on the point system according to one's skill set*' (Walton –Roberts) However, Nina's case is different as she migrates to Canada under the category of 'family reunification class' because of her marriage to Canadian Indian-born husband. Immediately after she leaves India to meet her husband Ananda in Halifax, consequently begins her life as an immigrant in Canada.

The word 'immigrant' represents an unstable migrant. The moment she gets down the flight at the Toronto Airport, she faces the discomfiture of being 'othered'. By sending a note she conveys her misery to her husband. "*They stopped me at Toronto...They kept asking me questions... They were treating me like a criminal... they wouldn't treat a European or American like that... They did it because we are third world*" (109).

Nina's journey across the spaces shown in the paper is that of striving for realizing her selfhood as a woman and as an immigrant in Canada. Ananda's journey is quite similar to that of self - discovery especially when he attempts to find a solution to his overhasty ejaculation. The paper ends with the note of Ananda discovering a solution to his sexual worries and Nina detecting her new identity by moving around as an immigrant in Canada. Nina in due course finds out about Ananda's disloyalty and decides to go away from married life and begins her life afresh in the province of New Brunswick. It is primarily interested in disclosing the problems of the newly emerging women and their identity. The major female characters in this paper denounce the male domination and the marginalization of woman. Nina too contributed her part in that way over here.

The paper promoted this viewpoint that a

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woman is never considered as an independent person as she has always been assigned to a inferior and marginal position in our society.

> Man can think of himself without woman. She cannot think of herself without man and she is simply what man decrees... she appears essentially to the male as a sexual being. For him she is sex... absolute sex, no less. She is defined and differentiates with reference to man and not he with reference to her; she is the incidental the inessential as opposed to the essential (1952:1-2).

Nina migrates to Halifax in Canada, which is a small east coast city with a lesser Indian immigrant population instead of the big metropolitan cities like Toronto, Montreal and Vancouver. If she has to relocate to any other city her lifestyle and identity would have been shaped up in a different manner. Since there were habitual Indian communities in these cities, maybe she would have sustained on her Indian traditions, food and clothes more intensely being contended to be Indian in the midst of Indian community while experiencing indistinguishable adjustment issues in Canada. Or it may be because many of these communities are not belonging to the same social class as her, she is not in a position to relate and thus feel detached and moderate to her fellow immigrants.

Two important aspects that can be observed in Nina's case here, that is prior to her arrival and after her arrival in Canada. One is her clothes and the other is that she is a vegetarian. Coincidently both these aspects find their way of change when there is a shift in Nina's transnational habitus towards a complete western way of living. She reaches Canada with her traditional wear, saris and salwar khameez, etc. The fact that she wears these clothes for her daily as well as social occasion gives much distress to Ananda. She strictly follows her Indian habitus thinking that by wearing such traditional clothes one can continue to be an integral part of one's own identity here it is of an Indian woman. Not a word of appreciation from her own husband, but everyone else in the story commends her traditional attire as 'exotic and beautiful' and a most suitable complement to her may be exotic 'Indian' feature and looks.

The references to clothing are countless all over the novel, consequently designating an important sign of identity for Nina, how it associates her to India and how she is recognized by others.

> *She took out her saris and stroked the intricate woven surfaces. Benarasi, Kanjeevaram. Orissa patola, Gujarati patola Bandhani; she had fancied carrying all parts of India to Canada in her clothes. She spread the brightest one on the bed, and gazed at the magic of the green, yellow and red Gujarati weave* (112).

When it comes to food habitus Nina is shocked to know that Ananda has changed into non-vegetarian leaving back Indian cuisine back to India itself. After her arrival at Halifax, "*She thought of the recipes her mother had anxiously written for her*" (112), that is of no use to her in Canada. Nina thinks that vegetarianism is the essential element of their culture and supposes that food binds them to the memories they have about India. The author also gives much importance to this. The process of cooking and eating the Indian food in the novel exemplifies the model consumption of that which Indians prefer to have.

> *Turmeric...red chillie.. onions and garlic... releasing sweet sharp smells... cumin and coriander... these smells and imagined sights travelled across the world from north India to western Canada to kick her sharply in the stomach* (139)

The sense and feeling of immigrant has a deep impact on Nina's psyche. She feels that Indians leaving the country as immigrants slowly because "*they are not among one those who fled persecution, destitution, famine slavery and death threats*" (120). The paper disclosed the pungent surveying of the various dilemmas of the Indian immigrants is commendable. She opines:

> Certain Indians become immigrants slowly.....immigrants are always in two minds. Outwardly they adjust well. Educated and English speaking, they allow misleading assumptions about a heart that is divided. In the new country they work lengthy hours to

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> gain entrance into the system, into society, into establishing a healthy bank account. ... As far as citizenship is concerned, a divided heart means that the immigrant clings to his status Feeling that to give up his passport is the final break in the weakened chain that binds him to his motherland. ...Forget the smells, sights, sounds you were used to, forget them or you will not survive. There is new stuff around, make it your own; you have to (121).

To adjust to the new environment she further complaints -"*Forget the smells, sights, sounds you were used to, forget them or you will not survive. There is new stuff around, make it your own, you have to*" (121). Arriving at alien land as an immigrant and as a wife becomes more difficult for Nina to manage the situation. Alienation and insecurity surrounds her. Consciousness of immigrant haunts her. Nina explains the situation:

> The immigrant who comes as a wife has a more difficult time. If work exists for her, it is in the future, and after much finding of feet. At present all she is, is a wife, and wife is alone for many, many hours. There will come a day when even books are powerless to distract. When the house and its conveniences can no longer completely charm or compensate. Then she realizes she is an immigrant for life. (121-122).

To overcome such situation she starts thinking of doing job. Though she was teaching in Delhi University the qualifications was not sufficient to teach at Canada. She joins Library School so that she can do job in Canada. Slowly and slowly Nina starts enjoying life in Canada. She starts changing her food and dress habit and confined to those which can suit Canadian life style. She realizes that it is in her control to keep herself happy. It is on her own that she can find the answers to her selfhood.

Consequently Nina freed herself from the patriarchal restrictions; she faced through the various processes in her life in Canada and changed her identity: the ability to choose her own career through education, the ability to decide whether she wants to have children, her sexual freedom, her change in dress and image, and eventually her decision to leave her husband.

The immigrant's psyche indulges in a continuous interaction with the traditional culture of the native home and the adopted culture of an alien land. It ushers a reconstruction in the inherited custom and culture of 'the immigrant'. Cultural diversity which the immigrants are concerned with is primarily dealt with in this paper. Immigration necessitates them to embrace the contrasting culture of an unknown land snapping down the native boundaries. Moving to a new country no more causes separation but may be perceived as rebirth and reinvention in a new place, city, and country noticeable for their new culture. The belongings of the past never be discarded but continues to stay even when someone approaches it to explicate and consider the alien experience.

Twenty first century is witnessing the influential role of Globalization. In the recent times every concept or idea is judged and appreciated for it universal value on the global platform. Migration of the people to a foreign country is easy because of eased transportation but the conditions are hard to adjust, far from one's native land. The home and identity are two important things every individual's life. Though people are living in an alien culture, they are very much connected to their roots and to their respective native lands. They keep a separate space for their native-land in their minds. These people are not ready to compromise on their own customs and traditions. Indians are there in all over the world like, USA, UK, Canada, Australia, South Africa, West Indies, etc. These Indians, who are living outside India, have established mini India in their home. They follow simultaneously the Indian calendar to celebrate all Indian festivals and partake in cultural practices. Bill Ashcroft and others comment on this diaspora: "*Diaspora, the voluntary or forcible movement of peoples from their homelands into new regions, is a central historical fact of colonization*" (2004:68-69).

Thus, This paper dares to break certain conventional attitudes that are never questioned in our society. The last three decades witnessed Indian women writers-novelists and poets, who are writing

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in English as well as regional languages, have shown a tremendous courage in dealing with the formerly prohibited and forbidden topic of female sexuality. Through many twists and turns which explore this space and reveals the myriad impediments that are firmly rooted in the family system, such as uprising against the age-old tradition, the search for selfhood, woman's rights and the politics of marriage. Nina's decision to forge an identity of her own away from her husband reminds us of the protagonist's words in Kamala Das's - *"I Shall Someday Leave: I shall someday leave, leave the cocoon you built around me with morning tea, Love words flung from doorways and of course Your tired lust"* (150)

Her realization that *"when one was reinventing oneself, anywhere could be home"* (334).empowers her and we see in her a newly gained confidence, courage and identity. Viewed from the angles of the gyno critics the narrative of the novel is authentically feminine.

Like Showalter, the renowned feminist author Helen Cixous also subscribes to the view that writing is of the body and that a woman doesn't write like a man, because she speaks with the body. She advocates: *"woman must write herself: must write about women and bring women to writing"* (320). Kapur has indeed, written with her – 'self'.

The Post-Independence era has witnessed the emergence of a large number of novelists whose works offer - interesting insights into the many ways in which the standard authentic notion of language has been subverted (Ashcroft, et. al, 2004:68-69).

CONCLUSION

The present day multicultural societies are a result of extensive Diaspora that has taken place over the last 200 years and now more so with the advent of globalization. Immigration of the Indians to US, England, Canada and Australia in the 20th century was mainly a personal choice either for academic pursuit or for economic gain but their acceptance in the alien lands has not come without contestations. The inhabitants of these countries have always reacted differently toward these immigrants, isolating them and resisting their assimilation into the main stream. The immigrants have always faced a close contesting culture which has always been followed by their attempts to adjust or engross, either to be known by a separate identity as a racial group or be assimilated.

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THE EXISTENCE OF MULTICULTURALISM IN JHUMPA LAHIRI'S *INTERPRETER OF MALADIES:* A STUDY

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ABSTRACT

The purpose of this paper is to understand how a diasporic framework influences multicultural identity with reference to Jhumpa Lahiri's *Interpreter of Maladies*. A diasporic identity provides a greater confidence to a exile writer who standing outside the national boundaries. Their diasporic locations in the U.S. or Britain and other countries which have well established broad looking communities provide them with a greater freedom. This research will explore this theme by taking into account the work of Jhumpa Lahiri's *Interpreter of Maladies.* The paper will analyze how futile attempts are made to redefine national, racial and sexual boundaries.

Keywords: *Transnational boundary- Multi cultural Identity- Diasporas experiences- cross- cultural relationship- immigrant experiences*

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Literature is not only a recorded expression of the creative age and heightened sensibility of the artists but also adds colours and life to reality. It is a depiction and celebration of life. Literary works are portrayals of the thinking patterns and social norms prevalent in society. In fact, works of art are the faithful representation of different factors of common life. Classical works of literature serve as food for thought and tonic for imagination and innovativeness. In the age of rapid globalization the formal and informal power of brain – border civil society networks are unpromisingly increasing the policymakers, business leaders, scholars and the civil societies themselves. In this context, Diasporas hold a great significance.

An expatriate writer's work represents Diasporas experiences and explores phenomena of migration, cultural displacement and its impact onthe memorial. Every writer is influenced by his mentor or mentors. But he becomes great through his/her originality and nobility of expression. Lahiri has many things about her own practices of writing, her personal life and the influence of the contemporary writers on her. But she has something new in her literary output which is a great contribution to the contemporary culture of writing and that newness has brought her so many laurels. As a short story writer,Jhumpa Lahiri inculcates a new meaning and a new perspective in her short fiction. Her stories describe some of her own experiences. She sincerely presents the predicaments of the diasporic way of life. Basically she is an objective storyteller who delineates Diaspora culture dispassionately. Jhumpa's less use of images and simple language with plain functionalism is her chief attribute as a mature writer. She presents attractive stories in order to compel reader's attention. She uses less number of similes and metaphors. She can create a picture in words. In her stories, actions flow like a perennial river that never dries up. The stories end with ease, without any torment of seldom invoking surprise of suspense in mind and heart of the readers. Jhumpa Lahiri's maiden venture of short story collection *Interpreter of Maladies*(1999) has won her the prestigious *Pulitzer Prize for Fiction* in the year 2000.

Jhumpa Lahiri has travelled extensively to India and has experienced the effects of colonialism and Diasporic issues parallel to it. She feels strong ties to her parents homeland -India especially Calcutta as well as the United States and England. Growing up with ties to all the three countries created in Lahiri a sense of homelessness and an inability to feel accepted. Lahiri explains this as an inheritance of her parent's ties in India. Lahiri, the daughter of a librarian and school teacher, has always been inclined to creative writing.

This shows the existence of multiculturalism in her works. Her works present themes such as cultural and social changes, struggle for preserving distinctions of being Indian, faith in cultural and religious practices, rituals and traditions, conflict between past and present immigrant's experiences faith in spirituality and disregard of materialism, conflict between tradition and modernity belief in the theory of Karma, mysticism, cross- cultural relationship and a sense of humanity. Though used in different ways, she used these themes very creatively. In fact, she has a heart of suggesting various things in a single situation. Themes like social-cultural changes, immigrant's experiences, faith in Indian Tradition and struggle for preserving Indian culture, immigrant experiences, and disregard of material life are found throughout the book. These themes mark Indianness. East West encounter, alienation in foreign land, sense of displacement, adaptation of new culture, sense of unbelonging mark multiculturalism.

The stories of *Interpreter of Maladies* are built upon the specificthematic structure of communication and interpretation. The characters communicate to express their feelings to others in order to escape from the traumas of their inner turmoil. They are in dilemma and need diagnostic interpretation. But, the interpretation is not easy. There are two possible reasons for that: one is an error in preferring an appropriate person who is supposed to have the interpretation of the malady. Secondly what they aim is different for which they are expecting interpretation. It means that they are unable to exactly identify what the malady is. So the interpretation is ineffective. Defective communication leads to the defective diagnosis. The

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Interpreter of Maladies is a collection of nine short stories with the themes of identity, immigrant experiences, cultural differences, love and family. The characters are largely Indian or Indian American and their stories together paint an evocative picture of Indian's Diaspora. Her art in the collection of stories is unique in its scope and is babbling simple. There are varied engagements between pain and memory; for the cause of pain that memory recalls behind each painful experience is subjective and is different in each story of *Interpreter of Maladies*. Pain in *Interpreter of Maladies* might well be seen as a way expressing the inexpressible. Like truth, it transcends the narration one way or the other and stays beyond definite meanings. Each individual in this book has his/her way of looking things and the probable truth, and thus senses different kinds of implications in similar incidents. One's search for relief amidst the prevailing pain is frequently occurring feather of almost all the stories.

A *Temporary Matter* might be read as an attempt for temporary erasing of memory to escape its tortures. It is a story about a childless couple desperately attempting to come to terms with the fact of the death of their only child. The narrative could be thought of in terms of a pain that complicates their relationship seriously enough for either to carry on with his / her normal married life. It recounts a pain that evades a narration, a catastrophe tale of a broken marriage in which no one, in particular, could be accused of being responsible for the disaster. The pain that ensues after the death of the newly born child in the personal lives of the couple engulfs in their private spaces that it becomes impossible for them to carry on together. Thought no one could be said responsible for the death of the child, each looks at other with hatred, with suspicion, as if blaming him/her for the tragedy.

Interpreter of Maladies expresses pain in so many different and complicated ways that there appears to be no single specified way of expressing it in *A temporary matter*, at one point of time the idea of the impermanence of the taste of food is contrasted with the permanence of pain that has come to stay in the lives of Shoba and Sukumar and that had deeply influenced two of them living under the same roof. Against the permanence of pain, other emotions appear impermanent. The readers can notice the way both Shoba and Sukumar talk to each other. They seem incapable of communicating with each other without inflicting pain. They speak only to deliberately hurt one another by narrating events that prove painful to the couple. Their way of hurting each other might be termed sadistic but they derive pleasure by inflicting their pain. The story pats their way of communicating with each other in the manner, which has already mentioned, proves an unhealthy relation between the pair. Further talks only prove to be more hurting and intense in inflicting pain. After Sukumar discovers that Shoba has been ruthless in her decision to stay away separately, Sukumar discloses the secret which he had promised to himself not to let Shoba know is about the birth and subsequent death of their baby, a fact to which he had access till then and had suffered under its burden alone.

Interpreter of Maladies also relates to loss of love between husband and wife who earlier thought of being in love and continued to stay with each other. The pain that emerges at a later stage and engulfs the entire relationship becomes the cause of a major reach. It can be seen as an extension of loss of love between the couple in *A Temporary Matter* where the couple is unable to feel the same affection and bonding they once had felt for one another. Those were the days they were newly married and 'eager to make love' even before they finished eating their dinner. Now they have lost interest in one another so that neither they can talk freely nor briefly enjoy each other's company. It is interesting to see how they both deliberately avoid one another in the small house and find reasons to hide behind their work to shun company.

CONCLUSION

Thus one can observe that the characters in Lahiri's works are always conscious about their history. Their disorder, disintegration and violation cause in them a sort of neurosis. To attain order they turn to different things. Some go to fantasy; some escape physically, some face reality. Indianness in characters forms one of the crucial part of her works. It is through the Indianness of characters that she succeeds in her desired themes. Is it what forms

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Indianness in characters is their sensibility, love for humanity, pride for culture, faith in traditions and rituals, longing for order, and unmistakable faith in testing? Indians always preserve their trust in God. In what ever dilemma they are, they remember God for inspiration and guidance. Her works deal with internal strife and changing human predicament among identities and cultures. One of the themes Lahiri deals is the search for identity, as defined by the self, by others, by location, and by circumstances. In Lahiri stories, everything including gender, homeland, geography, occupation and self within the community can act in determining and qualifying identity. Lahiri brings up interesting questions as to what can and what cannot act as agents in the discrimination of identity and many of her characters struggle against or conform to outside definition.

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LITERATURE, CULTURE AND ENGLISH LANGUAGE TEACHING & LEARNING

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ABSTRACT

Literature is a good source for English language learners to know the culture and beliefs of various people. Literature, Language and Culture are inter-connected and are mutually dependent in social life. Culture can be incorporated while teaching literature in second language teaching and short stories are the best vehicles to teach culture. Literary works is included in the course material of the language classroom to enable the learners to understand the culture of the target community better and to practice the target language in different aspects. Culture plays a very important role in language teaching because some of the words in the foreign language refer to specific meanings in a particular society, which may not be understood by the members of other cultures unless the cultural context is explained. Literature cannot be taught and understood without understanding the cultural context in which it is used. Culture provides adequate and authentic materials and it also provides interesting practical situations in teaching learning process. And this type of teaching learning process enable the learners to attain proficiency in English language as the learners spent much time in reading, listening and analyzing. There is an increasing need in incorporating cultural components in English as second language textbooks in the present as well as in the future under the phenomena called globalization as the English language is the tool for international communication mainly for business and politics. This paper discusses the importance of teaching culture through literature in English language classroom to know the societal values, beliefs and cultural elements of different communities. A few implications are also provided to the language teachers and policy makers.

Keywords: *Literature, Culture, English Language, Language Teaching,Learning.*

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INTRODUCTION

Teaching culture through literature is important in the language classroom as societal values, beliefs, cultural elements and attitudes are incorporated into communicative approach. It also increases the effectiveness of English language teaching and learning. The main aim of language teaching is to enhance linguistic abilities of the learners along with cultural competence which can be together called as intercultural competence. In present day language classrooms, teachers are expected to include cultural components in teaching because of paradigm shift in language teaching with a different outlook on culture. This outlook emerges from social sciences i.e culture as a broad term that embraces in it many aspects of a society like arts, food, environment, customs and traditions, religious practices, ethics, morals and manners. Consequently, culture includes everything that man has either acquired or learnt in his individual and social life. Anthropologist like Ward H. Goodenough believes that "Culture is an idealized cognitive system- a system of knowledge, beliefs, and values that exist in the minds of individual members of society" (Qtd. in Casson 17). Culture provides adequate and authentic materials and also interesting practical situations in teaching learning process. According to Krasner, linguistic competence alone is not enough for learners of a language to be competent in that language but they also should know the cultural background to learn better.

LANGUAGE AND LITERATURE

Literature is rooted in language and language gets life through Literature. So Literature and language are closely interconnected. According to Lazar (1993), Literature should be used in the classroom and must encourage the students to learn as it is a motivating stimulus for language acquisition; students enjoy it and also improve their communication skills. Literature, a convenient source of content for a course in foreign language, provides motivating materials for language teaching. Carter and Long (1991) equally agree that Literature is a legitimate and valuable resource for language teaching. Valdes (1986) opines that it is simply accepted as given that Literature is a viable component of second language programs at the appropriate level and that one of the major functions of Literature is to serve as a medium to transmit the culture of the people who speak the language in which it is written. It means, when one teaches literature in the language classroom, he/she is teaching language for communication in various contexts and situations.

LANGUAGE AND CULTURE

In the present industry world, employees must communicate with people from different cultural and linguistic backgrounds every day. While communicating, intonation, the use of non-verbal cues and inference play a large role in conveying information, and preferences around these communication methods differ widely by culture. Brooks (1986) argues that physically and mentally everyone is the same, while the interactions between persons or groups vary widely from place to place. Hantrais (1989) puts forth the idea that culture is the beliefs and practices governing the life of a society for which a particular language is the vehicle of expression. Therefore, everyone's views are dependent on the culture which has influenced them, as well as being described using the language which has been shaped by that culture. The understanding of a culture and its people can be enhanced by the knowledge of their language. This brings us to an interesting point brought up by Emmitt and Pollock (1997), who argue that even though people are brought up under similar behavioural backgrounds or cultural situations but however speak different languages, their world view may be very different. Language is rooted in culture and culture is reflected and passed on by language from one generation to the next (Emmitt & Pollock 1997). From this, one can see that learning of a new language involves the learning of a new culture (Allwright & Bailey 1991). Consequently, teachers of a language are also teachers of culture (Byram 1989).

LITERATURE AS A RESOURCE FOR LANGUAGE TEACHING

Literary texts may be used in the language classroom as a resource for language development. McKay (2001) argues that using literature in the language classroom provides three major advantages for learners:

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- It demonstrates the importance of authors' choice of form to achieve specific communicative goals,
- It is an ideal resource for integrating the four skills- reading, writing, listening and speaking,
- It raises cross-cultural awareness.

In addition to the advantages mentioned above, Lazar (1993, p.14) explains the following benefits of using literature in the language classroom for the learners:

- It is very motivating
- It provides authentic material
- It has general educational value
- It is found in many syllabi
- It enables students to understand another culture
- It is a stimulus for language acquisition
- It develops students' interpretative abilities
- It is highly valued and has a high status
- It expands students' language awareness
- It encourages students to talk about their opinions and feelings

CULTURE AS A SOURCE FOR ENGLISH LANGUAGE TEACHING

Language competence does not only include the knowledge of grammatical principles and sentence construction, but also knowledge of the norms that link language to social and cognitive context. Many teachers and students seem to overlook the fact that knowledge of grammatical systems has to be complemented with culture-specific meanings. It is therefore essential for language teachers to approach language learning with this in mind, as the understanding of this relationship is central to the acquisition of linguistic and cultural competency. It is impossible to teach a language without its culture for culture is the necessary context for language use (Stern, 1992, p.205). Claire Kramsch remarks that it is important to be aware that culture in language learning is not an expendable fifth skill; it is present within writing, reading, listening and speaking. She emphasizes the role of context and the circumstances in which language can be used accurately and appropriately. (c.f. Kramsch 1). Culture offers various authentic materials to enhance the dynamics of a class in particular for the undergraduate students. The structure of a language can determine the way in which speakers of that language view the world. The meanings of a particular language can also represent the culture of a particular social group. It is impossible to understand a culture without having some form of understanding of its language. When people learn another language, it helps them to learn about the world. Learning a language is therefore learning the behaviour of a given society and its cultural customs. Language is a product of the thoughts and behaviour of a society.

Language and culture have a function of communication as they both carry meanings. On the one hand, language carries syntactic, semantic and pragmatic meanings for language users to communicate (Brooks, 1997). On the other hand, culture carries meanings and cultural meanings are expressed through patterns of behaviour i.e. language. In order to communicate successfully across languages and cultures, one must understand culturally different norms of interaction and people's values and thoughts (Saville-Troike, 2003).

IMPLICATIONS FOR LANGUAGE TEACHING

1. Teachers must instruct the students on the cultural background of language usage. If one teaches language without teaching about the culture in which it operates, the students are learning empty or meaningless symbols or they may attach the incorrect meaning to what is being taught. The students, when using the learnt language, may use the language inappropriately or within the wrong cultural context, thus defeating the purpose of learning a language.
2. Language teachers must realize that the meaning of the text is bound in cultural context. So the teachers not only explain the meaning of the language used, but the cultural context in which it is placed as well. Often meanings are lost because of cultural boundaries which do not allow such ideas to persist. Language teachers must remember that people from different cultures learn things in different ways.

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IMPLICATIONS FOR LANGUAGE POLICY

Policies for language teaching must encompass cultural values from the societies from which the languages are derived as well as being taught. In other words, when making policies regarding language teaching, one must consider the cultural ideologies of all and every student, the teacher, as well as the culture in which the target language is being taught. Language teaching policies formed with the cultural characteristics of both teacher and student in mind will not be prone to make assumptions about the appropriateness of students' behaviour based on the policy maker's own cultural values (Englebert 2004) but will increase cultural awareness. When creating policies, one must consider the cultural meanings of teaching materials used.

IMPLICATIONS FOR TEACHING LITERATURE

1. An English language teacher needs to be competent in both Literature and Language inorder to attain proficiency in English language. The Literature teacher should encourage the learners to master the language skills prescribed in the literary texts and the language teacher should use excerpts from the prescribed literary texts to illustrate various language components. Thus, the success or failure of the learners in English Language classroom would be a collective responsibility of both the language and literature teacher.
2. Literature provides various activities to stimulate critical and aesthetic responses such as reading, listening and viewing, discussing, writing and performing. Literature transports learners to other places and other times and exposes them to real-life values. The close study of literary language can reveal the infinite variety of expression available in English, which in turn can sensitize learners to its nuances, its beauty, its wit and its sounds. The literature teacher can show the learners how writing entails making choices to create an impact on the reader and through this, the study of the forms and structures of language such as vocabulary, grammar and syntax is transformed from being a series of exercises into something living and relevant to the learner's need to communicate effectively in a complex world.

CONCLUSION

There is a close association between Literature, Culture and Language. It is impossible for one to teach language without teaching literature and culture of the given society. Literature is an agent for language development and improvement. As a teacher of language, one must be culturally aware, considerate of the students` culture, and inform students of cultural differences thus promoting understanding. Literature is used in English Language teaching to broaden students' horizons by giving them knowledge of the classics of literature, to improve students' general cultural awareness, to stimulate students' creative and literary imagination and to develop their appreciation of literature. Literary texts offer a rich source of linguistic input and can help learners to practice the four language skills i.e. listening, speaking, reading and writing in addition to exemplifying grammatical structures and presenting new vocabulary. Culture is a product of the human mind and it is defined, propagated and sustained through language and literature. In other words, language gives full expression to people's values and norms. Thus, it is important to integrate literature and culture in language teaching as it provides authentic materials and factual situations for language teaching and learning.

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MAP APPROACH TO VOCABULARY ACQUISITION FOR ENGINEERING GRADUATES

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ABSTRACT

It is the greatest challenge for the teachers of second language to make the students feel at ease while expressing their ideas and feelings. Many people build their English vocabulary through a blend of methods – by reading books, reading English news paper and watching movies in English. Apart from these playing word and vocabulary activities is a valuable part of learning English language. By utilizing a variety of vocabulary learning activities is in an exciting, immersive format, teachers can engage students and help them achieve their vocabulary goals. Students who aspire to go abroad are obliged to take the test of English as a foreign language. Implementation of MAP activities (Mobilize, Accelerate and Procure) in vocabulary helps the students of Engineering to build vocabulary skills to get high-stakes in vocabulary-rich examinations such as the GRE, TOFEL and IELTS. A strong knowledge of English vocabulary is understandably important in scoring well on the GRE, TOFEL and IELTS. So this paper deals with advices to improve vocabulary skills.

Keywords: *MAP –Vocabulary learning Strategies- Cultural Environment.*

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NEED OF ENGLISH COMMUNICATION SKILLS IN INDIA

English has its one of a kind significance in our nation. It has assumed a vital job in building current India. At present, it is one of the significant dialects utilized for correspondence on the planet. In our nation we have individuals living in various states talking distinctive dialects. Be that as it may, here English assumes a fundamental job of a scaffold. It helps distinctive locals of various provincial tongues to impart one another. English is a dialect which joins us with the outside world. The possibilities of work for a man knowing about English are brilliant in each nation.

In India, individuals going from North to South for instructor or business generally impart in English dialect, and it is one reason that it has turned into a connection dialect. Remembering this, the parliament has likewise perceived English as an official dialect notwithstanding Hindi. Every one of the actualities of history and improvements in present day India underline the proceeded with significance of learning English notwithstanding vernaculars. We should make the best utilization of English to create ourselves socially and socially so we can contend with the best in the realm of psyche, and matter. English dialect is our easy route window to the world.

In India, the official dialect in corporate world is English. A man can make fast walks in the administration stepping stool just in the event that he can communicate in English smoothly. In the event that one needs to work with multinational organizations, there organizations will keep running with the exchange with different nations. English is the basic dialect for correspondence.

ADVICE HOW TO IMPROVE SPECIFIC VOCABULARY

The vast majority of the understudies of Engineering wrap up that scholastic or particular vocabulary is conceivably the best test for acing English for Specific Purposes. The activities described may help the students to improve their specific vocabulary by:

- Allocating a particular vocabulary opening toward the finish of every scholarly session.
- Teaching understudies to examine word reference sections with an emphasis on historical underpinnings and levels of custom.
- Selecting perusing, composing and oral practice materials from fitting sources, for example, News papers, Magazines for outlining scholarly and particular vocabulary recreations.
- Providing understudies with models of good practice to copy – this requires the capacity to utilize an extensive variety of particular vocabulary to bestow the learning in understudies.

The following are some suggestive MAP Activities to improve specific English vocabulary to the students of Engineering.

ACTIVITY 1: BRAIN STORMING POLY-SEMOUS VOCABULARY

Polysemy is the relationship of single word with at least two particular implications. A polyseme is a word or expression with numerous implications. "Polysemy" originates from the Greek for "some signs.

For instance: There is a three letter word that maybe has a greater number of implications than some other English three-letter word i.e. 'FIX'. It has numerous implications, for example, append, Arrange Get prepared (sustenance or beverages) repair, rebuff, set right (the hair).

PROCEDURE

- Select a few polysemous words which are useful to understudies in particular reason.
- Ask understudies to work in sets or gatherings.
- Give each match or gathering a couple of words to chip away at.
- Ask them to utilize their lexicons to discover whatever number faculties of each word as could be expected under the circumstances.

ACTIVITY 2: BREAKING HEADLINES

Numerous course book perusing errands begin with requesting that understudies take a gander at the title of the piece and anticipate what they will peruse from it. This is considerably more troublesome with a daily paper article in light of the

fact that the feature is frequently the most troublesome piece of the article to comprehend, and the equivalent is in any event as valid for understudies perusing alone. For understudies who previously read the news a considerable amount, feature words can likewise be hard to use in regular discourse or even be best stayed away from. The action intends to show them the words they will regularly run over and demonstrate them if and how that vocabulary can be utilized in their own composition and discourse.One of the best approaches to construct vocabulary is to peruse books or Newspaper chatter segments. This isn't generally as hard as it sounds, and it is significantly more viable than some other strategy in light of the fact that enhancing the vocabulary while having a fabulous time, while perusing fascinating bit of books or news papers. Slice the features which give off an impression of being foggy to make the understudies immaculate in polysemous words.

PROCEDURE

- Put one of the features on the board and request that understudies work in sets utilizing their word references to discover why it is clever.
- Give each combine or gathering another feature to chip away at.
- Ask understudies to clarify the two implications of each feature. (On the off chance that the class is monolingual, request that they make an interpretation of the features into the two conceivable translation).

1. **Police begin campaign to run down jaywalkers**
2. **Safety experts say school bus passengers should be belted**
3. **Drunk gets nine months in violin case**
4. **Girl hit by car in hospital**

ACTIVITY 3: VOCABULARY GROUP -LABEL

List-group-label is a form of semantic mapping. The strategy encourages students to improve their vocabulary and categorization skills and learn to organize concepts. Categorizing listed words, through grouping and labeling, helps students organize new concepts in relation to previously learned concepts.

- It helps students organize their understanding of specific vocabulary and concepts.
- It builds on students' prior knowledge about a topic.
- It actively engages students in learning new vocabulary and content by activating their critical thinking skills.
- It teaches categorizing and labeling skills.

PROCEDURE

- Select a main concept in a reading selection.
- List: Have students brainstorm all the words they think relate to the topic.
    - Visually display student responses.
    - At this point do not critique student responses. Some words may not reflect the main concept, but hopefully students will realize this as they begin grouping the words in the next step.
- **Group**: Divide your class into small groups. Each group will work to cluster the class list of words into subcategories. As groups of words emerge, challenge your students to explain their reasoning for placing words together or discarding them.
- **Label**: Invite students to suggest a title or label for the groups of words they have formed. These labels should relate to their reasoning for the grouping.

ACTIVITY 4: VOCABULARY WORD WALLS

A word divider is an accumulation of words which are shown in extensive unmistakable letters on a divider, announcement board, or other presentation surface in a classroom. The word divider is intended to be an intelligent device for understudies and contains a variety of words that can be utilized amid composing and perusing.

- They provide a permanent model for high frequency words
- They help students see patterns and relationship in words, thus building phonics and spelling skills
- They provide reference support for children during reading and writing activities.

PROCEDURE

- Make words accessible by putting them where every student can see them. They should be written in large black letters using a variety of background colors to distinguish easily confused words.
- Teachers and students should work together to determine which words should go on the word wall. Try to include words that children use most commonly in their writing. Words should be added gradually — a general guideline is five words per week.
- Use the word wall daily to practice words, incorporating a variety of activities such as chanting, snapping, cheering, clapping, tracing, word guessing games as well as writing them.
- Provide enough practice so that words are read and spelled automatically and make sure that words from the wall are always spelled correctly in the children's daily writing.
- New information should be added on a regular basis.

ACTIVITY 5: TECHNICAL OXYMORON WORDS

A confusing expression is an interesting expression containing words that appear to negate one another. It's frequently alluded to as a logical inconsistency in wording. Likewise with other logical gadgets, confusing expressions are utilized for an assortment of purposes. Here and there they're utilized to make a tad of show for the peruser; now and again they're utilized to make a man stop and think, regardless of whether that is to chuckle or to ponder.

A typical ironic expression is the expression "a similar distinction." This expression qualifies as a confusing expression on the grounds that the words "same" and "contrast" have direct inverse implications. Uniting them into one expression delivers a verbally bewildering, yet captivating, impact.

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- Act naturally
- Alone together
- Amazingly awful
- Bittersweet
- Clearly confused
- Dark light
- Deafening silence
- Definitely maybe
- Farewell reception
- Sweet sorrow
- True myth

ACTIVITY 6: HOT VOCABULARY SEAT

This action can be utilized in general class movement. On the off chance that you show understudies who can work autonomously, you may utilize it as a little gathering or match movement once understudies know about the action's principles.

In this movement, one understudy is chosen to go to the front of the class and take the "last place anyone would want to be." The last place anyone would want to be is found a couple of feet before a writing slate, whiteboard, or graph. The understudy sits in a seat confronting his or her cohorts and with his or her back to the board or graph. The understudy likewise ought to have a reasonable perspective of the class word divider. The instructor or a colleague chooses a word from the word divider (or from understudies' spelling or vocabulary records) and composes that word on the board or diagram. The understudy in the last place anyone would want to be can't see the word, yet it is his/her business to figure the word by making inquiries that assistance to limit the conceivable outcomes. For instance, the understudy in the last place anyone would want to be might inquire

- Is it a noun?
- Does it have fewer than 10 letters?
- Does it have more than two syllables?
- Is the vowel *a* found in the word?
- Would this word be found in the first half of the dictionary?

As the student narrows down the word, the questions might get more specific. For example, if the students gets a positive response to the question *Is it an animal?,* then the follow-up questions might include *Is it bigger than a fox?* or *Does this animal live in the rain forest?* If the clues help the student narrow down the word to a handful of possibilities, the student might ask questions to narrow down those possibilities, such as *Does the word mean the same thing as [a definition of the word]?* or *Does the word rhyme with [another word]?*

Keep a tally of the number of questions/clues it takes for the student to guess the word.

CONCLUSION

On the entire, the activity based mostly approach was associate ready tool to reinforce the language skills of the scholars and created easier the thanks to attain the objectives of second acquisition. The ultimate insight that the investigator got eventually was the immediate would like for applying activities to English Teaching so as to form a true state of affairs wherever one will learn a language with real urge and interest. Though in several aspects English differs from the regional language (Telugu), the teacher would achieve success in teaching English by making English atmosphere within the category space with the ready facilitate of activity based mostly approach.

As results of the activities, students are going to be ready to describe the method of learning core vocabulary. By continuation that activity with a range of targeted vocabulary words, supported pragmatic operate students are going to be ready to outline specific Vocabulary words.

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ROLE OF CULTURE & CREATIVITY IN SHAPING HUMAN PERSONALITY

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ABSTRACT

"Creativity is inventing, experimenting, growing, taking risks, & making something new"

Man is not born as person. At birth he is an infant possessing the potentiality of becoming a person. As a result of a variety of experiences and under the influence of culture, social factors he becomes a person and comes to possess a personality. Personality is the result of many factors where every factor is responsible in shaping A person when interacts with environment, culture, society, parents, friends and to those who come in contact by chance learns behaviour. The five factors of personality are Biological, Social, Cultural, Physical Environment, & Situational Factors.

Culture is a word used for the way of life of group of people, which means the way they do things. Different groups may have different cultures. Culture is passed on to the subsequent generations through learning where as heredity is passed through genes. Culture is a system of behaviours and modes which we adopt unknowingly and unconsciously. Creative expression is a universal human phenomenon that is firmly grounded in culture itself. Creativity and divergent thinking are components of learning, skills tied to creativity, innovation; critical thinking, problem solving, collaboration and multimodal literatures are required to keep up with technology and an increasing connected world (Brandt, 2010).

Creativity is the act of turning new and imaginative ideas into reality. Creativity is characterised by the ability to perceive the world in new ways, to find hidden patterns, to make connections between seemingly unrelated phenomena, and to generate solutions. Creativity involves two processes: thinking, then producing. Our culture teaches us how to be and not to be. It motivates us to be creative by inspiring us at every situation. Koutilya's Ardhasastra, Morals of Vidura ,Code of Conduct of Dharmaraju, Determination of Droupadi, Generosity of Karna and Management Principles of Sri Krishna are few examples of our cultural heritage and as motivating factors of our personality. This paper focuses on the role of culture and creativity in shaping human personality.

Keywords: *Culture, Creativity, Personality, Behaviour, Society, Development , Factors Influencing , Divergent Thinking, Traits, Characteristics*

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"Creativity comes from a conflict of ideas"

Man is not born as person. At birth he is an infant possessing the potentiality of becoming a person. As a result of a variety of experiences and under the influence of culture, social factors he becomes a person and comes to possess a personality. The term 'personality' is derived from the Latin word 'persona' which means a mask. Herbert A. Bloch defined it as "the characteristic organisation of the individual's habits, attitudes, values, emotional characteristics which imparts consistency to the behaviour of the individual. All port defined personality as "the dynamic organization within the individual of those psychophysical systems that determine his characteristic behaviour and thought."

The five factors of personality are Biological, Social, Cultural, Physical Environment, & Situational Factors. Children are born in a family; inherit physical and psychological characteristics from their parents which become a part of their personalities. Some of the inherited traits are courage, coward, intelligence, weakness etc. When an individual interact with other persons it affects the personality of an individual. Social factors like group experiences and contacts with others influence the person whether it is good or bad and it becomes a part and parcel of that individual's personality. Both material as well as non-material culture affects personality of an individual, consciously or unconsciously and the individual acts accordingly.

Culture of any society determines the behaviour and personality of an individual as he/ she tries to behave according to the norms of that culture. Environmental factors include land, river, mountains, hills, forests, plain area, atmosphere etc which affect the personality to be good or bad, healthy or weak. All the feelings, emotions, ideas, attitudes, habits and behaviour as well as body structure are the result of physical environment of to which an individual belongs.

Every person face may situations in his life which enables him/her to change his/her behaviour. Personality is not the result of only one factor but every factor is responsible to give complete share in its formation. A person behave and his/her personality exists when interacts with environment, culture, society, parents, friends and to those who come in contact by chance.

Culture is a word used for the way of life of group of people, which means the way they do things. Different groups may have different cultures. Culture is passed on to the subsequent generations through learning where as heredity is passed through genes. The concept of culture is very complicated with several meanings. Culture is a system of behaviours and modes which we adopt unknowingly and unconsciously. It is a connection of ideas and feelings accepted by the majority of people in a society. (Rocher, 1972, 2004 P.No 142) Undoubtedly culture is learned. It includes all human phenomena which are not purely as a result of genetics. It is an integrated pattern of human knowledge, beliefs, behaviour, outlook, attitudes, values, morals, goals and customs shared by a society .In other words culture includes beliefs, arts, skills, moralities, laws, traditions, and behaviours that an individual, as a member of society gets from his own society(Taylor, 1974).

Culture is learnt by relating ourselves with other people that means through social interaction. It will be transmitted from one generation to the other. The elements are carried from one place to another. For example Indians who are migrated to other countries follows certain rituals which are pertinent to their religion and there by transmits them to the next generation as well as to others who are interested in them. Devotees from other countries to ISKON, PUTTAPARTHI, and SHRIDI who frequently visit India are another example for cultural exchange of ideas and beliefs. Similarly Inter-caste & Inter-religious marriages, living in group houses and gated communities also gives an opportunity to observe and learn various cultures. Words are the most significant tools of cultural heritage and poems, stories, epics, fictions; myths are some of the ingredients of the components of society's culture.

Indian culture is rich and diverse which made it as unique. Even though we have accepted modern means of living, improved our life style, our values and beliefs still remain unchanged because they are deeply rooted in our hearts, mind, body and soul. The humanity of the Indians made them to accept the reforming zeal of the British. The tolerance of Indians was exhibited through the principle of non-violence led by Mahatma Gandhi brought credit to India in the International arena.

Unity is another part of our culture where different castes and creeds live together, enjoys each other's rituals and celebrations. The elite business man and the common vendor on the road worship the same Deity and share the same news. Secularism is in our breath.

Hodgetts and Luthans feel that culture is the acquired knowledge that people use to interpret experience and generate social behaviour. This knowledge forms values, creates attitudes and influence behaviour. Culture becomes a flowing stream only when there is continuity of collective life of people. Such continuity is expressed in many ways

like common beliefs, customs, aspirations, goals, sharing of joy and pride. Culture has structure and well nit to bring changes in each component. It has an adaptive character.

Culture teaches many lessons and leads us towards right path. Mahabharata the great Indian epic is a big story house of stories. This book highlights the theory – how to avoid confrontation, rather than face it. It taught us to run institutions successfully and how to resolve problems in global management. Koutilya's ardhastra also talks about discipline as one of the management principles, which is of two kinds- inborn and acquired. He also pointed out the qualities of a trainable person as desire to learn (technical skills) effective listening ability (human skills), ability to reflect (design skills), and ability to reject false views (assertive skills), focus on truth not on any person9conceptual skills). Vidura also explained the personality traits of a good manager as one who is alert, set attainable goals, resilient, determined; perseverant which are highly essential even today to be successful in any field.

The real strength of any country lies in the development of human mind and body. The greatest challenge for our society today is to prepare the leaders of the future. Indian culture surviving science thousands of years has the foundation of universal truth. Indian culture teaches us inner quality of human being based on the concepts of self – management, self – control, self – realization.

Creativity is a powerful catch phrase. In Western societies it epitomises success, the modern, trends for novelty and excitement. Whether linked to individuals, enterprises, cities or regions creativity establishes immediate empathy, and conveys an image of dynamism. Creativity is a positive word in a society constantly aspiring to innovation and "progress".

To emerge culture-based creativity requires: - personal abilities (ability to think laterally or in a non-linear way, to be imaginative), - technical skills (often artistic skills or craftsmanship), - a social environment (a social context through notably education and learning that encourages, and appreciates creativity as well as an economy that invest in culture and culture-based creativity).

Culture-based creativity is an essential feature of a post-industrial economy. A firm needs more than an efficient manufacturing process, cost-control and a good technological base to remain competitive. It also requires a strong brand, motivated staff and a management that respects creativity and understands its process. It also needs the development of products and services that meet citizens' expectations or that create these expectations. Culture-based creativity can be very helpful in this respect.

Apple's success is intrinsically linked to the founder's vision that technology, marketing and sales alone are not sufficient to deliver corporate success. A key factor is to have people who believe very strongly in the values of the company and who identify it with as creators and innovators – the ad campaign "Think different" featuring Picasso, Einstein, Gandhi was described by Steve Jobs as a way for the company to remember who the heroes are and who Apple is.1 Apple has succeeded to create empathy for technology that other technology companies have failed to provide. The aesthetic of the product range, through innovative design, also yielded success.

Culture-based creativity is a fundamental means for industry and policy decision makers to adopt and implement more user-centred strategies (less about "making things" more about providing a service). Culture-based creativity helps to promote well-being, to create lifestyle, to enrich the act of consumption, to stimulate confidence in communities and social cohesion. It is increasingly used in the management of human resources, notably though artists-in-residence projects. Culture-based creativity is therefore a key input for businesses or public authorities which want to communicate more effectively, challenge conventions and look for new ways to stand out. It contributes to product innovation, to branding, to the management of human resources and to communication.

Culture contributes to strengthening social ties among communities and thereby nurtures individual as well as organisational self-esteem and ultimately well-being. Society plays an important role in developing and advancing creativity.

A fundamental external factor that influences creativity is education and learning. Education and learning play a fundamental role in shaping a creative environment. Art and culture have the ability to stimulate people's imagination and creativity in schools, in colleges and universities and in lifelong learning. Creativity in learning is about fostering "flexibility, openness for the new, the ability to adapt or to see new ways of doings things and the courage to face the unexpected." Imagination, divergent thinking and intuition need to be considered as important characteristics of progressive arts education – by schools, universities and further education providers. Creativity involves a combination of cognitive elements that involve the ability to "connect ideas", "to see similarities and differences", be "unorthodox"," be "inquisitive" and

"to question societal norms". Creativity is also the ability to connect with senses and emotions expression of the human soul. Many of these personality elements are common to artists and creative people.

FACTORS INFLUENCING CREATIVITY

1. Genetic factors – genes which are inherited from parents and previous generations.
2. Personality factors which includes intelligence, motivation, divergent thinking, culture observed in and out of the family
3. Psychological factors which involves the combination of conscious and unconscious.
4. Cognitive factors which are skills to think, to connect, and to create.
5. Management skills which helps to organise, collaborate and to identify the relationships
6. The cultural and social environment in which the person lives.

"Creativity is a process based on intrinsic value and motivation that is often spontaneous, rebellious and chaotic" and that can be stimulated whether in early life, at home, school or work by nurturing exploration. We would like to add that culture-based creativity is essentially an act of imagination relying on memories.

Creative expression is a universal human phenomenon that is firmly grounded in culture itself. Creativity and divergent thinking are components of learning, skills tied to creativity, innovation; critical thinking, problem solving, collaboration and multimodal literatures are required to keep up with technology and an increasing connected world (Brandt, 2010).

Creativity is the act of turning new and imaginative ideas into reality. Creativity is characterised by the ability to perceive the world in new ways, to find hidden patterns, to make connections between seemingly unrelated phenomena, and to generate solutions. Creativity involves two processes: thinking, then producing.

Your ability to generate innovative ideas is not merely a function of the mind, but also a function of five key behaviours that optimize your brain for discovery:

1.Associating: drawing connections between questions, problems, or ideas from unrelated fields

2.Questioning: posing queries that challenge common wisdom

3. Observing: scrutinizing the behaviour of others, and to identify new ways of doing things

4. Networking: meeting people with different ideas and perspectives

5.Experimenting: constructing interactive experiences and provoking unorthodox responses to see what insights emerge

CONCLUSION

Creativity is present everywhere in society, but one should recognise the specific role that culture, family, society play in fostering it; Arts and culture play an important role in education and lifelong learning, particularly as a means of promoting creative thinking, unlocking the creative abilities of people and helping to develop new skills for new jobs in an evolving socio-economic environment;

Culture and creativity are driving forces for the development of human individuals as well as societies. Those creative individuals help to enhance & revitalise national economies. Creativity generates and stimulates the intellectual minds to invent something new. Culture can be an important factor in tackling the challenges that the societies, are now facing, particularly the demographic changes, social cohesion, globalisation and sustainable development in welfare of mankind

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CULTURAL CONTEXT IN CHINUA ACHEBE'S'*THINGS FALL APART*'

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ABSTRACT

In this paper , the researcher likes to present the conflict that existed between the two cultures namely the Nigerian Igbo culture and the European culture created sparks in the imagination of the author Chinua Achebe. This article presents how Achebe's novel directs the misleading of the European novels that depict Africans as savages into a whole new light from an African perspective. He wanted to change the impression held in much of the Western world that African cultures were simple, one-dimensional, and impossible to understand. He wanted Nigerians and other African citizens to take pride in their wealth of cultural experience and history and value the same as he brings in the cultural context through the various aspects of traditions, customs, myths, proverbs economic status, family, religion and law .

Keywords: *Cultural gap- Nigerian Traditions- Customs-Myths- Law.*

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The individuals write their books as how they are always influenced by their society. Therefore, it is important to consider a work's cultural context. Culture can refer to the beliefs, customs, values, and activities of a particular group of people at a particular time. Substance produced by a given culture express these values in both open and unconscious ways. Works of literature are the best way to present one's culture in profundity. Cultural context looks at the society the characters that live in, at how their culture can affect their behaviour and their opportunities. It thinks about where and when each text is set, thinks about the values and attitudes that matter to these characters and about how they formed these beliefs. It checks if their culture has influenced them.

The most powerful forces in a society include religion, gender roles, attitudes towards sex and marriage, social status or class, job opportunities or emigration, (wealth or poverty), stereotypes or ethnic identity. The culture of a people is what marks them out distinctively from other human societies in the family of humanity. Culture is the cumulative deposit of knowledge, experience, beliefs, values attitudes, meanings, hierarchies, religion, notions of time, spatial relations, concepts of the universe, material objects and possessions acquired by a group of people in the course of generations through individual and group striving. Although culture — like religion — moulds the individual, it is its relativism and ethnocentrism that is the bane of humanity. Culture...refers to the totality of the pattern of behaviour of a particular group of people. It includes everything that makes them distinct from any other group of people for instance, their greeting habits, dressing, social norms and taboos, food, songs and dance patterns, rites of passages from birth, through marriage to death, traditional occupations, religious as well as philosophical beliefs. Culture is passed on from generation to generation.

The child just grows into and within the cultural heritage of his people. He imbibes it. Culture, in traditional society, is not taught; it is caught. The child observes, imbibes and mimics the action of his elders and siblings. This shows that every human being who grows up in a particular society is likely to become infused with the culture of that society, whether knowingly or unknowingly during the process of social interaction. In this paper, we shall be dealing with African culture and drawing examples from Nigerian Igbo culture. African culture, therefore, refers to the whole lot of African heritage. We could see that African culture embraces the totality of the African way of life in all its forms and ramifications.

For a long time the story of Africa is told most exclusively through the words of the European writers that began to change when the African countries achieved Independence and the African writers began to tell their own stories. Chinua Achebe had his early education in native missionary English medium school where he also learnt his Bible. However he was extremely interested in the early folk tales narrated by his elder sister. Thus he was exposed to cross road culture. After his completion of bachelor's degree in Ibadan University, Achebe went to England for his higher studies for more than six years and calls this period as a period of 'Self imposed exile'. He had the unique advantage of having witnessed the three land marks through which Africa passed. The departing glory of Africa as it passed through the colonial times, the heady pre-independence era and the post-independent period. He also witnessed the stages of disillusionment which many African countries have experienced. After his return from London studies he wrote 'Things Fall Apart' in 1958. This book in particular has become the classic of world literature, translated in fifty languages selling a eleven million copies . Chinua Achebe was only twenty eight when he wrote this book and it was his first novel. Achebe is the product of both Igbo culture and the European culture.

On the occasion of the fiftieth anniversary of 'Things Fall Apart' in his interview in Washington when asked for the reason of what he set out to do fifty years ago and why he wrote 'Things Fall Apart' he said,

" I knew that something needed to be done, that was my place in the world, my story. The story of my self, the story of my people."

He said that initially he wasn't questioning Christianity, the religion of his parents. He considered it to be good and very valuable religion for them. Later discovered that perhaps it was not completely

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the whole. He said, *"There was no attempt to understand what was behind the Igbo religion. You simply dismissed us the worship of stones".*

People in different parts of the world find that 'Things Fall Apart' resonates their own history. Author Chinua Achebe's novel was written for both Western and African readers. 'Things Fall Apart' is an response to European novels that depicted the Africans as savages who needed to be enlightened by the Europeans . Achebe presents to the readers his people's history with both strengths and imperfections by describing for instance, Igbo festivals the worship of their gods and the practices in their ritual ceremonies, their rich culture and other social practice, the colonial era that was both stopping Igbo culture and also brought some benefits to their culture.

Chinua Achebe, commenting on the role of the writer as a teacher in "African Writers Talking" (1972), notes:

"What I think a novelist should teach is something very fundamental, namely to indicate to his readers, to put it crudely that we in Africa did not hear of culture for the first time from Europeans." Thus *"a writer has a responsibility to try and stop this, because unless our culture begins to take itself seriously, it will never take off the ground".*

"This" is in reference to the misleading notion that Africa, as a "dark continent", needs to be illuminated by Westernization.

The setting of the novel is in the outskirts of Nigeria in a small fictional village, Umuofia just before the arrival of the Europeans into their land. The villagers did not know how to react to the sudden cultural changes the Europeans tried to bring in with their new missionary zeal, economic development and political structures and institutions. This essay aims at analyzing the cultural context at the advent of the European colonization on Igbo society. He educates readers extensively about the Igbu's myths and proverbs. The novel deals with the story of the protagonist Okonkwo, a powerful man and his downfall. He is famous because of his "solid personal achievements". He signifies his attribute towards the cultural patterns of the Igbo tribe right from the beginning of the novel. But his doom at the end of the story is remarkably related to the patterns of the culture of the Igbo which he wanted to preserve though there is a disruption of the ethics caused by the missionaries. The sort of relations of the human being with tradition and the farming activities are displayed in the novel through the culture of Igbo. The Ibo society unlike the traditional societies was not chiefly directed but achievement oriented. A man could not inherit title and rank from his family but had to achieve by his own abilities. Okonkwo's whole life was dominated by fear - *"The fear of failure and weakness."* the hero despite his father's shameful reputation like whom he never wished to be was a self-made man with pride and confidence, a respected leader within the Ibo community of Umuofia. Okonkwo at a very young age brought honour to his village when he wrestled and threw to the ground Amalinze, who was nick named the cat. A man's wealth was measured by the yams and cowries he possessed. Children, wives and land were all symbols of wealth. In Ibo society, a man could keep more than one wife. Okonkwo though young, was already a wealthy farmer of yams - a sacred crop and had three wives which were all indicators of wealth and 'manliness'. For Okonkwo, 'yam' stands for masculinity: "Yam stood for manliness, and he who could feed his family on yams from one harvest to another was a very great man indeed".

In Ibo society, there is a wide division between the masculine and feminine actions and responsibilities. Respect and success are based on only manly activities and accomplishments; whereas domestic chores like taking care of children and hens are left to the women folks. This is evident in Okonkwo's prosperity in his household. He owned a large compound, and his three wives had their own 'Obi' and each of them built a small attachment to her. One of the most significant social markers of the Ibo society was the unique system of honorific titles. As a man becomes wealthy, he gains additional recognition and prestige by 'taking a title.' Titles are not conferred but they are purchased. Taking a title is a sign of manliness and superiority, an 'Osugo' or a low-ranked person was not respected in the society. In the Igbo society, tribal laws are also very important

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but proves destructive. Ikemefuna, who was sent as a peace emissary to the village of Umuaro, as per the direction of the 'oracle of the hills and the caves' was to be killed (chapter-VII). Okonkwo is advised by Ezeudu not to "bear a hand in his death". But Okonkwo decided to stick to tradition at any cost and mercilessly murdered him. Thus, Ikemefuna becomes a victim of tribal law.

Despite Ibo society being male dominated, women played an important role in it. Her status depended on how many children she bore and how many were male. As Ekwefi says 'woman's crowning glory.' All preparations for ceremonies and celebrations are carried out by the women within the village and also with other villages. They play an important role in creating social ties. The Ibo society with its multi-division both internal and external, was an added advantage for the white man with his religion and culture to make inroads into the Ibo world. The white man whom the Igbo's considered 'lepers' brought with them their own religion, i.e., Christianity, influencing the natives, thus they abandoned their own religion. The novel thus deals with the theme of disintegration of the Ibo native culture. As the Christians began to gain power, the villagers saw their traditional beliefs as increasingly outdated and powerless and endangered. The Igbos believed that twins were a bad omen. They were put in earthenware pots and thrown in the 'Evil Forest', but the new religion offered support and acceptance to those considered outcasts by the natives. Thus, the missionaries were successful in making their way into the traditional Ibo society, leading to chaos and confusion among the products of hybrid culture including Nwoye, Okonkwo's own son. Nwoye, abandons the traditional ways and joined the Christians.

`In traditional Ibo religion, the ancestral spirit communicated through the mask in which it speaks. The Ibos believed that during this time the human underneath the mask is not present; the mask is transformed into the spirit. Thus, unmasking the 'Egwugwu' kills the ancestral. On one such occasion which was held annually, where the Ibo clan held a sacred ceremony to honour the Earth deity, the 'Egwugu' or the ancestral spirits of a clan, dance in the tradition of the celebration. His inflexible nature at the end made him destined for self-destruction.

The customary law with which the people punished the defaulters and avenged was strong. The killing of Mbiano, wife of Ogbuefi Udo of Umofia by their neighbouring village aroused anger amongst the villagers. Umofia was feared by all the neighbouring villages. The story about the medicine 'agadi-nwayi,' or old woman reflects the belief of the people in spirits. Consulting spirits as the Oracle of the Hills and the Caves, who is addressed as 'Agbala' shows the early sacrifices and the traditional belief of the Igbos. In this novel we find Unoka sacrificing cock to 'Ani,' the owner of all land, for good harvest and at the shrine of' Ijej ioku,' the god of yams. The people observed strict cultural practices. They were not to speak harsh words during the 'Week of peace,' a week before planting crops, so as to appease the great goddess of the Earth. But Okonkwo broke it by beating his youngest wife. So, as instructed by the priest, Okonkwo had to offer one she-goat, one hen, a length of cloth and a hundred cowries. Such specific sacrificial objects and animals show the age-old religious practices of the Igbo people.

The yam feast symbolizes the harvest and prosperity of the Igbo people. People who harvest more yams were more wealthy. So Okonkwo's prosperity as a titled man of fame is seen in his "stacks of yams," sheds for goats and hens he kept in his compound. The passing of days and seasons were calculated basing on the season of yam cultivation. Even the growth of the young lad Ikemefuna is described as "He grew rapidly like a yam tendril in the rainy season, and was full of the sap of life".

The Ibos believed if locusts descend upon their village, they will have good harvest. The descending of locusts signified good harvest. The locusts descended on Umofia like a "boundless sheet of black cloud drifting towards Umofia" and covered half the sky and broke like 'shining star-dust.' Achebe presents it as a 'tremendous sight, full of power and beauty' generation to generation.

The nine villages of Umofia gathered together on certain days to dispute cases. On one such occasion they settled the matter of a couple, Uzowulu and his wife. The nine Egwgu, went away to

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consult together in their house and the matter was settled with the command to Uzowulu, to go to his in-laws with a pot of wine and beg his wife to return to him. It is *pot* bravery, when a man fights with a woman. They share mutual understanding and have a we-feeling when it comes to settling family disputes. And so, though they represent different villages, they were bounded under the same law.

CONCLUSION

Chinua Achebe's novels have helped to develop what I known as African Literature today. He has written novels exploring his tradition and culture, while still staying true to his roots. The most important transformation of any society is the cultural transformation and thus through the various changes in the cultural context Achebe has enlightened his readers about the Igbo society. Nelson Mandela, the father of Africa has also referred to Achebe as a writer in whose company the prison walls fell down. All Achebe did with his pen are nothing but miracles and magic. Achebe is regarded as an irreplaceable legend of Africa.

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THE EDUCATIONAL SOJOURN AND CULTURE SHOCK AMONG INTERNATIONAL STUDENTS STUDYING AT VFSTR, GUNTUR, INDIA

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ABSTRACT

The present study makes an attempt to link between the educational sojourn and cultural shock by interacting with the international students studying various programmes at Vignan's Foundation for Science, Technology and Research (VFSTR), Deemed to be University, Guntur, India. It is natural that when one is exposed to an unfamiliar culture, there would be some experiences which would be 'shocking' or 'unpleasant'. Most of these experiences would make the person discomfort. On the other hand, some of the experiences could be pleasant. The present study also aims to explore these experiences among international students studying at VFSTR. The study was undertaken by administering a questionnaire and a semi-structured interview protocol to ten international students from Sudan pursuing various programmes at VFSTR. Further, the interview was recorded and later transcribed. Three themes emerged from the interview which are: *language issues, making friends* and *pleasant experiences.* The study makes suggestions to the host institutes admitting international students in academic courses to take special care and conduct special counseling sessions by professional counselors.

Keywords: Cultural Shock and Socio-Cultural Theory

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INTRODUCTION

There are many reasons why one needs to travel to different countries and one of the reasons which is frequently observed among young mass is for higher education. While travelling to a completely 'new' cultural set-up, there is always a chance to experience which would be 'shocking' and completely unwanted. This could lead to many psychological issues like stress and depression which may generate a negative perception of the local culture and indirectly people of that locality. This could be one of the de-motivating factors in the process of language learning.

The present study analyses experiences of foreign national studying in various courses at VFSTR, which is located in a rural set-up in Guntur district of Andhra Pradesh, India.

WHAT IS CULTURAL SHOCK?

The term culture shock has been defined by many. However, Oberg (1960) is considered to be one of the initial promoters of the term, who believes that 'culture shock' is an experience by any person who is from a different culture and experiences something which is completely new or unfamiliar. Culture shock has been generally perceived in a negative way.

> According to Longman dictionary of Applied Linguistics culture means "*strong feelings of discomfort, fear, or insecurity which a person may have when they enter another culture. For example, when a person moves to live in a foreign country, they may have a period of culture shock until they become familiar with the new culture.*" (Rechards & Schmidt, 2010)

Although, there have been many attempts by various researchers, Ward et al. (2001) provides a succinct explanation of culture shock. Referring to Ward et al. (2001), culture shock has six various aspects as highlighted by Furham (2012).

1. Strain due to the effort required to make necessary psychological adaptations.
2. A sense of loss and feelings of deprivation in regard to friends, status, profession and possessions.
3. Being rejected by/and or rejecting members of the new culture.
4. Confusion in role, role expectations, values.
5. Surprise, anxiety, even disgust and indignation after becoming aware of cultural differences.
6. Feelings of impotence due to not being able to cope with the new environment.

Apart from the term 'cultural shock', there are many similar terminologies used to express similar issue, which include 'cultural differences', 'disorientation', 'mental shock', ' anxious confusion' and others. (Furham, 2012).

CULTURE AND LANGUAGE LEARNING: SOCIO-CULTURAL THEORY

There has always been close relationship between language, culture and society. One of the major theories based on this relationship is Socio-cultural theory. Vygotsky (1978) is the proponent of the learning theory which is based on the principle that learning best happens in a socially and culturally involved atmosphere. Learning as per this theory happens through social interaction. Socio-cultural theory emphasizes the role of social relationship and participation in cultural activities in the process of language learning. Vygotsky uses the concept Zone of Proximal Development (ZPD), which represents the distance or gap between what learners can do with support and without support. As per ZPD learners use different collaborative techniques when they encounter similar issues in future to address any issues.

THE STUDY: SAMPLE, PROCEDURE AND TOOL

The sample of the study includes ten international students from Sudan studying undergraduate courses at VFSTR. Out of ten students two were female students and eight were male students. All the respondents belong to age group between 20-25years. They have been in India from two months to one year. It shows that they have recently been to India for study purpose. Many of respondents, nine out of ten, do not have exposure of visiting any other country than India.

A semi-structure interview was conducted after getting responses on culture shock through a questionnaire. The questionnaire has eight items which intends to find out respondents views on their personal experiences in the host country, i.e. India. In

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the follow up interviews, a detailed cultural experience was sought.

RESULTS AND DISCUSSION

This section of the paper discusses results and discussion obtained from the two research tools i.e. questionnaire and interview protocol. This study adopts and adapts the culture questionnaire prepared by Baier S. T. (2005) as it is comprehensive and relevant to Indian context.

RESULTS FROM THE QUESTIONNAIRE

Questionnaire was administered to ten international students to find out their cultural experiences in India. All the students belong to Sudan and they all have come to VFSTR for academic reason like higher studies. All the ten students have been pursuing one of the undergraduate courses i.e. Bachelor of technology, bachelor of Pharmacy and Bachelor of Computer Application.

There are eight different areas where the respondents were asked to provide their responses in the three point likert scale (i.e. Never, Sometimes and Often). The followings are the eight items of the questionnaire.

1. Have you been homesick?
2. Have you felt depressed?
3. Have you felt discriminated by Indian?
4. Have you felt stressed in meeting academic requirements?
5. Have you been sick?
6. Have you had any eating problems?
7. Do you feel the need of assistance in coping with the new culture?
8. Have you felt better in Indian culture than your home country?

All these above items of the questionnaire attempt to get cultural experiences of the international students. The following Figure (Figure 1) provides respondents' responses on each item of the questionnaire.

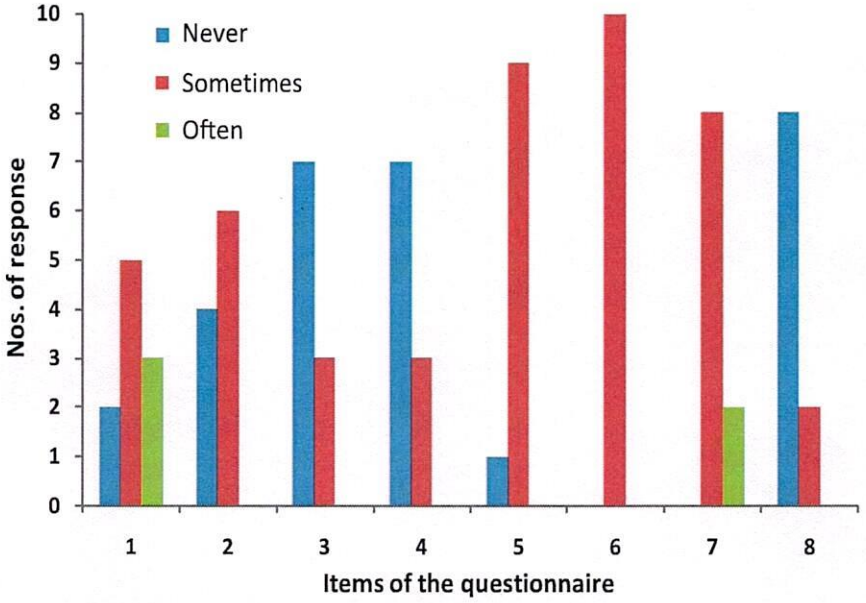

Figure 1: International Students' Responses on Cultural Shock

Responding to the item whether the participants feel homesick, there was a mixed responses. Three respondents say often they miss their home, five say sometimes and two states that they never feel homesick. As the students have come for studies of late, and even some of them have come out of their country just two months before; it is quite natural that they would feel homesick.

No respondents state that they always feel depressed. Six of them feel depressed sometimes; however four of them state that they never feel depressed. As the students have come to a completely unfamiliar academic atmosphere, the

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demand of the academic and staying away from familiar persons are the primary causes of such feelings.

Responding to the item, whether the respondents ever felt discriminated based on their colour or religion, all of them state that it was not often. Seven of the respondents believe that they have never felt such experience and three of the respondents feel it 'sometimes'. As per the responses of the respondents there are less academic requirements to make them depressed. However, nine respondents state that they sometimes feel sick. The primary reason of feeling sick is due to spicy food which they are not so used to.

Many respondents are of the opinions that they need a counselor for academic and psychological supports, preferable from their own country. Responding to the question whether they feel better in Indian culture than their own cultures, many are of them have negative opinion. Eight of the respondents believe that they never felt better in Indian culture and two of the state that they sometimes feel better in Indian culture. However, no one states that she/he feels better in Indian culture always. This shows that the international students studying at VFSTR miss their countries a lot.

RESULTS FROM INTERVIEW PROTOCOL

A semi-structured interview was administered with the same ten respondents to find more about their experiences with Indian culture. Their responses could be categorized into three major themes which include *good experiences*, *language issues* and *issues with making friends*. The respondents were asked to narrate in detail on their experiences. The vignettes of some of the respondents have been given below.

VIGNETTES OF GOOD EXPERIENCES

Respondent A *" One day, I had been out to buy some fruits. I was struggling to make the vendor understand what I needed. In the meantime, an unknown person behind me, came forward and assisted me (without my request) and spoke to the vendor in the local language and solved my problem. People are really very helpful!"*

Respondent B *" One day I went out to buy a blanket from the local market. I got down in the bus station and asked about the nearest place where I could buy a blanket. People with good gesture directed me to a good shopping mall and thus I got a nice blanket with affordable price".*

Respondent C *" I had kidney stone issue and it had to be operated. All my Indian friends were very nice to take me to the right hospital and assist me throughout. Thanks to my friends' assistance, I recovered fast"*

VIGNETTE OF LANGUAGE PROBLEMS

Respondent D *"During my initial days here at Vignan, I tried to communicate with the hostel warden in English regarding paying of hostel fees...although I was able to understand the warden what he wanted to ask, I was not able to make him understand...Further, a lady caretaker who cleans my room does not know English, I use online 'Google translator' and use only words to express myself. We don't have many problems these days"*

VIGNETTE OF MAKING FRIENDS

Respondent C *"Making friends in India is not easy, especially with strangers and unknown people. Once, I happened to make friends with a stranger on my way to a place, but the person didn't reciprocate. However, in my country it is very easy to make friends. You can talk to strangers and make friendship with them easily"*

It can be noticed from the narrations that the respondents have mixed opinion regarding Indian culture. Although some experiences are positive, some experiences are not as expected by them.

Conclusion, Suggestions and recommendations

The present study makes an attempt to find out international students' exposure to Indian culture. The students are in India for higher education purposes. An exploratory study method was adopted to find out the students exposure and it was carried out through administering questionnaire and interview protocol. The ten students from Sudan were first asked to provide their experiences through a questionnaire and later interviewed to find more about their culture shock. It was found that almost all the students miss their culture, especially when it comes to food and social meetings. Further, making friendship with strangers in India is not easy as compared to the students' native culture. However, the respondents have a very high opinion regarding Indian culture, especially when it comes to helping

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during illness and other related issues. The study highlights that there were not many 'culture shock' among international students studying at VFSTR.

The implications of the study can be related to students, teachers and administrators who always closely interact with the international students. All of them need to be a little more sensitive and understand the cultural differences of international students. Further, as suggested by a few students, a professional counselor needs to be appointed, exclusively for international students. VFSTR has already a very systematic and effective counseling system to encounter such issues.

Further studies can be carried out on international students of VFSTR on the areas of 'adjustment *strategies*' to Indian culture and '*reverse cultural shock*' when they go back to their home countries.

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LITERATURE, CULTURE AND REGIONAL COOPERATION IN THE INDIAN SUBCONTINENT

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ABSTRACT

This paper will provide the analyses of unnoticed relation namely that of cultural familiarity as a possible source for successful regional cooperation, in order to provide better access and opportunity to people for harmony and religious beliefs. Indian subcontinent which is known as South Asian countries, are mostly post-colonial political organisation.Due to their collective colonial past, South Asian region is unique with shared in history, heritage, literature, culture, religion and languages. South Asian culture is also very rich and varied, which seems to beoriginated from the rich Indus Valley civilization that saw the influx and mix of the Aryan and Dravidian races. But in the recent past with lot of small countries booming as emerging economic centres synchronized with civilization, these south Asian countries identities in cultures was basically hampered by various religious practices that prevails in these Nations.

South Asian Association for Regional Cooperation (SAARC), aims for a collective development through economic cooperation, maintenance of peace and security, social unity, promotion of cultural synthesis and regional integration in the Indian sub-continent. However, a major obstacle that has to be considered towards regional integration is frequent political and military conflicts happening between the states of this region. Many of the nations in the South Asia, are plagued by diverse social and economic problems wherehigh rates of illiteracy and unemployment take the major part. Education and employment remain two important areas in the nation-building discourses of most South Asian countries in the recent years due to an alarming increase in population growth. Hence, there is a need for greater cooperation among the Nations in the South Asian Region, in the field of education to improve the situation. Culture and literature go hand in hand in shaping the growth of any of the nation by addressing all social-economic issues which is believed to be an integral part in bringing regional cooperation with similarities in lifestyle, recreation and entertainment.

Keywords: *Region, Cooperation, Indian Subcontinent, Culture, Literature.*

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INTRODUCTION

The South Asian regions are inseparably linked through geography, shared history, and culture heritage, but they are divided by their internal politics and geopolitical environment. Economic imperatives drive them towards connectivity and cooperation, however the lack of coherence of interests keeps them apart. Consequently, South Asia's economic development has failed to reach its optimal level and hamper the progress towards integration within the region[i].

The South Asian Association for Regional Cooperation (SAARC)is the regional inter-governmental organisation, founded in the year 1985 with seven South Asian countries - Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan and Sri Lanka. Later, in 2007, Afghanistan joined the Association making the member list grew to eight. The main aim of the organisation is to promote a shared understanding, good neighbourly relations, and meaningful cooperationin orderto achieve peace, freedom, social justice, and economic prosperity in the region[ii].

South Asia occupies around 3.4 % of the world's available land, which is ultimately home to approximately 24 percent of the world's population (1.749 billion), making it the most densely populated place on earth[iii].SAARC occupies a land area larger than the European Union (EU) and the Association of Southeast Asian Nations (ASEAN). Nonetheless, despite of such traits, SAARC has failed to achieve its objectives and South Asia in present scenario, is treated as "one of the least integrated regions" in the world as per the World Bank (2017) statistics[iv].

Promoting intra-regional connectivity through trade is one of the primary focus areas of SAARC. However, even after three decades of existence, intra-SAARC trade stands at a mere5% of overall South Asia's total trade.In contrast, intra-regional trade constitutes 35 % of East Asia's total trade, and 60 % of Europe's[v].

LANGUAGE AND CULTURE IN SOUTH ASIA

Culture is nothing but the knowledge of a group of people, encompassing language, religion, cuisine, social habits, music and arts.Before we analyse the concept Culture, first we may answer the question, does culture matter? Looking back at the place of culture in social science, the answer in the 70s and 80s would have been negative. But as contribution to an anthology on economic development and democracy, David Lands answers the question affirmative: "If we can learn anything from the history of economic development, it is that culture that makes almost all the difference" but also "On the other hand, culture does not stand alone"[vi].

If we look at the South Asian Region, there is an evidence of Neolithic culture that has been found throughout the modern states of Afghanistan, Bangladesh, Bhutan, Maldives, Nepal, India, Pakistan and Sri Lanka which represent South Asia or Southern Asia (also known as the Indian subcontinent). Following the Indo-Aryan settlement in the Indo-Gangetic Plain and the establishment of the characteristic social groups (Brahmanas, Kshatriyas, Vaishyas and Shudras) in the caste system based on theJatimodel in the Varna order, the tribal entities variously consolidated into oligarchic chiefdoms or kingdoms (the 16 Mahajanapadas), beginning in the 6thcentury B.C. Hinduism, Buddhism, Jainism and Sikhism are major world religions that originated in South Asia[vii]. These arguably represent the furthest reaching, most profound and permanent South Asian ideas on other cultural spheres.

Afghanistan and Pakistan are situated at the western periphery of South Asia, where the cultural character has been made by both, Persia, a civilization rooted in Mesopotamia and the Indosphere.Pakistan's two eastern regions of Punjab and Sindh share cultural links to Northwest India. The Brahui are a group of tribes who live primarily in Baluchistan and Sind provinces of Pakistan. Brahui is a Dravidian language and, as such, is distinct from the languages of the neighbouringPathan, Baluch, and Sind people. It is reported that many Brahui are bilingual in Baluchi and that Brahui contains numerous loanwords from Baluchi and Sindhi. The heart of Brahui territory is the district of Kalat, in Baluchistan. Politically, the Brahui are best described as a loose confederation of tribes, which was ruled from about 1700 to Pakistan's independence in 1947 by the Ahmadzais dynasty[viii].

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Bangladesh and the Indian state of West Bengal share a common heritage and culture based on the Bengali language. Urban Bengali elite culture has produced one of South Asia's finest literary traditions, including not only the novel, short story, and poetry but drama and film as well. Some of India's best classical musicians and greatest exponents of the dance have been Bengalis. Bengalis have also made major contributions to Indian and world cinema. Rural Bengal has an old and well-developed folk literature, including narrative poetry (*puthi*), drawn from history, myth, and legend, as well as a very popular itinerant theatre (called *jatra*)[ix]. Despite industrialization and the spread of commercially manufactured products throughout the region, the Bengali rural economy still depends on the services of traditional craftspeople weavers, potters, carpenters, blacksmiths, metalworkers, and the like whose lifestyle often represent a high quality of both technique and aesthetic design.

Nepal is culturally linked to both India and Tibet and the varied ethnic groups of the country share many of the festivals and cultural traditions which were used and celebrated in North and East India and Tibet. Nepali, the dominant language of Nepal uses the Devanagari alphabet which is also used to write many North Indian languages.Nepal is a Hindu kingdom in which the king is considered an incarnation of the god Vishnu. Although the majority of the country is Hindu, a number of groups of sizable populations are Buddhist. There are a few groups of Muslims in the country and an even smaller number of converts to Christianity. Generally, Hinduism in Nepal is based on the Dharmashastras, Puranas, and various developments in Vaishnavism and Shaivism that have largely originated in India. Buddhism in Nepal blends Mahayana, or the Great Vehicle, with Vajrayana, the Diamond Way[x].

Bhutan is a culturally linked to Tibet with significant influences from India. Tibetan Buddhism is the dominant religion in Bhutan and the Tibetan alphabet is used to write Dzongkha, the dominant language of Bhutan. In Bhutan about 20 dialects are spoken which also includes Nepali[xi]. The national dress is the symbol of unity without which the nation lacks meaning. In Bhutan, culture is largely shaped by religion (Buddhism). Before Buddhism, the bonism culture (worshipping of animals and nature) was widespread. The first temple is being constructed in the capital city of Thimpu. One can also see the film industry growing where Bollywood certainly has an influence.

Sri Lanka is culturally tied to both India and Southeast Asia. Sinhalese, the dominant language in the country is written in the Sinhalese alphabet which is derived from the Kadamba-Pallava alphabet, certain cultural traditions, and aspects of its cuisine, for example, show South Indian influences. Cultural festivals, aspects of its cuisine and Theravada Buddism, the dominant religion in Sri Lanka, show a Southeast Asian affinity. The unique culture of Sri Lankan Tamils took on distinctiveness early from its close proximity to the Sinhalese and from waves of immigration from diverse regions of southern India. Many features of Sri Lankan Tamil culture, including village settlement patterns, inheritance and kinship customs, and domestic and village "folk religion" stand in sharp contrast to mainland Tamil customs. One possible reason is that the immigrants who created the first Tamil settlements in Sri Lanka appear to have come not just from the Tamil region of south India but from the Kerala coast as well[xii].

Indo-Aryan languages are spoken in Pakistan, Sinhalese of Sri Lanka and most of North, West and East India and Nepal. Dravidian languages are spoken in South India and in Sri Lanka by the Tamil community. Tibeto-Burman languages are spoken in the North and North East India. Iranic languages are spoken in Baluchistan and Khyber Pakhtunkhwa in Pakistan. The main languages of Afghanistan are Pashto and Dari.

The above stated infusion of languages in different parts of the country apart from their country of origin, shows how varied the trade happened between those places in earlier days with the merger of different culture and traditions. At present day scenario trade between two countries is not happen as olden days as conflict of interest arises between different political parties which show their supremacy to retain their position in their own country. Despite these hurdles, there is still lot of scope and hope in the rising generation which can put a barricade to difference in opinion between the

political parties and ruling government which they have to abide based on their constitution.

LINKAGE BETWEEN CULTURE AND REGIONAL COOPERATION IN SOUTH ASIA

Apart from economic gains, regional cooperation is needed for maintenance of peace and security, social unity, promotion of cultural synthesis and for religious integrity.Prof Partha Ghosh in his paper titled "Culture, Cultural Productions and South Asian Spaces", said South Asia is more a cultural rather than a geo-political construct and it will survive even if SAARC were to disappear[xiii].

Peace and security has always been the focus of Bhutan's foreign policy. Cultural identity is also part of the nine points of Gross National Happiness in Bhutan. Bhutanese culture is composed of Buddhist identity, competence in the mother language, knowledge of art and craft, and manifestation of various views. Culture is of course one of the factors in Indo-Bhutan relations. This cultural foundation brings together many people from both the countries including writers and artists. Culture can be used as a unifying factor to build bridges[xiv].

There is a rise of identity at the social, political and religious levels that have acquired far serious proportions. The intermingling of politics and identity is poisonous as the cultural space is fragmented by political divisions. Prof. Muni in his paper, emphasised that culture retains the potential to promote harmony. It is, however, important to keep politics away from cultural aesthetics[xv].There is another author correctly mentioned that, theCulture could be used as an instrument for foreign policy and where thepolicies belonged to the states and culture belonged to the people, with a constant tension between the two. There were framed consciously by bureaucrats and politicians to serve their interests while culture was organic and constantly evolving, which she says is a complex and diverse concept[xvi].

For India, culture as a foreign policy tool in the neighbourhood had limited appeal and was often perceived with suspicion. However, there has been a metamorphic change in South Asia in recent years and there is greater openness to accept diverse identities and use culture as an instrument to bring countries and people together which seems to be an ice breaker towards religious and cultural cooperation.

CONCLUSION

Culture is one of the leading subject having very effective elements that will directly help people in the nations to lead their development strategies. So the SAARC Cultural Centre should engage in implementing programmes to promote culture in South Asian Countries.There should be more access to each other's repositories of culture. Apart from Governments initiatives, other Cultural societies and NGOs must work for new harmonisation, a realignment of interest. The future of South Asian integration lies in the strategic use of soft power to promote values which are beneficial for the region as a whole.

Since the China's presence in South Asian Region, has been increasing in the recent time, India should take all the possible ways to have collaboration with each Nation in the region. Literature and Culture would be the one of the best way for that. Another option would be through SAARC, India may cooperate with nations in South Asia. This cultural collaboration may not change the prolonged political issues, between the Nations, however, this may change the mind set of people in positive way.

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THE EFFECT OF SCHEMA THEORY ON READING COMPREHENSION IN COMPARISON WITH TRADITIONAL READING APPROACH

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ABSTRACT

This study was carried out to investigate the effectiveness of using schema theory in comparison with traditional reading approach to improve reading comprehension skills of first year engineering students affiliated to JNTUK, Kakinada during the second semester. The prescribed reading texts were used in this study for examination. The respondents were 120 students who belonged to the branch of Electronics & Communication Engineering (ECE) of Sri Sarathi Institute of Engineering & Technology, Nuzvid. The study was conducted in three stages. The first stage was conducted to understand the opinion of English faculty and first year students on the effectiveness of prescribed lessons in the English text books and their effectiveness in improving reading comprehension skill. The second stage was carried out to find out the present level of students' reading comprehension skill. After understanding from the stage-1 that majority of the English faculty were using traditional reading approach (bottom-up) which was not producing the desired outcome and students were poor in reading comprehension from the second stage-2 of the study, the researcher felt that there was a need for the adopting suitable method in teaching as alternative to traditional reading approach (bottom-up) which was being used in the present classrooms. Hence, a detailed examination was carried out in previous studies to identify a suitable method to overcome the present problem in teaching reading comprehension. From the analysis and observations of all the reading methods used in the past, it was learnt that schema theory (top-down) method was a suitable method because of its effectiveness to teach English reading skills to the second language learners of English. Hence the present study was conducted by implementing schema theory in comparison with traditional reading approach (bottom-up). The results of the study revealed that schema theory (top-down) was more effective in improving the reading comprehension skill of first year engineering students.

Keywords: *Schema Theory (Top-Down) , Traditional Reading Approach (Bottom-Up).*

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Introducing M/M/S queue with arrivals of customers follow poisson distribution with an arrival rate λ, and service time are exponentially distribution with mean rate μ obviously service time various from one customer to the other, but the same for each server and there is no limit to the number in the queue, thus infinite calling population. The queue discipline is first come first serve, and no Balking or Reneging is allowed. If n < s, the number of customer are less than the number of servers, then there will be no queue formed this means that ns, number of servers will be idle. The combined service rate is $\beta_n = n\beta$.
If n ≥ s, then all servers are busy and the maximum number of customers in the queue is s - n, the combined service rate is $\beta_n = s\beta$. Akinnuli and olugbade (2014) the total service rate must be more than the arrival rate.
ie) $s\beta > \lambda$, otherwise the waiting line will be infinitely large that would give undesirable graph (Adamu, 2015).

III. The Model in Fuzzy Environment

The arrival rate λ and service rate β are assumed to be fuzzy numbers respectively.

Now, $\bar{\lambda} = \{x, \mu_{\bar{\lambda}}(x); x \in S(\bar{\lambda})\}$, $\bar{\beta} = \{y, \mu_{\bar{\beta}}(y); y \in S(\bar{\beta})\}$

where $s(\bar{\lambda})$, $s(\bar{\beta})$ are the universal set's of the arrival rate, service rate in a regular busy period. Define f(x,y) as the system performance measure related to the above defined fuzzy queuing model which depends on the fuzzy membership function $f(\bar{\lambda}, \bar{\beta})$.

Applying Zadeh's extension principle (1978) the membership function of the performance measure $f(\bar{\lambda}, \bar{\beta})$ can be defined

$$\mu_{f(\bar{\lambda},\bar{\beta})}(H) = \sup_{\substack{x \in S(\bar{\lambda}) \\ y \in S(\bar{\beta})}} \{\mu_{\bar{\lambda}}(x), \mu_{\bar{\beta}}(y) / H = f(x,y)\} \qquad (1)$$

If the α-cuts of $f(\bar{\lambda}, \bar{\beta})$ degenerate to some fixed value, then the system performance is a crisp number, otherwise it is a fuzzy number. Under the study state condition $\rho = \frac{\lambda}{\beta} < 1$.

We obtain the membership function of some performance measure's namely the average number of customer in the system, the average time a customer waiting in the system.

(i) The average number of customer in the system:

$$L_s = [\frac{1}{(s-1)!}(\frac{\lambda}{\beta})^s \frac{\lambda\beta}{(s\beta-\lambda)^2}]p_0 + \frac{\lambda}{\beta}$$

(ii) The average time a customer spends waiting in the system:

$$W_s = [\frac{1}{(s-1)!}(\frac{\lambda}{\beta})^s \frac{\lambda\beta}{(s\beta-\lambda)^2}]p_0 + \frac{1}{\beta}$$

where the probability that all the servers are ideal p_0 is given by

$$p_0 = [\sum_{n=0}^{s-1} \frac{(\frac{\lambda}{\beta})^n}{n!} + \frac{1}{s!}(\frac{\lambda}{\beta})^s (\frac{s\beta}{s\beta-\lambda})]^{-1}$$

When $s = 5$, we get performance of the system in terms of the membership functions are,

$$\mu E[\bar{L_S}](A) = \sup_{\substack{x \in S(\bar{\lambda}) \\ y \in S(\bar{\beta})}} \{\mu_{\bar{\lambda}}(x), \mu_{\bar{\beta}}(y) / A\} \qquad (2)$$

$$A = [\frac{600y^6x + 360y^5x^2 - 276y^4x^3 + 76y^3x^4 - 3y^2x^5}{600y^7 + 360y^6x - 276y^5x^2 + 76y^4x^3 - 3y^3x^4 - y^2x^5}]$$

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$$\mu E[\bar{W}_S](B) = \sup_{\substack{x\in S(\bar{\lambda}) \\ y\in S(\bar{\beta})}} \left\{\mu_{\bar{\lambda}}(x), \mu_{\bar{\beta}}(y) / B\right\} \quad (3)$$

$$B=[\frac{600y^6+360y^5x-276y^4x^2+76y^3x^3-3y^2x^4}{600y^7+360y^6x-276y^5x^2+76y^4x^3-3y^3x^4-y^2x^5}]$$

Using the fuzzy analysis technique explained we can find the membership of $E[\overline{L_s}]$, $E[\overline{W_s}]$ as a function of the parameter α, thus the α-cut approach can be used to develop the membership function of $E[\overline{L_s}]$, $E[\overline{W_s}]$.

IV. Performance measure

The average number of customer in the system

The average number of customer in the system Based on Zadeh's extension principle μE[Ls] is superimum of minimum over $\left\{\mu_{\bar{\lambda}}(x), \mu_{\bar{\beta}}(y)\right\}$ to satisfying $\mu_{E[L_s]}(A) = \alpha, 0 \le \alpha \le 1$

We consider the following two cases:

case(i) : $\mu_{\bar{\lambda}}(x) = \alpha$, $\mu_{\bar{\beta}}(x) \ge \alpha$

case(ii): $\mu_{\bar{\lambda}}(x) \ge \alpha$, $\mu_{\bar{\beta}}(x) = \alpha$

For case(i) the lower and upper bound of α cuts of $E[\overline{L_s}]$ can be obtained through the corresponding parametric non-linear programs,

$$E[L_s]_\alpha^{L_1} = \min_{\Omega}\left\{[A]\right\} \text{ and } E[L_s]_\alpha^{U_1} = \max_{\Omega}\left\{[A]\right\}$$

Similarly, we can calculate the lower and upper bounds of the α -cuts of $E[\overline{L_s}]$

For thecase (ii) By considering all the case simultaneously the lower and upper bounds of the α -cuts of $E[\overline{L_s}]$ can be written as

$$E[L_s]_\alpha^{L} = \min_{\Omega}\left\{[A]\right\} \text{ and } E[L_s]_\alpha^{U} = \max_{\Omega}\left\{[A]\right\}$$

such that

$$[x]_\alpha^L \le x \le [x]_\alpha^U \text{ and } [y]_\alpha^L \le y \le [y]_\alpha^U$$

Now,

$E[L_s]_\alpha^L$ and $E[L_s]_\alpha^U$ are invertible with respect to α, the left and right shape function, $L(A) = [E[L_s]_\alpha^L]^{-1}$ and $R(A) = [E[L_s]_\alpha^U]^{-1}$ can be derived from which the membership function $\mu_{E[\overline{L_s}]}(A)$ can be constructed as,

$$\mu_{E[\overline{L_s}]}(A) = \begin{cases} L(A), & (E(L_s))_{\alpha=0}^L \le A \le (E(L_s))_{\alpha=0}^U \\ 1, & (E(L_s))_{\alpha=1}^L \le A \le (E(L_s))_{\alpha=1}^U \\ R(A), & (E(L_s))_{\alpha=0}^L \le A \le (E(L_s))_{\alpha=0}^U \end{cases} \quad (4)$$

In the same way we get the following result.

Average time a customer spends waiting in the system

$$\mu_{E[\overline{W_s}]}(B)=\begin{cases}L(B), & (E(W_s))^L_{\alpha=0}\le B\le(E(W_s))^U_{\alpha=0}\\ 1, & (E(W_s))^L_{\alpha=1}\le B\le(E(W_s))^U_{\alpha=1}\\ R(B), & (E(W_s))^L_{\alpha=0}\le B\le(E(W_s))^U_{\alpha=0}\end{cases} \tag{5}$$

V.Numerical study

The average number of customer in the system:

Suppose the arrival rate $\overline{\lambda}$, service rate $\overline{\beta}$ are assumed to be Pentagonal fuzzy numbers described by: $\overline{\lambda}=\{1,2,3,4,5\}$ and $\overline{\beta}=\{11,12,13,14,15\}$ per hour respectively.Then

$$\lambda(\alpha)=\left(min\{x\in s(\overline{\lambda}),G(x)\ge\alpha\},\ \ max\{x\in s(\overline{\lambda}),G(x)\ge\alpha\}\right)$$

Where,

$$G(x)=\begin{cases}0, & \text{if } x\le a_1\\ 1-(1-r)\dfrac{x-a_2}{a_3-a_2}, & \text{if } a_2\le x\le a_3\\ 1, & \text{if } x=a_3\\ 1-(1-r)\dfrac{a_4-x}{a_4-a_3}, & \text{if } a_3\le x\le a_4\\ r\dfrac{a_5-x}{a_5-a_4}, & \text{if } a_4\le x\le a_5\\ 0, & \text{if } x\ge a_5\end{cases} \tag{6}$$

(ie)., $\lambda(\alpha)=[1+\alpha],[5-\alpha]$, $\beta(\alpha)=[11+\alpha],[15-\alpha]$

It is clear that, when $x=x^U_\alpha$ and $y=y^U_\alpha$, A attains its maximum value and when $x=x^L_\alpha$ and $y=y^L_\alpha$ A attains its minimum value.

From the generated for the given input values of $\overline{\lambda}$ and $\overline{\beta}$

(i) For fixed value of x, A decrease as y increase.

(ii) For fixed value of y, A decrease as x increase.

The smallest value of occurs when x-takes its lower bound.

i.e)., $x=1+\alpha$ and y take their upper bound given by $y=15-\alpha$ respectively. And maximum value of $E[L_s]$ occurs when $x=5-\alpha, y=11+\alpha$. If both $E[L_s]^L_\alpha$ and $E[L_s]^U_\alpha$ are invertible with respect to 'α' then, the left shape function L(A) = $[E[L_s]^L_\alpha]^{-1}$ and the right shape function R(A)= $[E[L_s]^U_\alpha]^{-1}$ can be obtained and from which the membership function $\mu_{E[\overline{L_s}]}(A)$ can be constructed as:

$$\mu_{E[\overline{L_s}]}(A)=\begin{cases}0, & if\ A\le A_1\\ 0.5(x-2), & if A_1\le A\le A_2\\ 0.5(4-x), & if A_2\le A\le A_3\\ 0.5(5-x), & if\ A_3\le A\le A_4\\ 0, & if\ A\ge A_5\end{cases} \tag{7}$$

The values of A_1, A_2, A_3, A_4, and A_5 as obtained from (7) are:

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$$\mu_{E[\overline{L_s}]}(A) = \begin{cases} 0, & if\ A \leq 0.0000 \\ 0.5(x-2), & if\ 0.0000 \leq A \leq 0.3654 \\ 1, & if\ x = 1 \\ 0.5(4-x), & if\ 0.3654 \leq A \leq 0.8946 \\ 0.5(5-x), & if\ 0.8946 \leq A \leq 0.3644 \\ 0, & if\ A \geq 0.0000 \end{cases} \quad (8)$$

In the same way we get the following results.

The average time a customer spends waiting in the system:

$$\mu_{E[\overline{W_s}]}(B) = \begin{cases} 0, & if\ B \leq B_1 \\ 0.6(y-2), & if B_1 \leq B \leq B_2 \\ 0.6(4-y), & if B_2 \leq B \leq B_3 \\ 0.6(5-y), & if\ B_3 \leq B \leq B_4 \\ 0, & if\ B \geq B_5 \end{cases} \quad (9)$$

The values of $B_1, B_2, B_3, B_4,$ and B_5 as obtained from (9)are:

$$\mu_{E[\overline{W_s}]}(B) = \begin{cases} 0, & if B \leq 0.0000 \\ 0.6(y-2), & if\ 0.0000 \leq B \leq 0.4625 \\ 0.6(4-y), & if\ 0.4625 \leq B \leq 0.7954 \\ 0.6(5-y), & if\ 0.7954 \leq B \leq 0.4620 \\ 0, & if B \geq 0.0000 \end{cases} \quad (10)$$

The following two graphs are represent the performance measures:

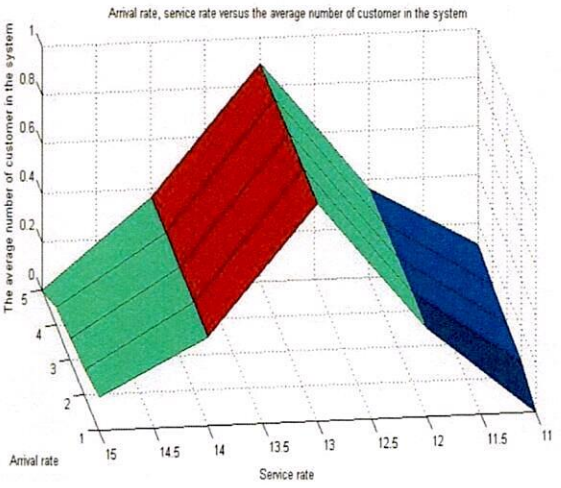

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Figure 1: arrival rate, service rate, versus the average number of customer in the system

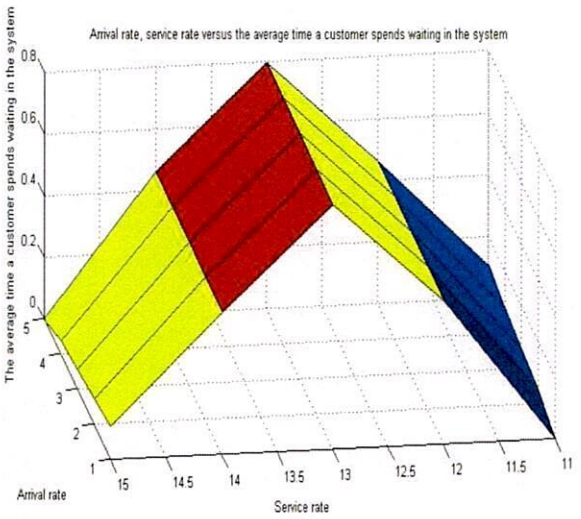

Figure 2: arrival rate, service rate, versus the average time a customer spends waiting in the system

VI. Conclusion

In this research paper we have studied the FM/FM/S queue with multiple-lines, multiple server systems of customers using Pentagonal fuzzy numbers. We have obtained the performance measures such as average number of customers in the system and average time a customer spends waiting in the system. We have obtained numerical results to all the performance measures for this fuzzy queues. The application of this fuzzy queues, there are situations, particularly in Bank, where theservice provided is a group that, a group of customers can be served simultaneously with batch servicing in this process.

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IMPORTANCE OF LITERATURE AND CULTURE

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ABSTRACT

Culture is a wider concept than literature, so in this context it will be considered in terms of its relationship with literature, i.e. as a combination of literature and culture. Thus in the teaching of culture literature plays different roles: it serves either as illustration or a starting point for the study and mediation of cultural phenomena. It is understood as part of a specific foreign civilization, thus by learning about the social, historical, linguistic and other cultural implementations in literary texts specifics of the foreign culture are being mediated. Literature is important. Because Expanding horizons, Building critical thinking skills, A leap into the past, Appreciation for other cultures and beliefs, Better writing skills, Addressing humanity, Teaching, learning and assessment. Finally, the paper makes a plea that the multiplicity of cultures and plurality of norms of verbal and non-verbal behaviour necessitate training in intercultural communication and thus literature can be used as a rich resource to develop the ability to communicate appropriately in alien cultural settings.

Keywords: *Literature, Horizons, Historical, Culture.*

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'Why Literature is important in our lives'. There are many limitations on the extent of a mans lifetime experience such as time, geography and point of view. Literature serves as a method of transcending such barriers. Literature is derived from the Latin term littera which means letter, any printed matter written in a book, a magazine, or a pamphlet, a faithful reproduction of man's manifold experiences blended in to harmonious expression. Literature is very important today because it enable the people to know the history of a nation's spirit; people must read its literature. To understand the real spirit of a nation, one must trace the little rills as they course along down the ages, broadening and deepening into the great ocean of thought which men at the present source are presently exploring. It also enable to express of one's feelings according to him, may be through love, sorrow, happiness, hatred, anger, contempt or revenge.

Literature is one way for us to hear the voices of the past and work with the present. It is the way for the present to connect to the possible future. We learn about history we didn't experience. the customs we are not familiar with or that read to what we do now, it unlocks the culture of the time period, and in a way can give wisdom to the modern society about life, allow us to interpret our own life and emotions and we find ways to relate to the story so we in turn can reflect. Literature is the most invisible with the five senses and the most visible with feelings, Literature is always realistic, and it is about life. It is life when we get involved in it even it is legendary, unbelievable, and whatever it talks about, it is life because it is created and produced by people from their life. Literature and culture play within political and social history (anticipation, reaction, engagement, detachment, imaginary spaces / times) and how this contributes to a deeper understanding of different contexts of communication in contemporary society (e.g. cultural background of political events or social development), making connections between literary, cultural and media developments, producing a systematically developed (oral or written) presentation in the foreign language about an experience (reading a literary text, watching a theatre play, a movie, TV-programme, etc.), making use of the meta-language of analysis within a given (multiple) theoretical framework

7 REASONS WHY LITERATURE IS SO IMPORTANT

It is believed that literature gives us great knowledge. There is a belief in the society that Science graduates get good jobs and literature students do not get good jobs. Somewhere along the line, the world has come to think that literature is insignificant.In fact, literature serves as a gateway to learning of the past and expanding my knowledge and understanding of the world. Here are just a few reasons why literature is important.

1. Expanding horizons: Literature opens our eyes and makes us see the wild and wide world. It helps us realize the wide world outside, surrounding us. With this, we begin to learn, ask questions, and build our intuitions and instincts. We expand our minds.

2. Building critical thinking skills: It improves our critical thinking. When we read, we learn to look between the lines. We are taught to find symbols, make connections, find themes, learn about characters. Reading expands these skills, and we begin to look at a sentence with a larger sense of detail and depth and realize the importance of hidden meanings so that we may come to a conclusion.

3. A Leap into the Past: History and literature are interdependent on each other. History is not just about power struggles, wars, names, and dates. It is about people who are products of their time, with their own lives. Today the world is nothing like it was in the 15th century; people have changed largely. Without literature, we would not know about our past, our families, the people who came before and walked on the same ground as us.

4. Appreciation for other Cultures and Beliefs. We can get a view of the inside looking out, a personal view and insight into the minds and reasoning of someone else. We can learn, understand, and appreciate many cultures.

5. Better Writing Skills: Literature improves our writing skills.How did this person imagine and write this? Well, many of those authors, poets, or playwrights used literature to expand their writing.

6. Addressing Humanity: Poetry makes a man a better man. Infact, all literature, whether it be poems, essays, novels, or short stories, helps us address human nature and conditions which affect all people.

We need literature in order to connect with our own humanity.

CONCLUSION

The fields of literature and culture are particularly suited to the use of innovative pedagogy, though in most courses traditional approaches still prevail. Nevertheless, there is evidence that new approaches are been used such as using e-learning and e-platforms, various types of group work and group assignments, project work, field-work, study visits, presentations in different media, autonomous learning and cross-curricular learning – in short, the whole range of learner-centered teaching and learning methods. There is strong emphasis on the fostering of self-evaluation and reflection by students as well as on the development of key skills alongside the development of subject-specific literary and culture competences. These might include: close reading of a variety of texts, intercultural skills such as empathy, contextualization, differentiation, linguistic competence in the target language which supports engagement with the study of literature and culture

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The analysis of M/M/1 queue with working vacation in fuzzy environment

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The analysis of $M/M/1$ queue with working vacation in fuzzy environment

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Abstract

This study investigates the $FM/FM/1$ queue with working vacation. For this fuzzy queuing model, the researcher obtains some performance measure of interest such as the regular busy period, working vacation period, stationary queue length and waiting time. Finally, numerical results are presented to show the effects of system parameters.

Keywords: $FM/FM/1$ queue; the regular busy period; working vacation period; stationary queue length and waiting time

MSC 2010 No.: 68M20, 90B22

1. Introduction

The authors Servi and Finn (2002) introduced a class of semi-vacation policies: a customer is served at a lower rate during a vacation, such a vacation is called a working vacation (WV). They studied an $M/M/1$ queue with working vacations, and obtained the transform formulae for the distributions of the number of customers in the system and sojourn time in steady state, then applied these results to performance analysis of gateway router in fiber communication networks.

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Subsequently, Kim et al. (2003), Wu and Takagi (2006) investigated $M/G/1$ queues with working vacations. Baba (2005) extended this study to a $GI/M/1$ queue with working vacations. In view of partly utilizing service ability during a vacation, the working vacation policy of the queue with single server is similar to the vacation policy in a multi server queue. The latter can be found in Tian and Zhang (2006).

It is well known that stochastic decomposition results have a probabilistic interpretation in a classical vacation queue, where the server completely stops service during a vacation. Fuhrmann and Cooper (1985), Shanthikumar (1988) established stochastic decomposition structures for a classical $M/G/1$ queue with general vacations. The queue with working vacations where the server serves customers at a lower rate during a vacation has similar stochastic decomposition properties studied by Liua et.al(2007). Also the same authors gave stochastic decomposition structures of the number of customers and sojourn time in an $M/M/1/WV$ queue, and obtain the distributions of the additional queue length and additional delay.

Kalayanaraman et.al (2009) introduced a single server vacation queue with fuzzy service time and vacation time distributions with some performance measures. Kalyanaraman et.al (2010) gave a single server fuzzy queue with group arrivals and server vacation.

Kalyanaraman et.al (2013) investigated a fuzzy bulk queue with modified Bernoulli vacation and restricted admissible customers. They obtained some performance measures in fuzzy parameters.

Kannadasan and Sathiyamoorthi (2017) investigate the $FM/FM/1$ queue with single working vacation. We obtain some system characteristic such as the number of customer in the system in study-state, the virtual time of a customer is in the system, the server is in idle period, the server is in regular busy period. Kannadasan et.al (2017) also gave analysis for the $FM/FM/1$ queue with multiple working vacation with N-Policy, using non-linear programming method,with mean queue length, mean waiting time, at N=2.

Mery And Gokilavani (2011) investigate the performance measure of a $M^X/M/1$ multiple working vacation (MWV) queuing model in a fuzzy environment. Mary George and Jayalakshmi (2013) studied on the analysis of $G/M(n)/1/k$ queuing system with multiple exponential vacations and vacations of fuzzy length. Ramesh et.al (2013) constructs the membership function of the system characteristics of a batch-arrival queuing system with multiple servers, in which the batch-arrival rate and customer service rate are all fuzzy numbers.

Kannadasan and Sathiyamoorthi (2017) established the $FM^X/FM/1$ queue with multiple working vacation and some performance measure of interest such as mean system length, mean system sojourn time, mean busy period for the server and working vacation. Kannadasan and Sathiyamoorthi (2018) worked in fuzzy analysis technique in the FM/FM/1 queue with single working vacation and set-up times.

In this paper, we investigate the $FM/FM/1$ queue with working vacation. In section 2, we describe the queue model. In section 3 and 4 we discuss the fuzzy model with the regular busy period, working vacation period, stationary queue length and waiting time are studied in fuzzy environment respectively. In section 5 includes numerical study about the performance measures.

2. The Crisp Model

Consider a classic $M/M/1$ queue with arrival rate λ and service rate μ_b. The server beings a working vacation of random length at the instants when the queue becomes empty, and the vacation duration V follows an exponential distribution with parameter θ. During a working vacation an arriving customer is served at a rate of μ_v. when a vacation ends, if there are no customers yet in the queue, another working vacation is taken; otherwise, the service switches service rate from μ_v to μ_b, and a regular busy period starts. Similar to (2002) this queue is referred to as an $M/M/1/MV$ queue.

We assume that inter arrival times, service times and working vacation times are mutually independent. In addition , the service discipline is first in first out (FIFO). Let $Q_v(t)$ be the number of customer in the system at time t and let

$$J(t) = \begin{cases} 0, & \text{the system is in a working vacation period at time } t, \\ \\ 1, & \text{the system is in a start-up period at time } t. \end{cases}$$

Then, $Q_v(t), J(t)$ is the QBD process with the state space,

$$\Omega = \{0,0\} \cup \{(k,j) : k \geq 1, j = 0,1\}.$$

3. The Model in Fuzzy Environment

In this section, the arrival rate, service rate, working vacation an customer is served at a rate, working vacation time are assumed to be fuzzy numbers $\bar{\lambda}, \bar{\beta}, \bar{v}, \bar{\theta}$ respectively. Now,

$$\bar{\lambda} = \{w, \mu_{\bar{\lambda}}(w); w \in S(\bar{\lambda})\},$$

$$\bar{\beta} = \{x, \mu_{\bar{b}}(x); x \in S(\bar{\beta})\},$$

$$\bar{v} = \{y, \mu_{\bar{v}}(y); y \in S(\bar{v})\}, \text{ and}$$

$$\bar{\theta} = \{z, \mu_{\bar{\theta}}(z); z \in S(\bar{\theta})\},$$

where $S(\bar{\lambda})$, $S(\bar{\beta})$, $S(\bar{v})$ $S(\bar{\theta})$ are the universal set's of the arrival rate, service rate, working vacation a customer is served at a rate, working vacation time respectively. It define $f(w,x,y,z)$ as the system performance measure related to the above defined fuzzy queuing model, which depends on the fuzzy membership function $f(\bar{\lambda}, \bar{\beta}, \bar{v}, \bar{\theta})$. Applying Zadeh's extension principle (1978) the membership function of the performance measure $f(\bar{\lambda}, \bar{b}, \bar{v}, \bar{\theta})$ can be defined as;

$$\mu_{\bar{f}(\bar{\lambda},\bar{\beta},\bar{v},\bar{\theta})}(H) = \sup_{\substack{w \in S(\bar{\lambda}) \\ x \in S(\bar{\beta}) \\ y \in S(\bar{v}) \\ z \in S(\bar{\theta})}} \{\mu_{\bar{\lambda}}(w), \mu_{\bar{\beta}}(x), \mu_{\bar{v}}(y), \mu_{\bar{\theta}}(z) / H = f(w,x,y,z)\}. \quad (1)$$

If the α- cuts of $f(\bar{\lambda}, \bar{\beta}, \bar{v}, \bar{\theta})$ degenerate to some fixed value, then the system performance is a crisp number, otherwise it is a fuzzy number.

The regular busy period

$$P_0 = K_0(1-\rho) = \frac{(\mu_b - \lambda)[2\mu_v - N]}{(\mu_b - \lambda)[2\mu_v - N] + \theta \times N}, \tag{2}$$

where $N = \lambda + \theta + \mu_v - \sqrt{(\lambda + \theta + \mu_v)^2 - 4\lambda\mu_v}$.

The working vacation period

$$P_1 = \frac{(\mu_b - \lambda)[2\mu_v - N] + \theta[2\mu_v - N]}{\mu_b[2\mu_v.N]}. \tag{3}$$

The stationary queue length

$$E(L) = \frac{\mu_b - \lambda}{\mu_b - \lambda z}\left[\frac{\mu_b - \lambda}{\mu_b} + \frac{\theta.N}{\mu_b(2\mu_v - N)}\right]^{-1} \times \left[\frac{2\mu_v - N}{2\mu_v}\right] + \left[\frac{N}{2\mu_v}\right]\left(\frac{\mu_b - \mu_v}{\mu_b}\right)\frac{z(2\mu_v - N)}{2\mu_v - (N)z}. \tag{4}$$

The waiting time

$$E(W) = \frac{1}{(\mu_b - \lambda)} + \frac{2\mu_v[\mu_b - \mu_v]}{\lambda(2\mu_v\mu_b - N)} \times \frac{N}{2\mu_v - N}. \tag{5}$$

We obtain the membership function of some performance measures, namely the regular busy period, the working vacation period, the stationary queue length and the waiting time. For the system in terms of this membership function are:

$$\mu_{\overline{P_0}}(A) = \sup_{\substack{w\in S(\bar{\lambda}) \\ x\in S(\bar{\beta}) \\ y\in S(\bar{b}) \\ z\in S(\bar{\theta})}} \{\mu_{\bar{\lambda}}(w), \mu_{\bar{\beta}}(x), \mu_{\bar{v}}(y), \mu_{\bar{\theta}}(z)/A\}, \tag{6}$$

where

$$A = \frac{(x-w)[2y-M]}{(x-w)[2y-M] + z[M]}, \quad M = w + z + y - \sqrt{(w+z+y)^2 - 4wy}.$$

$$\mu_{\overline{P_1}}(B) = \sup_{\substack{w\in S(\bar{\lambda}) \\ x\in S(\bar{\beta}) \\ y\in S(\bar{b}) \\ z\in S(\bar{\theta})}} \{\mu_{\bar{\lambda}}(w), \mu_{\bar{\beta}}(x), \mu_{\bar{v}}(y), \mu_{\bar{\theta}}(z)/B\}, \tag{7}$$

$$B = \frac{(x-w)[2y-M] + z[2y-M]}{2xyM}.$$

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$$\mu_{\overline{E(L)}}(C) = \sup_{\substack{w\in S(\tilde{\lambda}) \\ x\in S(\tilde{\beta}) \\ y\in S(\tilde{b}) \\ z\in S(\tilde{\theta})}} \{\mu_{\tilde{\lambda}}(w), \mu_{\tilde{\beta}}(x), \mu_{\tilde{v}}(y), \mu_{\tilde{\theta}}(z)/C\}, \tag{8}$$

where

$$C = \left(\frac{x-w}{x-w.u}\right)\left[\frac{y-w}{y} + \frac{z.M}{(2xy-M)}\right]^{-1} \times \left[\frac{M}{2y}\right] + \left[\frac{M}{2y}\right]\left[\frac{x-y}{x}\right] \times \frac{u(2y-M)}{2y-(M)u}$$

$$\mu_{\overline{E(W)}}(D) = \sup_{\substack{w\in S(\tilde{\lambda}) \\ x\in S(\tilde{\beta}) \\ y\in S(\tilde{b}) \\ z\in S(\tilde{\theta})}} \{\mu_{\tilde{\lambda}}(w), \mu_{\tilde{\beta}}(x), \mu_{\tilde{v}}(y), \mu_{\tilde{\theta}}(z)/D\}, \tag{9}$$

and

$$D = \frac{1}{x-w} + \frac{2y(x-y)}{w(2yx-M)} \times \frac{M}{2y-M}.$$

Using the fuzzy analysis technique explain, we can find the membership of $\overline{P_0}$, $\overline{P_1}$, $\overline{E(L)}$, $\overline{E(W)}$ as a function of the parameter α. Thus the α-cut approach can be used to develop the membership function of $\overline{P_0}$, $\overline{P_1}$, $\overline{E(L)}$, $\overline{E(W)}$.

4. Performance Measure of Interest

The following Performance measure are studied for this model in fuzzy environment.

The regular busy period

Based on Zadeh's extension principle, $\mu_{P_0}(A)$ is the superimum of minimum over $\mu_{\tilde{\lambda}}(w)$, $\mu_{\tilde{\beta}}(x)$, $\mu_{\tilde{v}}(y)$, $\mu_{\tilde{\theta}}(z)\}$, $A = [A]$ to satisfying $\mu_{P_0}(A) = \alpha$, $0 < \alpha \leq 1$.

The following Four case arise:

Case(i) : $\mu_{\tilde{\lambda}}(w) = \alpha$, $\mu_{\tilde{\beta}}(x) \geq \alpha$, $\mu_{\tilde{v}}(y) \geq \alpha$, $\mu_{\tilde{\theta}}(z) \geq \alpha$,
Case(ii) : $\mu_{\tilde{\lambda}}(w) \geq \alpha$, $\mu_{\tilde{\beta}}(x) = \alpha$, $\mu_{\tilde{v}}(y) \geq \alpha$, $\mu_{\tilde{\theta}}(z) \geq \alpha$,
Case(iii) : $\mu_{\tilde{\lambda}}(w) \geq \alpha$, $\mu_{\tilde{\beta}}(x) \geq \alpha$, $\mu_{\tilde{v}}(y) = \alpha$, $\mu_{\tilde{\theta}}(z) \geq \alpha$,
Case(iv) : $\mu_{\tilde{\lambda}}(w) \geq \alpha$, $\mu_{\tilde{\beta}}(x) \geq \alpha$, $\mu_{\tilde{v}}(y) \geq \alpha$, $\mu_{\tilde{\theta}}(z) = \alpha$.

For case (i), the lower and upper bound of α- cuts of $\overline{P_0}$ can be obtained through the corresponding parametric non-linear programs;

$$[\overline{P_0}]_{\alpha}^{L_1} = \min_{\Omega}\{[A]\} \; and \; [\overline{P_0}]_{\alpha}^{U_1} = \max_{\Omega}\{[A]\}.$$

Similarly, we can calculate the lower and upper bounds of the α-cuts of $\overline{E(L)}$ for the cases $(ii), (iii)$ *and* (iv).

By considering the cases, simultaneously the lower and upper bounds of the α-cuts of $\overline{P_0}$ can be written as

$$[\overline{P_0}]_\alpha^L = \min_{\Omega}\{[A]\}, \quad and\ [\overline{P_0}]_\alpha^U = \max_{\Omega}\{[A]\}.$$

Such that

$$w_\alpha^L \le w \le w_\alpha^U,\ x_\alpha^L \le x \le x_\alpha^U,\ y_\alpha^L \le y \le y_\alpha^U,\ z_\alpha^L \le z \le z_\alpha^U.$$

If both $(\overline{P_0})_\alpha^L$ and $(\overline{P_0})_\alpha^U$ are invertible with respect to α, the left and right shape function, $L(A) = [(P_0)_\alpha^L]^{-1}$ and $R(A) = [(P_0)_\alpha^U]^{-1}$, can be derived from which the membership function $\mu_{\overline{P_0}}(A)$ can be constructed as

$$\mu_{\overline{P_0}}(A) = \begin{cases} L(A), (P_0)_{\alpha=0}^L \le A \le (P_0)_{\alpha=0}^U, \\ 1, \quad (P_0)_{\alpha=1}^L \le A \le (P_0)_{\alpha=1}^U, \\ R(A), (P_0)_{\alpha=1}^L \le A \le (P_0)_{\alpha=0}^U. \end{cases} \tag{10}$$

In the same way as we said before we get the following results.

The working vacation period

$$\mu_{\overline{P_1}}(B) = \begin{cases} L(B), (P_1)_{\alpha=0}^L \le B \le (P_1)_{\alpha=0}^U, \\ 1, \quad (P_1)_{\alpha=1}^L \le B \le (P_1)_{\alpha=1}^U, \\ R(B), (P_1)_{\alpha=1}^L \le B \le (P_1)_{\alpha=0}^U. \end{cases} \tag{11}$$

The stationary queue length

$$\mu_{\overline{E(L)}}(C) = \begin{cases} L(C), (E(L))_{\alpha=0}^L \le C \le (E(L))_{\alpha=0}^U, \\ 1, \quad (E(L))_{\alpha=1}^L \le C \le (E(L))_{\alpha=1}^U, \\ R(C), (E(L))_{\alpha=1}^L \le C \le (E(L))_{\alpha=0}^U. \end{cases} \tag{12}$$

The waiting time

$$\mu_{\overline{E(W)}}(D) = \begin{cases} L(d), (E(W))_{\alpha=0}^L \le D \le (E(W))_{\alpha=0}^U, \\ 1, \quad (E(W))_{\alpha=1}^L \le D \le (E(W))_{\alpha=1}^U, \\ R(D), (E(W))_{\alpha=1}^L \le D \le (E(W))_{\alpha=0}^U. \end{cases} \tag{13}$$

5. Numerical Study

The regular busy period

Suppose the arrival rate $\overline{\lambda}$, the service rate $\overline{\beta}$, working vacation an customer is served at a rate $\overline{\nu}$, and working vacation time $\overline{\theta}$ are assumed to be trapezoidal fuzzy numbers described by: $\overline{\lambda} = [41, 42, 43, 44]$, $\overline{\beta} = [51, 52, 53, 54]$, $\overline{\nu} = [61, 62, 63, 64]$ and $\overline{\theta} = [71, 72, 73, 74]$ per hours, respectively. Then,

$$\lambda(\alpha) = \min_{w \in s(\bar{\lambda})} \{w \in s(\bar{\lambda}), G(x) \geq \alpha\}, \max_{w \in s(\bar{\lambda})} \{w \in s(\bar{\lambda}), \geq \alpha\},$$

where

$$G(x) = \begin{cases} w - 41, & 41 \leq w \leq 42, \\ 1 \quad , & 42 \leq w \leq 43, \\ 44 - w, & 43 \leq w \leq 44. \end{cases}$$

That is,

$\lambda(\alpha) = [41 + \alpha, 44 - \alpha]$, $\mu(\alpha) = [51 + \alpha, 54 - \alpha]$,

$\nu(\alpha) = [61 + \alpha, 64 - \alpha]$ and $\theta(\alpha) = [71 + \alpha, 74 - \alpha]$.

It is clear that, when $w = w_\alpha^U$, $x = x_\alpha^U$, $y = y_\alpha^U$ and $z = z_\alpha^U$, A attains its maximum value and, when $w = w_\alpha^L$, $x = x_\alpha^L$, $y = y_\alpha^L$ and $z = z_\alpha^L$, A attains its minimum value.

From the generated, for the given input value of $\overline{\lambda}$, $\overline{\mu}$, $\overline{\theta}$ *and* $\overline{\beta}$.

i) For fixed values of w, x and y, A decreases as z increase.
ii) For fixed values of x, y and s, A decreases as w increase.
iii) For fixed values of y, z and w, A decreases as x increase.
iv) For fixed values of z, w and x, A decreases as y increase.

The smallest value of occurs when w-takes its lower bound. That is, $w = 41 + \alpha$ and x, y and z, take their upper bounds given by $x = 54 - \alpha$, $y = 64 - \alpha$ and $z = 74 - \alpha$ respectively. The maximum value of P_0 occurs when $w = 44 - \alpha$, $x = 51 + \alpha$, $y = 61 + \alpha$, $z = 71 + \alpha$.
If both $[P_0]_\alpha^L$ and $[P_0]_U^\alpha$ are invertible with respect to α, then the left shape function $L(A) = [(P_0)_\alpha^L]^{-1}$ and right shape function $R(A) = [(P_0)_\alpha^U]^{-1}$ can be obtained, from which the membership function $\mu_{\overline{P_0}}(A)$ can be constructed as;

$$\mu_{\overline{P_0}}(A) = \begin{cases} L(A), A_1 \leq A \leq A_2, \\ 1, \quad A_2 \leq A \leq B_3 \ , \\ R(A), A_3 \leq A \leq A_4. \end{cases} \tag{14}$$

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The values of A_1, A_2, A_3 and A_4 as obtained from (14) are;

$$\mu_{\overline{P_0}}(A) = \begin{cases} L(A), & 0.2524 \leq A \leq 0.2938, \\ 1, & 0.2938 \leq A \leq 0.3755\ , \\ R(A), & 0.3755 \leq A \leq 0.4112. \end{cases}$$

In the same way as we said before we get the following results.

The working vacation period

$$\mu_{\overline{P_i}}(B) = \begin{cases} L(B), B_1 \leq B \leq B_2, \\ 1, \quad B_2 \leq B \leq B_3\ , \\ R(B), B_3 \leq B \leq B_4. \end{cases} \tag{15}$$

The values of B_1, B_2, B_3 and B_4 as obtained from (15) are

$$\mu_{\overline{P_i}}(B) = \begin{cases} L(B), & 1.3203 \leq B \leq 1.3773, \\ 1, & 1.3773 \leq B \leq 1.413\ , \\ R(B), & 1.4133 \leq B \leq 1.4628. \end{cases}$$

The stationary queue length

$$\mu_{\overline{E(L)}}(C) = \begin{cases} L(C), C_1 \leq C \leq C_2, \\ 1, \quad C_2 \leq C \leq C_3\ , \\ R(C), C_3 \leq C \leq C_4. \end{cases} \tag{16}$$

The values of C_1, C_2, C_3 and C_4 as obtained from (16) are

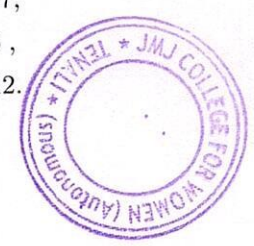
$$\mu_{\overline{E(L)}}(C) = \begin{cases} L(C), & 0.1198 \leq C \leq 0.1657, \\ 1, & 0.1657 \leq C \leq 0.2054\ , \\ R(C), & 0.2054 \leq C \leq 0.2245. \end{cases}$$

The waiting time

$$\mu_{\overline{E(W)}}(D) = \begin{cases} L(D), D_1 \leq D \leq D_2, \\ 1, \quad D_2 \leq D \leq D_3\ , \\ R(D), D_3 \leq D \leq D_4. \end{cases} \tag{17}$$

The values of D_1, D_2, D_3 and D_4 as obtained from (17) are

$$\mu_{\overline{E(W)}}(D) = \begin{cases} L(D), & 0.0751 \leq D \leq 0.0987, \\ 1, & 0.0987 \leq D \leq 0.1175\ , \\ R(D), & 0.1175 \leq D \leq 0.1412. \end{cases}$$



Further, by fixed the vacation rate by a crisp value $\bar{\theta} = 72.4$ and $\bar{\nu} = 61.3$ taking arrival rate $\overline{\lambda} = [41, 42, 43, 44]$, service rate $\overline{\beta} = [51, 52, 53, 54]$ both trapezoidal fuzzy numbers the values of the regular busy period are generated and are plotted in the figure 1, it can be observed that as $\overline{\lambda}$ increases the the regular busy period increases for the fixed value of the service rate, where as for fixed value of arrival rate, the regular busy period decreases as service rate increases.

Similar conclusion can be obtained for the case $\bar{\theta} = 72.6$, $\bar{\nu} = 62.3$. Again for fixed values of taking $\overline{\lambda} = [41, 42, 43, 44]$, $\overline{\beta} = [51, 52, 53, 54]$, the graphs of the working vacation period are drawn in figure 2 respectively. These figure show that as arrival rate increases the working vacation period also increases, while the working vacation period decreases as the service rate increases in both the case.

It is also observed from the data generated that the membership value of the regular busy period is 0.41 and the membership value of the working vacation period 0.46 when the ranges of arrival rate, service rate, and the vacation rate lie in the intervals$(41, 42.4)$, $(52, 54.6)$, and $(72.8, 73.4)$ respectively.

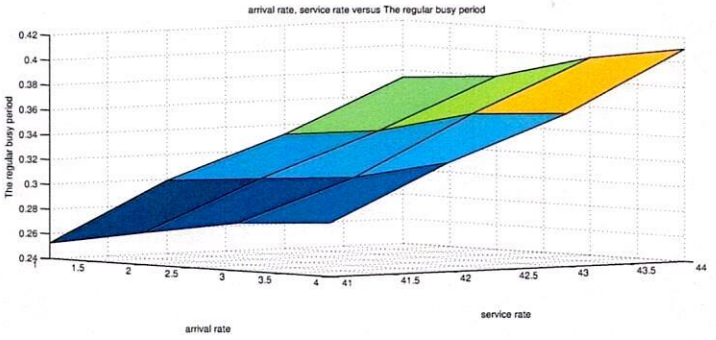


Figure 1: Arrival rate, service rate versus the regular busy period

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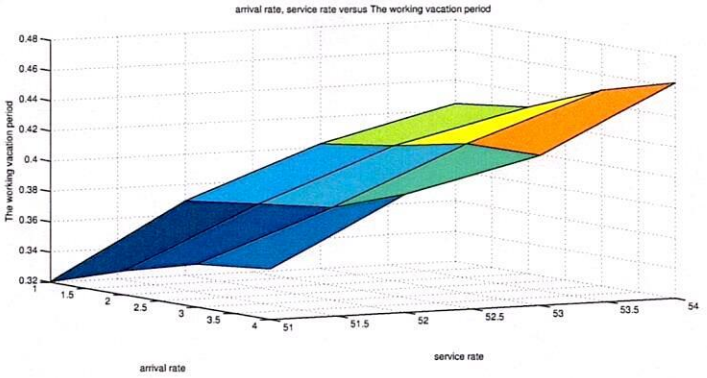

Figure 2: Arrival rate, service rate versus the working vacation period

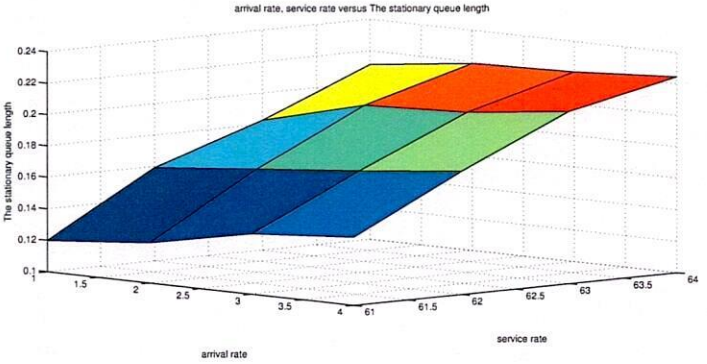

Figure 3: Arrival rate, service rate versus the stationary queue length

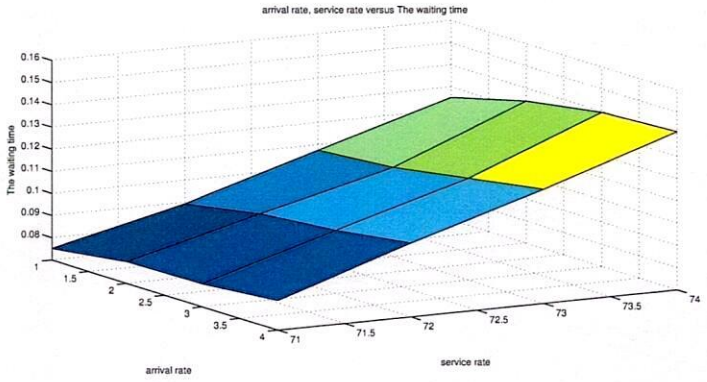

Figure 4: Arrival rate, service rate versus the waiting time

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6. Conclusion

For the batch arrival queues, some researchers studied a batch arrival $M^X/M/1$ queue with single working vacation. Furthermore, they found the upper bound and lower bound of the stationary waiting time in the Laplace transform order, from which they got the upper bound and lower bound of the waiting time. In this research paper, we have studied the analysis of $M/M/1$ queue with working vacation in fuzzy environment. We have obtained the performance measures such as the regular busy period, working vacation period, stationary queue length and waiting time. We have obtained numerical results to all the performance measures for this fuzzy Queues. The application of this fuzzy queues, there are situations particularly in transportation system (Bus service, trains, and express elevators) where the service provided is a group that, a group of customers can be served simulataneously, batch servicing in this process.

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Different Types of Ideals in Partially Ordered Ternary Semigroups

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Abstract: Partially Ordered ternary semi group, Partially Ordered left(right) ternary semi group Partially ordered lateral ternary ideal, Partially Ordered ternary ideal are the terms that are defined in this paper. Some properties of these ternary semi groups are discussed. Completely prime partially ordered ideals and prime partially ordered ideals are defined and their properties established. Prime partially ordered radical and completely prime partially ordered radical are defined and their properties discussed.

Introduction:

CLIFFORD, PETRICH, LYARIN and ANJANEYULU studied the algebraic theory of semi groups. In 1932 LEHMER introduced the theory of ternary algebraic system .he worked on certain algebraic systems called triplexes which turn out to be commutative ternary groups with one associative ternary operation the ternary semi groups are universal algebras. The nation of a ternary semi group with examples was given by BANACH. The theory of ternary semi groups was developed by SANTIAGO. And the ideal theory in ternary semi groups was introduce the notions of completely prime ideal, prime ideal, completely semi prime ideal, prime ideal, prime radical and completely prime radical and characterize completely prime ideals, completely semi prime ideals, prime radicals and completely prime radicals in partially ordered ternary semi group.

2. Preliminaries:

Definition 2.1: A Ternary semi group T is said to be a partially ordered ternary semi group If T is a partially ordered set such that
$a \leq b \Rightarrow [a\ a_1\ a_2] \leq [b\ a_1\ a_2], [\ a_1\ a\ a_2] \leq [\ a_1\ b\ a_2], [\ a_1\ b\ a_2] \leq [\ a_1\ a_2\ b]$ for all $a, b, a_1, a_2 \in T$.

Definition 2.2: A Non empty subset A of a partially ordered ternary semi group T is said to be partially ordered left ternary ideal or partially ordered left ideal of T.

If (i). $b, c \in T, a \in T \Rightarrow bca \in A$.

(ii). If $a \in A$ and $t \in T$ such that $t \leq a$ then $t \in A$.

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Definition 2.3: A Non empty subset A of a partially ordered ternary semi group T is said to br partially ordered lateral ternary ideal or partially ordered lateral ideal of T .

If (i). $b, c \in T, a \in A \Rightarrow bac \in A.$

(ii). If $a \in A$ *and* $t \in T$ *such that* $t \leq a$ *then* $t \in A.$

Definition 2.4: A non empty subset A of a partially ordered ternary semi group T is said to be partially ordered right ternary ideal or partially ordered right ideal of T.

If (i). $b, c \in T, a \in T \Rightarrow abc \in A.$

(ii). If $a \in A$ *and* $t \in T$ *such that* $t \leq a$ *then* $t \in A.$

Definition 2.5: A non empty subset A of a partially ordered ternary semi group T is said to be partially ordered two sided ternary ideal or partially ordered two sided ideal of T.

If (i). $b, c \in T, a \in T \Rightarrow bca \in A, abc \in A.$

(ii). If $a \in A$ *and* $t \in T$ *such that* $t \leq a$ *then* $t \in A.$

Definition 2.6: A non empty subset A of a partially ordered ternary semi group T is said to be partially ordered ternary ideal or partially ordered ideal of T.

If (i). $b, c \in T, a \in A \Rightarrow bca \in A, bac \in A, abc \in A.$

(ii). If $a \in A$ *and* $t \in T$ *such that* $t \leq a$ *then* $t \in A.$

Note 2.7: **Let** T be a partially ordered ternary semi group and $A \subseteq T, B \subseteq T.$ *Then*

$$(i). A \subseteq (A],$$

$$(ii). \big((A]\big] = (A],$$

$$(iii). (A](B](C] \subseteq (ABC],$$

$(iv). A \subseteq B \Rightarrow A \subseteq (B]$ *and* $(v). A \subseteq B \Rightarrow (A] \subseteq (B].$

Note 2.8: The non empty intersection of any family of partially ordered left ideals of a partially ordered ternary semi group T is a partially ordered left ideal of T.

3. Completely Prime Partially ordered ideals and Prime partially Ordered ideals:

Definition 3.1: A partially ordered (left/lateral/right) ideal A of a partially ordered ternary semi group t is said to be a completely prime (left/lateral/right) ideal of T provided

$x, y, z \in T and\ xyz \in A\ impplies\ either\ x\ \in A, or\ y \in A\ or\ z \in A.$

Theorem3.2: A partially ordered ideal A of a partially ordered ternary semi group T is completely prime if and only if $x_1, x_2, x_3 \ldots x_n \in T$, n is an odd natural number, , $x_2, x_3 \ldots x_n \in A \Rightarrow x_i \in A\ for\ some\ i = 1,2, \ldots n.$

Theorem3.3: A partially ordered ideal A of a partially ordered ternary semi group t is completely prime if and only if T\A is either a sub semi group of T or empty.

Definition 3.4: A partially ordered ideal A of a partially ordered ternary semi group T is said to be a prime ideal of T provided X,Y,Z are ideals of T and $XYZ \subseteq A \Rightarrow X \subseteq A\ or\ Y \subseteq A\ or\ Z \subseteq A$.

Theorem3.5: In a partially ordered ternary semi group T ,the following conditions are equivalent:

(i). A is a prime partially ordered ideal of T.

(ii). $a, b, c\ \in T; \langle a\rangle\langle b\rangle\langle c\rangle \subseteq A\ implies\ a \in A\ or\ b \in or\ c \in A.$

(iii). $a, b, c\ \in T; T^1T^1aT^1T^1bT^1T^1cT^1T^1 \subseteq A\ implies\ a \in A\ or\ b \in or\ c \in A.$

4. Completely semi prime Partially ordered ideals and semi prime partially ordered ideals

Definition 4.1: A partially ordered ideal A of a partially ordered ternary semi group t is said to be a completely semi prime partially ordered ideal provided
$x \in A, x^n \in A\ for\ some\ odd\ natural\ number\ n > 1\ implies\ x \epsilon A.$

Theorem4.2: A partially ordered ideal A of a partially ordered ternary semi group T is completely semi prime if and only if $x \in T, x^3 \in A$ *implies* $x \in A$.

5. Prime partially ordered radical and completely prime partially ordered radical:

Notation 5.1: If A is a partially ordered ideal of a partially ordered ternary semi group T. Then we associate the following four types of sets

A_1= the intersection of all completely prime partially ordered ideals of T containing A.

$A_2 = \{x \in T : x^n \in A \text{ for some odd natural numbers } n\}$.

A_3= The intersection off all prime partially ordered ideals of T containing A.

$A_4 = \{x \in T : \langle x^n \rangle \subseteq A \text{ for some odd natural numbers } n\}$.

Theorem5.2: If A is partially ordered ideal of a partially ordered ternary semi group T, then $A \subseteq A_4 \subseteq A_3 \subseteq A_2 \subseteq A_1$.

Proof: i. $A \subseteq A_4$:let $x \in$A. Then $\langle x \rangle \subseteq A$ and hence x $\in$ A_4

Therefore $A \subseteq A_4$.

ii. $A_4 \subseteq A_3$: let $x \in A_4$. Then $\langle x \rangle^n \subseteq A$ for some odd natural number n.

Let P be any prime partially ordered ideal of T containing A.

Then $\langle x \rangle^n \subseteq A$ for some odd natural number n $\Rightarrow \langle x \rangle^n \subseteq P$

Since P is prime, $\langle x \rangle \subseteq P$ and hence $x \in$P

Since this is true for all prime ideals of p containing A, $x \in A_3$

Therefore $A_4 \subseteq A_3$

iii. $A_3 \subseteq A_2$:Let $x \in A_3$. Suppose if possible $x \notin A_2$.

Then $x^n \notin A$ for all odd natural number n, and $x \in T$

Consider Q=U x^n for all odd natural number n, $x \in T$.

Let $a, b, c \in Q$. Then $a = (x)^r, b = (x)^s, c = (x)^t$ for some odd natural numbers r,s,t.

Therefore $abc = (x)^r\ (x)^s\ (x)^t = x^{r+s+t} \in Q$ and hence Q is a sub semi group of T.

By theorem 3.3, P=T\Q is a completely prime partially ordered ideal of T and $x \notin P$.

By theorem 3.8, P is a prime partially ordered ideal of T and $x \notin P$. Therefore $x \notin A_3$.

It is contradiction. Therefore $x \in A_2$ and hence $A_3 \subseteq A_2$.

iv. $A_2 \subseteq A_1$. Now $x \in A_2 \Rightarrow x^n \in A$ for some odd natural number n.

Let p be any completely prime partially ordered ideal of T containing A.

Then $x^n \in A \subseteq P \Rightarrow x^n \in P \Rightarrow x \in P$. Therefore $x \in A_1$. Therefore $A_2 \subseteq A_1$.

Hence $A \subseteq A_4 \subseteq A_3 \subseteq A_2 \subseteq A_1$.

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జాషువా మానవతా వాదం

JAASHUVAA MAANAVATHAA VAADAM

బి. మేరి కుమారి B.MARY KUMARI
జె.యం.జె మహిళా కళాశాల (స్వయంప్రతిపత్తి), తెనాలి. J.M.J Women's College(Autonomous), Tenali.

"కుల మతాలు గీసుకొన్న గీతల దొచ్చి
పంజరాన గట్టువడను నేను
నిఖిలలోక మెట్లు నిర్ణయించిన నాకు
తరుగలేదు విశ్వనరుడనేను"

అని ధైర్యంగా చెప్పిన జాషువా భావకవిత్వం ఉధృతంగా ఉన్న రోజులలో తనదైన భావ వ్యక్తీకరణకు పద్యాన్ని సాధనంగా తీసుకుని ఛంద సామ్రాజ్యాన్ని పాలించిన నవయుగ కవిచక్రవర్తి జాషువా. ఆయన జీవితాన్ని, కవిత్వాన్ని విడదీసి చూడలేము. అనుభూతి ఆవేదనల వ్యక్తీకరణమే జాషువా కవిత్వం.

ప్రకృతిలోని అతి సామాన్యమైన వస్తువుల్ని కవితా వస్తువులుగా స్వీకరించి రచన చేసిన ఘనత జాషువాకే దక్కుతుంది. గిజిగాడు, సాలీడు, గొల్లభామ, తేనెటీగ మొదలైన అల్ప ప్రాణుల్ని సైతం ప్రతిభావంతంగా వర్ణించిన ఉదాత్త భావుక సంపన్నుడు జాషువా.

శిశువు :- ఆంధ్ర సాహిత్యంలో కవులు 'శిశువు' తీరును వర్ణించిన సందర్భాలు చాలా తక్కువగా ఉన్నాయి. శిశువు బాల్య చేష్టలను కవితా వస్తువుగా స్వీకరించారు, కాని శిశువు తీరును వర్ణించిన ప్రశస్తి జాషువాకే దక్కుతుంది. ఆయన ఊహ, లోకవృత్త పరిశీలన, ఆలోచన సరళి అభివ్యక్తమౌతాయి.

శిశువు బొటనవ్రేలు నోటిలో పెట్టుకొని ముల్లోకాల తీరు తెన్నుల్ని గమనిస్తూ యోగభ్యాసం చేస్తూ లోపల ఆనందం అనుభవిస్తున్నాడని చెప్పడం సమంజసంగా ఉంది. తల్లిదండ్రుల శరీరాలనే తీగలకు తొమ్మిది నెలల పండుగా శిశువు జన్మించాడని చెప్పటం క్రొత్తదనంగా వుంది.

శిశువుకు అమృతం, విషం అనే తేడా తెలియదు. దేనినైనా ఆస్వాదించటానికి సిద్ధపడతాడు. అతడు వెఱ్ఱిబాగులవాడని చేతికి దొరికిన ప్రతి వస్తువును తినటానికి ఊబలాట పడతాడని చెప్తాడు. శిశువుకు మాటలు రావు, కేవలం పాలే త్రాగుతాడు, బాగా నిద్రపోతాడు. ఏ దేశమో తెలియదు. మొన్న మొన్ననే ఈ భూమి మీదకు వచ్చాడని అంటాడు. శిశువు యొక్క ప్రతి కదలికను గ్రహించి ఆకళింపు చేసుకున్న రచయితగా దర్శనమిస్తాడు.

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మాత కడగొట్టు బిడ్డగా ఇతడు జన్మించాడు. ఇతడు తనకు లభించిన ధనంతోనే సంతృప్తి
రకంగా తనను హింసించినా చెప్పులు కుట్టడం అనే తన వృత్తిని కొనసాగిస్తాడు. ఇతని
ం ఋణపడి ఉంది. తనకు తిండి లేకపోయినా లోకానికి తిండి పెట్టే శ్రామిక మూర్తి
ంతుడు. ఇతని తలమీద వున్న బురదను కడగటానికి గంగాజలం కూడా కడగలేకుండా
ఇతడు దేవునికి నైవేద్యం పెడితే త్రిమూర్తులకు కూడా నైవేద్యం ఉండదు. పాముకు పాలు,
చదార పెట్టి సంతృప్తిపడే లోకం మనది. అంటరానివాడు వున్నచోట ధర్మదేవత కూడా
దీనిని బట్టి అంటరానివానికి న్యాయం దక్కదని భావం.
ంటరానివానిని ఉద్ధరించడానికి భగవంతుడే పూనుకోలేదు. ఇక మనిషి అతన్ని ఎలా
పుట్టు బానిస అయిన తనకు పెండ్లి ఎందుకు అని పెండ్లే మానుకున్నాడు. తన ఇంట్లో
దయ్యపు పిల్లలా తిరుగుతున్న గబ్బిలంతో తన వృత్తాంతాన్ని తెలియజేస్తాడు. నీవు
లలో తిరుగుతూ మాలాంటి వ్యక్తులకు లేని గౌరవాన్ని పొందుతున్నావు అని అంటాడు. ఈ
ంధతి సుతునిచే కవి పల్కించటం సామాజిక స్థితిని తెలియజేస్తుంది. భూ ప్రపంచం గాఢనిద్రలో
ాయంలో నా ఇంటిలో దేనికోసం వెతుకుతున్నావు నీవు. ఇక్కడ నీకు ఆనందం లేశమైనా
. హృదయంలేని లోకం ఇది. ఇక్కడ ధర్మధేనువులు పిదికే పాలు పేదలకు లభించవు.
డు ఆజ్ఞాపిస్తే బ్రహ్మాది దేవతలు కూడా నోరు విప్పరని చెప్పటం ద్వారా ధనవంతులకు ఉన్న
ర్యాన్ని గుర్తించవచ్చు.
ఈ లోకంలో విగ్రహాల వివాహాలు చేయడానికి వందలు వేలు ఖర్చు పెడతారే గాని పేదలైన
స్త్రాల్లో మెతుకును కూడా విదిల్చరు. ముప్పై ముడు కోట్ల దేవతలు ఈ దేశం మీద ఎగబడ్డారని
ఆకలి ఎప్పటికి తీరని సమస్యగా ఉండిపోతుందన్నాడు. దేవతార్చన కంటే మానవత్వం
ని తెలియజేశాడు.
కన్నతల్లిదండ్రుల ప్రేమను మరచిపోయి వారిని వృద్ధాశ్రమాలలో ఉంచుతూ మానవత్వం
పోయిందని కవి నేటి యువతరం గురించి ఆవేదన వ్యక్తం చేశాడు. అలాగే ఈనాటి సమాజం
త్వం మరచి బీదవానిని ఆకలి రాకాసి నుండి కాపాడలేకపోతున్నారని తెలియజేశాడు.

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నిద్రపోయే సమయంలో శిశువు అమ్మకౌగిలి అనే పంజరంలో& చిలుక లాంటి వాడని, చిలక పంజరంలో ఉన్నట్లే శిశువు కూడా తల్లి కౌగిలి అనే పంజరంలో ఉంటాడు అంటాడు. అతని లేత కండలు, పస్తాదుల కండలలా మెలి తిరిగిఉబ్బి ఉంటాయని అందుపల్ల అతడు చిన్ని పస్తాదు అంటాడు. మాటలు నేర్చిన తర్వాత ఈ భూమి మీదకు ఎందుకు వచ్చాడో అడగాలి అంటాడు. ప్రస్తుతానికి అతనికి ఏ పాపము తెలియదు అని అతని అమాయకత్వాన్ని తెలియజేస్తున్నాడు.

కేవలం జానెడు నిడివి, చీకట్లు కమ్ముకొని కడుపులోనిద్రించి లేచిన నిర్గుణుడు. నున్నని చెక్కిళ్ళతో బోసినోటి నవ్వులతో ముద్దులు మూటకట్టే అందగాడు అంటాడు. తల్లిపాలు అనే తేనె ధారల్ని అన్నంగా తెచ్చుకొన్న అతిధి అంటాడు. అతిధి అన్నం తెచ్చుకోడు, కాని ఈ అతిధి అన్నం తెచ్చుకున్నాడని చపుత్కరించటం గమనించవచ్చు. బట్టలు కట్టుకోడు అయినా సిగ్గుపడడు. ప్రకృతి అనే స్త్రీ ఆకల, నిద్ర నేర్పింది అంటాడు. భూమి అనే పాఠశాల వర్ణన అద్భుతంగా ఉంది.

తల్లితో అతనికున్న సంబంధం ఎంత గాఢమైందో కాని, ఏడ్చి మరి సేపలు చేయించుకుంటాడు. భగవంతుడు ఏమి సరసాలు ఆడతాడో కాని పెద్దగా చప్పట్లు కొట్టుకొంటాడు. తల్లి "నా బంగారుకొండ, నా రత్నమా" అని పిలుస్తుంది. పెరిగి పెద్దయి చదువు సంధ్యలు నేర్చుకొని తల్లి పలుకుల్ని నిలుపుతాడో లేదో అని కవి తన అనుమానమును వ్యక్తం చేస్తున్నాడు. ఇప్పటి యువత తల్లిదండ్రుల పట్ల చూపిస్తున్న నిరాదరణ కవి ఆనాడే తన కవిత్వంలో తెలియజేశాడు. చేతిలోని గిలక్కాయతో ఆడుకొంటూ అది పలకటం లేదని కోపపడతాడు, పొరుగావిడ తన దగ్గరకురాగా ఆమె ఇతర అనే భావాన్ని ప్రకటిస్తాడు. పెద్ద పెద్ద శబ్దాలకు వణికిపోయి తల్లి కౌగిలిలో దాక్కుంటాడు. చిన్నప్పుడు తల్లిని వదలుకుండా ఉండి, పెద్దయ్యాక ఆ తల్లిని మరిచి పోవటం ఏమి న్యాయం, ఈ అంశాన్ని నేటి యువతరం గుర్తించాలి.

గబ్బిలం :- జాషువా కలం నుంచి జాలువారిన కావ్యాలలో గబ్బిలము ముఖ్యమైనది. ఇది కల్పిత కావ్యం అరుంధతీ సుతుని ఆక్రోశ సందేశంతో కూడిన కావ్యం. కుల వివక్ష వల్ల, అస్పృశ్యతవల్ల, పేదరికం వల్ల, మత మౌడ్యం వల్ల జాషువ పడిన బాధలు, ఆవేదనలు అవమానాలకు అక్షరరూపమే ఈ కావ్యం.

ఈ లోకంలో పంచముడుగా పుట్టిన మనిషి సమాజం నుంచి వెలివేయబడ్డాడు. ఇతనిని ఉన్నత వర్ణాలవారు దగ్గరకు రానీయరు. శూద్రులు కూడా వీళ్ళను అసహ్యించుకుంటారు. పంచముడు ఏ వర్ణానికి చెందక ఉభయ బ్రష్టత్వం పొందుతాడు. గబ్బిలం కూడా పక్షిజాతికి, జంతుజాతికి చెందక, మృగపక్షి ధర్మాలతో ఉండి అరుంధతీ సుతుని సందేశాన్ని అందించటానికి సాధస మౌతుంది. గబ్బిలం ప్రవేశించిన గృహం నివాసయోగ్యం ఎలా కాదో అలాగు అరుంధతి సుతుడు కూడా సమాజానికి అంటరానివానిగా కవి పర్ణించాడు.

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MUTUAL FUNDS PERFORMANCE EVALUATION IN INDIA

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Performance and analysis.

ABSTRACT

In recent years, credit inter-mediation is shifting, with the traditional dominance of the banking sector yielding ground to non-bank intermediaries, including the asset management industry. In addition, mutual funds play an important role in equity, debt and money markets as efficient allocates of resources. The debt portfolio of mutual funds mainly comprises corporate debt instruments, which include floating rate bonds, non-convertible debentures and public sector undertaking bonds. In the money market segment, mutual funds are the major lenders in the collateralize borrowing and lending obligation segment, accounting for over 60 per cent of lending in this segment. As major domestic institutional investors, they operate in both primary and secondary segments of the capital market, providing a buffer against market volatility. AUM of MFs in India has registered a compound annual growth rate of 25 per cent over the last five years, outstripping the compound annual growth rate of only 11 per cent registered by aggregate bank deposits of scheduled commercial banks. With growing formalization and financialisation of the Indian economy, household savings have been shifting from physical assets to financial assets and within financial assets, from bank deposits to securities.

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INTRODUCTION

A mutual fund is a professionally managed investment fund that pools money from many investors to purchase securities. These investors may be retail or institutional in nature. Mutual funds have advantages and disadvantages compared to direct investing in individual securities. The primary advantages of mutual funds are that they provide economies of scale, a higher level of diversification, they provide liquidity, and they are managed by professional investors. On the negative side, investors in a mutual fund must pay various fees and expenses. The first introduction of a mutual fund in India occurred in 1963, when the Government of India launched Unit Trust of India. UTI enjoyed a monopoly in the Indian mutual fund market until 1987, when a host of other government-controlled Indian financial companies established their own funds, including State Bank of India, Canara Bank and by Punjab National Bank. Larger Indian Mutual Fund Industry has benefited from outsourcing the activity of servicing their investors to two of the leading Registrar and Transfer Agents in India namely CAMS and Karvy. While CAMS commands close to 65% of the Assets servicing, rest is with Karvy. Mutual fund investments done online are also quicker and do not require you to step out of your comfort zone for any document verification or fund transfer. The entire process is handled efficiently online.

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Funds India has an award-winning team of market research analysts, financial gurus and investment experts who will direct your funds into the most rewarding mutual funds.

Definition

A mutual fund is an investment security that enables investors to pool their money together into one professionally managed investment. Mutual funds can invest in stocks, bonds, cash or a combination of those assets. The underlying security types, called holdings, combine to form one mutual fund, also called a portfolio. In simpler terms, mutual funds are like baskets. Each basket holds certain types of stocks, bonds or a blend of stocks and bonds to combine for one mutual fund portfolio.

Objectives

- To study the organizational structure of mutual funds, marketing as well as the regulatory framework operating in India for mutual funds in India.
- To know about the performance evaluation of mutual funds.
- Top mutual funds in India.
- To Study evaluate and compare the performance of different mutual fund in India with reference to different performance indicators.

Structure of Mutual Funds in India: The structure of Mutual Funds in India is a three-tier one. There are three distinct

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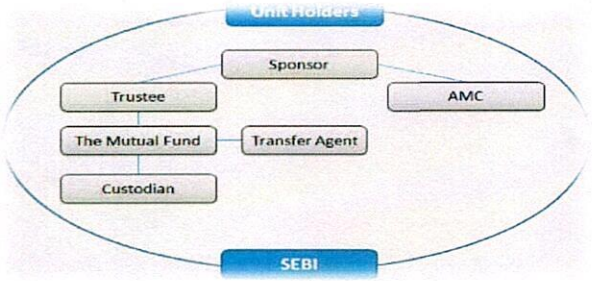
entities involved in the process – the sponsor who creates a Mutual Fund, trustees and the asset management company which oversees the fund management. The structure of Mutual Funds has come into existence due to SEBI Mutual Fund Regulations, 1996. Under these regulations, a Mutual Fund is created as a Public Trust. We will look into the structure of Mutual Funds in a detailed manner.



Fund Sponsor is the first layer in the three-tier structure of Mutual Funds in India. SEBI regulations say that a fund sponsor is any person or any entity that can set up a Mutual Fund to earn money by fund management. This fund management is done through an associate company which manages the investment of the fund.

- A sponsor can be seen as the promoter of the associate company. A sponsor has to approach SEBI to seek permission for a setting up a Mutual Fund. Once SEBI agrees to the inception, a Public Trust is formed under the Indian Trust Act, 1882 and is registered with SEBI.
- Trustees are appointed to manage the trust and an asset management company is created complying with the Companies Act, 1956. There are eligibility criteria given by SEBI for the fund sponsor.
- The sponsor must have experience in financial services for a minimum of five years with a positive Net worth for all the previous five years.
- The net worth of the sponsor in the immediate last year has to be greater than the capital contribution of the AMC.
- The sponsor must show profits in at least three out of five years which includes the last year as well. The sponsor must have at least 40% share in the net worth of the asset management company.
- Any entity that fulfills the above criteria can be termed as a sponsor of the Mutual Fund. Trust and Trustees Trust and trustees form the second layer of the structure of Mutual Funds in India.
- A trust is created by the fund sponsor in favor of the trustees, through a document called a trust deed. The trust is managed by the trustees and they are answerable to investors.
- They can be seen as primary guardians of fund and assets. Trustees can be formed by two ways a Trustee Company or a Board of Trustees.
- The trustees work to monitor the activities of the Mutual Fund and check its compliance with SEBI (Mutual Fund) regulations.
- They also monitor the systems, procedures, and overall working of the asset management company. Without the trustees' approval, AMC cannot float any scheme in the market.
- The asset management company acts as the fund manager or as an investment manager for the trust. A small fee is paid to the AMC for managing the fund.
- The AMC is responsible for all the fund-related activities. It initiates various schemes and launches the same.
- The AMC is bound to manage funds and provide services to the investor. It solicits these services with other elements like brokers, auditors, bankers, registrars, lawyers, etc. and works with them.

Advantages of Mutual Funds: To summarize, the advantages of mutual funds can be described in four words simplicity, versatility, diversity, and accessibility:

Simplicity: Most investors do not have the knowledge, time or resources to build their own portfolio of stocks and bonds. Stock investors often have extensive knowledge of fundamental analysis or technical analysis. However, buying shares of a mutual fund enables an investor to own a professionally managed, diverse portfolio, although the investor may have little or no knowledge of investing concepts and strategies. Mutual funds are professionally managed, which means the investor does not need knowledge of investing in capital markets to be successful with them.

Diversity: All investors, beginners and pros alike, know that putting all of their eggs into one basket is not wise. This speaks to the wisdom of diversification with mutual funds. To diversify with stocks, an investor may need to buy 20 or more securities to reach sufficient diversification. However, many mutual funds offer complete diversification in just one security that can be easily purchased. Therefore, a mutual fund investor can break the eggs-in-one-basket rule with mutual funds, at least when getting started, and then add more mutual funds later to increase diversity in the mutual funds portfolio. For more on this idea, be sure to read our article on how to get started investing with just one mutual fund.

Versatility: There are so many types of mutual funds that investors can gain access to almost any segment of the market imaginable. For example, sector funds make it possible for investors to buy into focused areas of the market, such as healthcare, technology, financials, and even social media. Beyond sector funds, investors can also access other asset types, such as gold, oil and other natural resources. This versatility can be used for further diversification as an investor's portfolio grows. Professional money managers often use sector funds for this purpose in building client portfolios.

Accessibility: With as little as $100 an investor can get started investing with mutual funds. And the fact that mutual funds hold dozens, hundreds, or even thousands of other securities, an investor can gain access to an entire market of investable securities. For example, an investor buying shares in one of the total stock market index funds, gains exposure to over 3,000 stocks in just one fund. This returns to the simplicity and diversification of mutual funds. Although investing concepts and strategies are rarely taught in schools, the beginning investor can find easy tips about how to buy mutual funds online or in bookstores and get started investing within minutes or just a few hours. And, when it comes to certain types of assets, like foreign equities or exotic commodities, mutual funds are often the most feasible way in fact, sometimes the only way for individual investors to participate.

Economies of Scale: Mutual funds also provide economies of scale. Buying one spares the investor of the numerous commission charges needed to create a diversified portfolio. Buying only one security at a time leads to large transaction, which will eat up a good chunk of the investment. Also, the $100 to $200 an individual investor might be able to afford is usually not enough to buy a round lot of a stock, but it will buy many mutual fund shares. The smaller denominations of mutual funds allow investors to take advantage of dollar cost averaging.

Professional Management: Most private, non-institutional money managers deal only with high net worth individuals – people with six figures (at least) to invest. But mutual funds are run by managers, who spend their days researching securities and devising investment strategies. So these funds provide a low-cost way for individual investors to experience (and hopefully benefit from) professional money management.

Individual-Oriented: All these factors make mutual funds an attractive options for younger, novice and other individual investors who don't want to actively manage their money: They offer high liquidity; they are relatively easy to understand; good diversification even if you do not have a lot of money to spread around; and the potential for good growth. In fact, many Americans already invest in mutual funds through their 401(k) or 403(b) plans. In fact, the overwhelming majority of money in employer-sponsored retirement plans goes into mutual funds.

Style: Investors have the freedom to research and select from managers with a variety of styles and management goals. For instance, a fund manager may focus on value investing, growth investing, developed markets, emerging markets, income or macroeconomic investing, among many other styles. One manager may also oversee funds that employ several different styles.

Disadvantages of Mutual Funds

Fluctuating Returns: Like many other investments without a guaranteed return, there is always the possibility that the value of your mutual fund will depreciate. Equity mutual funds experience price fluctuations, along with the stocks that make up the fund. The Federal Deposit Insurance Corporation (FDIC) does not back up mutual fund investments, and there is no guarantee of performance with any fund. Of course, almost every investment carries risk. But it's especially important for investors in money market funds to know that, unlike their bank counterparts, these will not be insured by the FDIC.

Cash: As you know already, mutual funds pool money from thousands of investors, so every day people are putting money into the fund as well as withdrawing it. To maintain the capacity to accommodate withdrawals, funds typically have to keep a large portion of their portfolios in cash. Having ample cash is great for liquidity, but money sitting around as cash is not working for you and thus is not very advantageous.

Costs: Mutual funds provide investors with professional management, but it comes at a cost – those expense ratios mentioned earlier. These fees reduce the fund's overall payout, and they're assessed to mutual fund investors regardless of the performance of the fund. As you can imagine, in years when the fund doesn't make money, these fees only magnify losses.

Diversification: Many mutual fund investors tend to overcomplicate matters – that is, they acquire too many funds that are highly related and, as a result, don't get the risk-reducing benefits of diversification; in fact, they have made their portfolio more exposed, a syndrome called diversification. At the other extreme, just because you own mutual funds doesn't mean you are automatically diversified. For example, a fund that invests only in a particular industry sector or region is still relatively risky.

Lack of Transparency: One thing that can lead to diversification is the fact that a fund's purpose or makeup isn't always clear. Fund advertisements can guide investors down the wrong path. The Securities and Exchange Commission (SEC) requires that funds have at least 80% of assets in the particular type of investment implied in their names; how the remaining assets are invested is up to the fund manager. However, the different categories that qualify for the required 80% of the assets may be vague and wide-ranging. A fund can therefore manipulate prospective investors via its title: A fund that focuses narrowly on Congo stocks, for example, could be sold with the grander title "International High-Tech Fund."

Evaluating Funds: Researching and comparing funds can be difficult. Unlike stocks, mutual funds do not offer investors the opportunity to compare the P/E ratio, sales growth, earnings per share, etc. A mutual fund's net asset value gives investors the total value of the fund's portfolio, less liabilities.

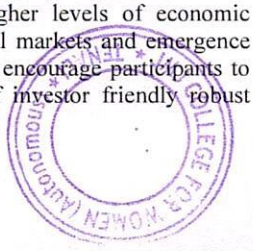
Best Performing Mutual Funds India last five years

Mutual funds are one of the best investment options for the long-term wealth generation. However, the biggest problem is to identify best mutual fund for the investment. There are thousands of mutual funds which make the task of investor difficult when it comes to actual investment.

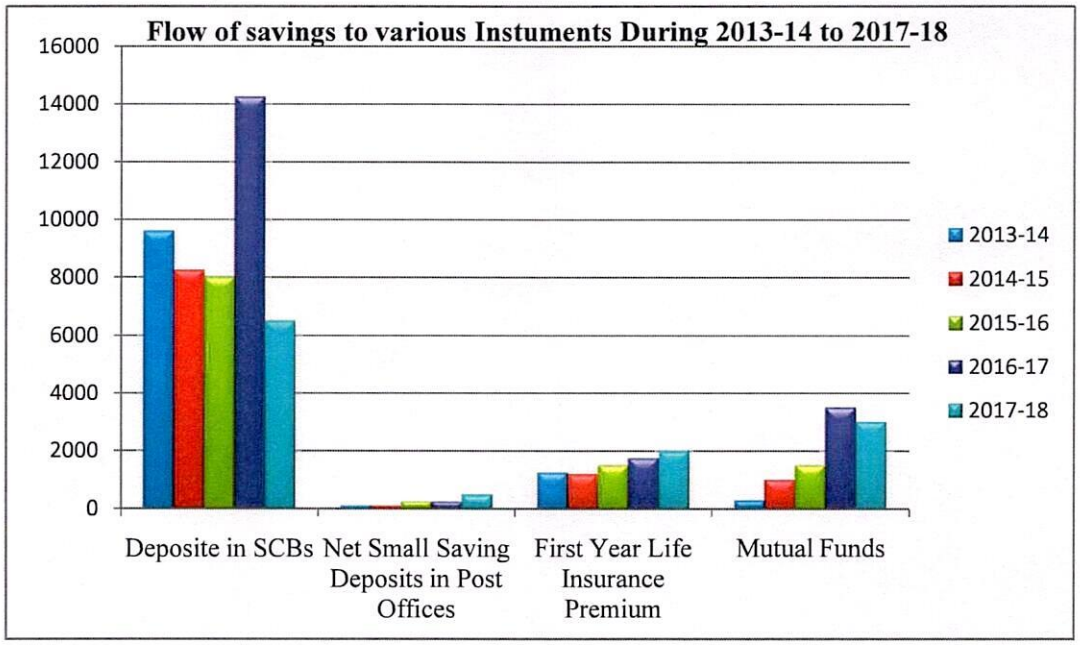
Mutual Funds Performing Analysis

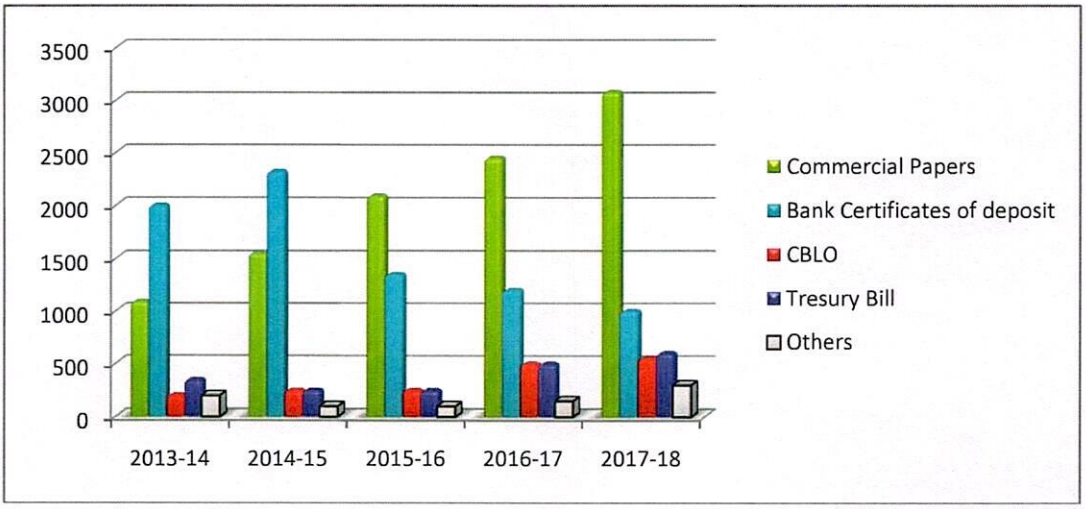
Resource Mobilization: MFs appear to have emerged as a preferred investment avenue for individuals as well as corporate. While the flow of resources to banks generally declined during the period 2013-18, the flow of resources to small savings schemes registered modest increase. In comparison, the flow of resources to MFs and insurance companies registered a significant increase during the period (Chart 3). During the period 2013-2018, the CAGR of bank deposits and small savings were 11 per cent and 6 per cent, respectively, which was much lower than CAGR of AUM of MFs (25 per cent). Bank term deposits by corporate registered a much lower CAGR of 2 per cent during 2013-2017. Along with increasing levels of economic development, deep and liquid capital markets and sound regulations are catalyzing the change in preference of investors not only from metro cities but also from small cities. MF investments are also becoming broad-based in terms of spatial distribution and investor profile.

India's Mutual Fund Industry in the Global Context: The global MF industry has witnessed steady expansion in size over the years on the back of higher levels of economic development, deep and liquid capital markets and emergence of defined contribution systems that encourage participants to invest in MFs in an atmosphere of investor friendly robust regulation.



Scheme	Category	1 Year (Return %)	3 Year (Return %)	5 Year (Return%)
Birla Sun Life Top 100 Fund	Large Cap Fund	15.7	13	19.9
SBI Blue chip Fund	Large Cap Fund	12.9	14.4	20.1
Birla Sun Life Frontline Equity Fund	Large Cap Fund	14	13.1	19.7
ICICI Pru Value Discovery Fund	Diversified Fund	6.2	10.9	21.8
HDFC Balanced fund	Balanced Fund	15.4	13.9	19.3
Birla Sun Life Advantage Fund	Diversified Fund	20.4	20.5	25.2
DSPBR Small and Midcap Fund	Small and Midcap	19.1	20.2	25.4
Franklin India Smaller Companies Fund	Small and Midcap	17.8	20.2	31.5
Mirae Asset Emerging Bluechip Fund	Small and Midcap	26.5	25	31.9
HDFC Midcap Opportunities Fund	Small and Midcap	16.4	19.1	26.3





According to the Investment Company Institute, global MF assets open-end fund registered an increase of 16.2 per cent in 2017-18 to reach a level of $53.9 trillion at end-March 2018. Top 5 countries accounted for 69.1 per cent of total global assets of MFs at end-March 2018. With assets of $24.3 trillion, the US MF industry was the largest in the world, accounting for a share of 45.1 per cent of the total global MF assets at end-March 2018. In comparison, MFs in Asia accounted for 12.7 per cent of total global MF assets. At end-March 2018, there were 45 MF companies registered with the SEBI which managed an AUM of ₹21,360.4 billion.

Of the total AUM, 83 per cent was held by private sector MFs and 17 per cent by public sector MFs. The ratios of AUM of MFs to GDP and net mobilization by MFs to gross domestic savings have increased significantly over the years.

Investments in Equity, Debt and Money Market Instruments in India: MFs' investment in equities stood at ₹8.9 trillion at end-March 2018, which accounted for 6.2 per cent of market capitalization of the BSE listed companies 2.8 per cent at end-March 2014. Of the total free float market capitalisation[3], the share of MFs was about 15 per cent.

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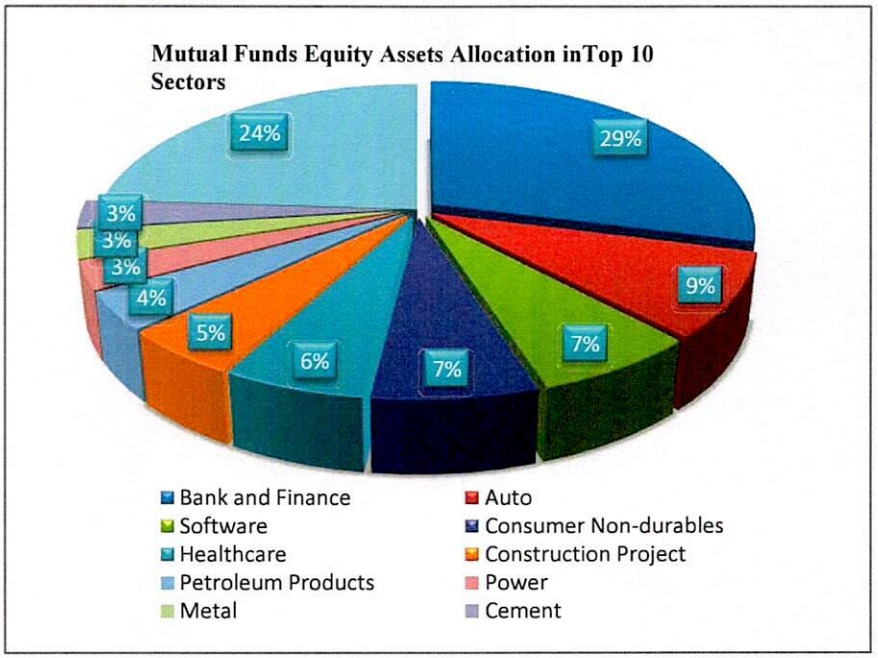
Ratios of MF AUM as per cent of GDP and Net Mobilization by MFs as per cent of Gross Domestic Savings		
Year	MF AUM % of GDP	Net Mobilization by MFs as % of Gross Savings
2011-12	6.7	-0.7
2012-13	7.1	2.3
2013-14	7.3	1.5
2014-15	8.7	2.6
2015-16	9.0	3.1
2016-17	11.5	7.5

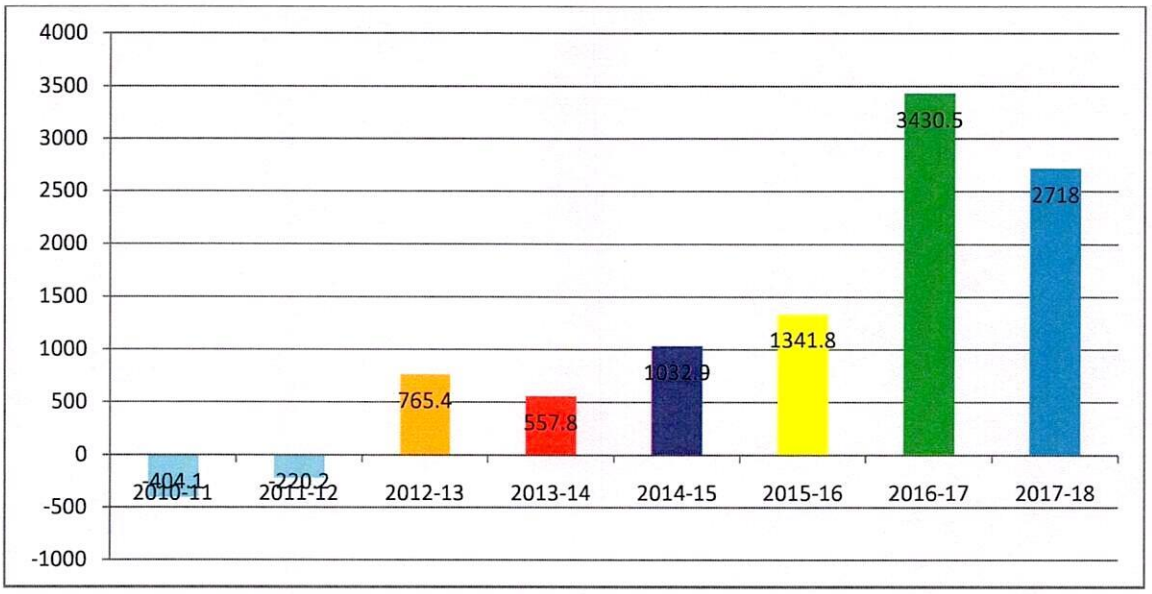


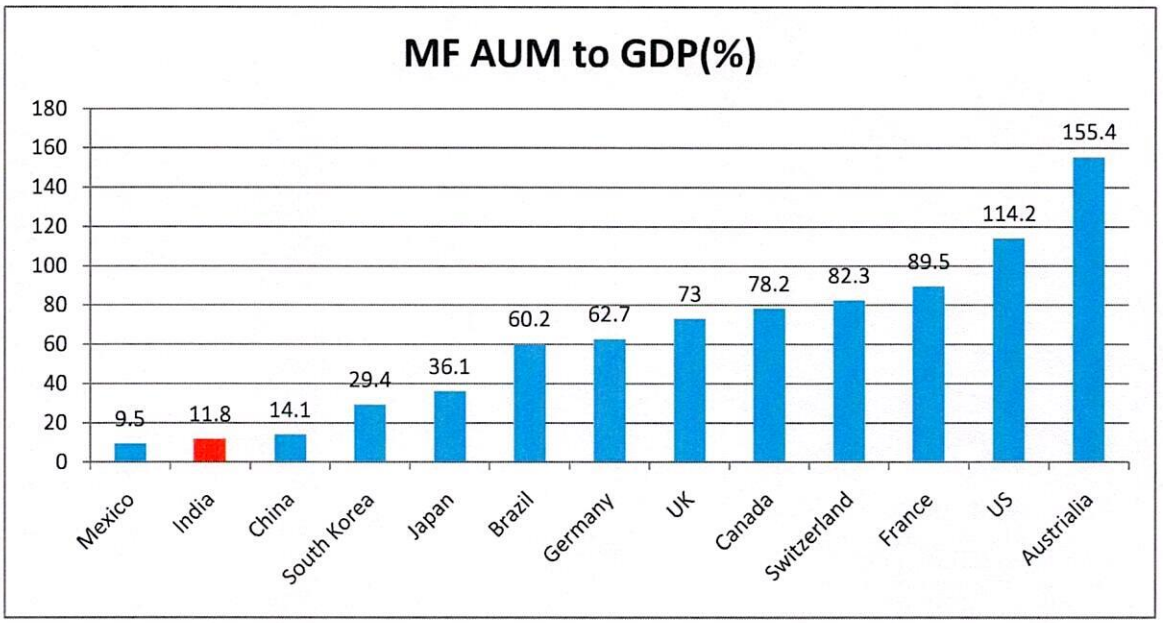
This increase has mainly been due to higher investments by MFs in equities in the last few years on the back of higher mobilizations by equity-oriented MF schemes. Top 10 sectors accounted for 76 per cent of the total equity assets of MFs. The banking and finance sector has the highest weight in MFs' portfolio.

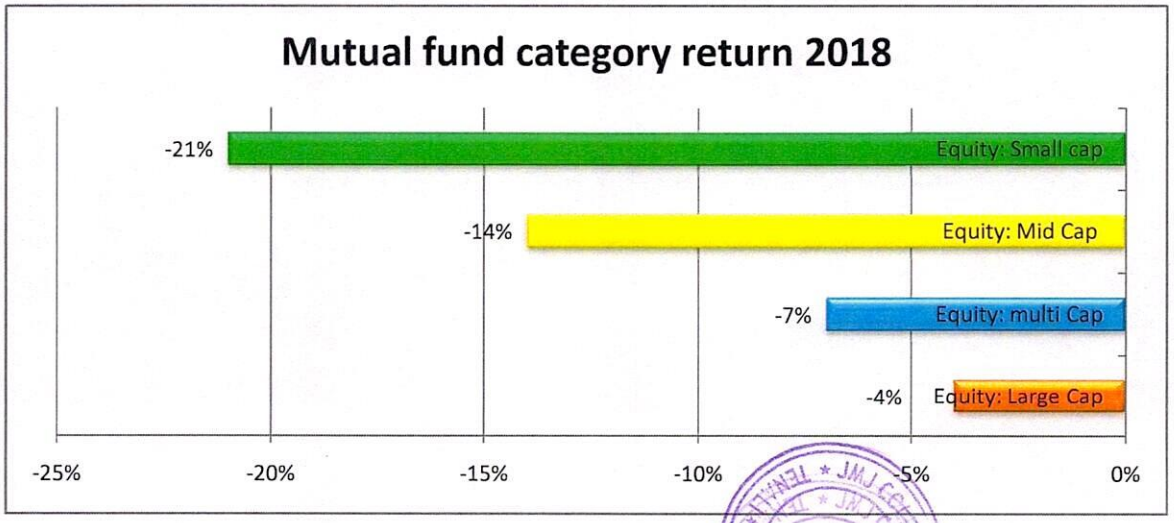
Investor Profile: During the period 2013-18, average yearly funds mobilized by MFs was significantly higher at ₹1,812.2 billion as compared with ₹119.8 billion during 2008-13. Fund mobilization by MFs reached a record in 2016-17, increasing by almost 3 times over the previous year, in the wake of demonetization in November 2016. However, there was a decline in fund mobilization in 2017-18 mainly on account of higher net outflows from debt/income schemes on higher redemptions by corporate/institutional investors.

Findings

- Mutual fund's assets under management as a percentage of GDP growth is a typical indicator used to show low penetration of mutual funds of a country
- Year 2018 was an action-packed year for the Rs 23 lakh crore Indian mutual funds (MF) industry as well as for its investors. Funds got friendlier as costs were pushed down and steps were taken to further curb misselling. Fund categories - and all schemes within - got standardized. This made it easier for investors to compare one fund with another. Perhaps the only piece of bad news was the introduction of long-term capital gains tax (LTCG) on equity funds in Budget 2018.
- Flows remained strong through the year: in November 2018, close to Rs 8,000 crore came into MFs through systematic investment plans (SIP); compare this with December 2016 when inflows stood at under Rs 4,000 crore.
- Flows were strong despite equity markets remaining volatile throughout the year. While the S&P BSE Sensex gained 5.6 percent year to date (as on December 14), equity funds disappointed.
- Large-cap funds fell by 4 percent on an average in 2018, mid-cap funds were down 14 percent while small-cap funds were off a steep 21 percent, as per Value Research.
- Budget 2018 introduced long-term capital gains tax at 10.4 percent, including the cess for equity MFs and direct equities. Equities and equity MFs had been exempt from LTCG tax since 2004 when LTCG tax was abolished.
- The holding period beyond which LTCG tax has been imposed, continued to remain at one year. However,
- all capital gains till Rs 1 lakh was made exempt from LTCG tax. All long-term gains until January 31, 2018 were also protected. Debt funds continued to be charged 20.6 percent LTCG tax after three years.
- To ensure that investors do not switch to dividend plans to escape paying the tax since dividends from equities and equity MFs were, earlier, tax-free as well, Budget 2018 also imposed an 11.648 percent dividend distribution tax. Both the LTCG and dividend distribution tax came into effect April 1, 2018.







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- The cost that you pay to your mutual funds, as part of the total expense ratio, came down significantly in 2018 and is set to go down further as your fund's size goes up, as per a revised SEBI formula.
- Earlier, your fund house charged 30 basis points over and above the total expense ratio limits as an incentive to get inflows from beyond top 15 cities. In 2018, SEBI tightened the norm and said the extra charge can be imposed only if the fund house gets new inflows from beyond top 30 towns. Further, only retail inflows will make the MFs eligible to charge extra. One basis point is one-hundredth of a percentage point.
- Similarly, the extra 20 basis points charged earlier in lieu of the exit loads have now been brought down to five basis points. Schemes that don't have exit loads, including closed-end schemes, cannot collect exit load charges, anymore.
- Later in 2018, through a series of reforms, it mandated that fund houses will have to meet all their expenses from their respective schemes (no more dipping into their own balance sheets to dole out incentives to distributors) and ensuring that direct plan fees do not reflect any hidden distributor commission.
- Mutual funds lapped up significant portions in smaller banks like RBL Bank and City Union Bank where their holdings increased by 12 and 8 percentage points from October 2017 respectively. Fund go-to banks ICICI Bank, SBI and HDFC Bank also saw an increase of 1-2 percentage points in their holdings. Among NBFCs, a noteworthy pick is Bharat Financial Inclusion whose MF shareholding increased from 9.6% to 28% between October 2017 and 2018.
- Telecom stocks took a beating this year. S&P BSE Telecom lost 40% in one year which decreased its exposure in market-cap weighted BSE 500 index from 2% to 1.32%. But mutual funds, on the other hand, have been buying, resulting in a marginal increase in exposure despite the fall in price. Bharti Airtel's MF shareholding jumped from 3.4% to 7.4% between October 2017 and October 2018.

Conclusion

Mutual Funds are a vehicle that collects money from investors to buy securities. It is very safe to invest in mutual funds. There are thousands of mutual fund schemes in which you can invest. There are funds that expose your invested amount to a minimal amount of risk, but generate relatively lower returns and on the other hand, there are some funds that expose your invested amount to a lot of risk for potentially greater reward. The riskiness of the investment is always mentioned clearly in the scheme offer document. The past year has seen the market take unexpected turns. Global events have kept it on its toes while domestic factors struggled to find stability. Different sectors have shown divergent performance. Some came as a surprise, like the revival of IT stocks which found solace in the weakening rupee and pharmaceutical stocks for a brief while. Some came as a support, like the steady growth of FMCG stocks. Simply ask one of Funds India's investment experts and market analysts which are the best funds to invest in at any particular time. At any given time, there will be certain funds performing poorly and certain funds performing exceptionally well.

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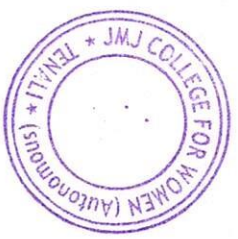

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Analysis of a FM/FM/1 WV and Vacation Interruptions with Set-Up Times

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ABSTRACT

Using fuzzy technique to analysis of a single server fuzzy queue working vacation(WV) and vacation interruptions with set-up time is discussed in this paper. We obtain model in fuzzy environment as the probability of the server is in a closed-down period, server is in a set-up period, server is in a regular busy period, membership function of the mean queue length and mean waiting time. Finally, numerical results are presented to show the effects of system parameters.

Keywords: FM/FM/1 Queue; Single server; Working vacation; Busy period; Set- up period; Close-down period; vacation interruptions.

Mathematical Subject Classification (2010): 6025K, 68M20, 90B22

1. Introduction

Working vacation is a kind of semi-vacation policy was introduced by Servi and Finn [9] a customer is served at a lower rate rather than completely stopping the service during a vacation. In the classical vacation queuing models, during the vacation period the server doesn't continue on the original work and such policy may cause the loss or dissatisfaction of the customers. For the working vacation policy, the server can still work during the vacation and may accomplish other assistant work simultaneously. So, the working vacation is more reasonable than the classical vacation in some cases. The details can be seen in the monograpraphs of Takagi [12], Tian and Zhang [13] and the survey of Doshi [3]. However, in these models, the server stops the original work in the vacation period and cannot come back to the regular busy period until the vacation period ends. Baba [1] studied a GI/M/1 queue with working vacations by using the matrix analytic method. Banik et al. [2] analyzed the GI/M/1/N queue with working vacations. Liu et al. [7] established a stochastic decomposition result in the M/M/1 queue with working vacations. In 2007, Li and Tian [8] first introduced vacation interruption policy and studied an M/M/1 queue. Majid and Manoharan [10] analyzed the M/M/1 queue with single working vacation and vacation interruption using matrix geometric method. For

example, when the number of customers exceeds the special value and if the server continues to take the vacation, the cost of waiting customers and providing service in the vacation period will be large. Using the method of a supplementary variable, Zhang and Hou [14] considered an M/G/1 queue with working vacations and vacation interruption. Sreenivasan et al. [11] studied an MAP/PH/1 queue with working vacations, vacation and N-Policy.

Power-Saving in ICT systems is an important issue because ICT devices consume a large amount of energy. One simple method is to turn off on idle device and to switch it on again when some jobs arrive. This is because in the current technology idle devices still consume of peak processing a job on the other hand, a quick response in crucial for delay sensitive applications. An off server needs some setup time in order to be active during which the server consumes energy but cannot process a job. Thus, there is a trade-off can be analyzed using single server queuing models with setup times which are extensively studied in the literature. Our models are suitable for a down link of a mobile station with a power saving mode. A mobile station receives data from a base station. Arriving messages are stored in the base station and the mobile station downloads these messages from the base station upon the completion of a download, if there are no messages in the base station the mobile station is turned off in order to save energy. However, when a message arrives, the base station sends a signal in order to wake up the mobile station. The mobile station needs some random setup time to be active so as to receive waiting messages.

Kalayanaraman et al. [4] introduced a single server vacation queue with fuzzy service time and vacation time distributions with some performance measures. Kalyanaraman, et al. [5] gave a single server fuzzy queue with group arrivals and server vacation. Kannadasan and Sathiyamoorthi [6] investigate the $FM/FM/1$ queue with single working vacation.

2. The model in fuzzy environment

In this section, the arrival rate, service rate, arriving customers can be served at a mean service rate and working vacation time are assumed to be fuzzy numbers $\bar{\lambda}, \bar{\gamma}_1, \bar{\gamma}_2, \bar{\theta}$ respectively. Now

$$\bar{\lambda} = \{x, \mu_{\bar{\lambda}}(x); x \in S(\bar{\lambda})\},$$

$$\bar{\gamma}_1 = \{y_1, \mu_{\bar{b}}(y_1); y_1 \in S(\bar{\gamma}_1)\},$$

$$\bar{\gamma}_2 = \{y_2, \mu_{\bar{\theta}}(y_2); y_2 \in S(\bar{\gamma}_2)\}$$

$$\bar{\theta} = \{z, \mu_{\bar{\theta}}(z); z \in S(\bar{\theta})\}.$$

where $S(\bar{\lambda})$, $S(\bar{\gamma}_1)$, $S(\bar{\gamma}_2)$ and $S(\bar{\theta})$ are the universal set's of the arrival rate, service rate, arriving customers can be served at a mean service rate, working vacation time respectively. It define $f(x, y_1, y_2, z)$ as the system performance measure related to the above defined fuzzy queuing model, which depends on the fuzzy membership function $f(\bar{\lambda}, \bar{\gamma}_1, \bar{\gamma}_2, \bar{\theta})$. Applying Zadeh's extension principle (1978) the membership function of the performance measure $f(\bar{\lambda}, \bar{\gamma}_1, \bar{\gamma}_2, \bar{\theta})$ can be defined as

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$$\mu_{\bar{f}(\bar{\lambda},\bar{\gamma}_1,\bar{\gamma}_2,\bar{\theta})}(H) = \sup_{\substack{x\in S(\bar{\lambda}) \\ y_1\in S(\bar{\gamma}_1) \\ y_2\in S(\bar{\gamma}_2) \\ z\in S(\bar{\theta})}} \{\mu_{\bar{\lambda}}(x), \mu_{\bar{\gamma}_1}(y_1), \mu_{\bar{\gamma}_2}(y_2), \mu_{\bar{\theta}}(z)/H = f(x, y_1, y_2, z)\} \quad (1)$$

If the α- cuts of $f(\bar{\lambda}, \bar{\gamma}_1, \bar{\gamma}_2, \bar{\theta})$ degenerate to some fixed value, then the system performance is a crisp number, otherwise it is a fuzzy number.

We obtain the membership function of some performance measures, namely Probability of the server is in a close-down period, Probability of the server is in a set-up period, Probability of theserver is in a regular busy period, Membership function of the mean queue length, Membershipfunction of the mean waitingtime. For the system in terms of this membership function are:

$$\mu_{\overline{P_1}}(A) = \sup_{\substack{x\in S(\bar{\lambda}) \\ y_1\in S(\bar{\gamma}_1) \\ y_2\in S(\bar{\gamma}_2) \\ z\in S(\bar{\theta})}} \left\{\mu_{\bar{\lambda}}(x), \mu_{\bar{\gamma}_1}(y_1), \mu_{\bar{\gamma}_2}(y_2), \frac{\mu_{\bar{\theta}}(z)}{A}\right\}, \quad (2)$$

where

$$A = \left[\frac{\left[\frac{x+z+y_2}{z+y_2} + \frac{z(x+y_2+z)}{x} + \frac{zy_1y_2(zx+z^2+zy_2+x)(z+y_2)^2}{x+z+y_2} + \frac{x^2z(x+z+y_2)y_1}{(xy_2)^2(y_1-x)} + \frac{(x^2+2xz+z^2+zy_2)y_1-x}{x+z+y_2}\right]^{-1}}{\left(\frac{x}{x^2+xy_2xz+x}\right)\left(\frac{y_1-x}{y_1}\right)\left(\frac{z+y_2}{x+z+y_2}\right)}\right]\frac{z}{x}$$

$$\mu_{\overline{P_2}}(B) = \sup_{\substack{x\in S(\bar{\lambda}) \\ y_1\in S(\bar{\gamma}_1) \\ y_2\in S(\bar{\gamma}_2) \\ z\in S(\bar{\theta})}} \{\mu_{\bar{\lambda}}(x), \mu_{\bar{\gamma}_1}(y_1), \mu_{\bar{\gamma}_2}(y_2), \mu_{\bar{\theta}}(z)/B\} \quad (3)$$

where

$$B = \left[\frac{\left[\frac{x+z+y_2}{z+y_2} + \frac{z(x+y_2+z)}{x} + \frac{zy_1y_2(zx+z^2+zy_2+x)(z+y_2)^2}{x+z+y_2} + \frac{x^2z(x+z+y_2)y_1}{(xy_2)^2(y_1-x)} + \frac{(x^2+2xz+z^2+zy_2)y_1-x}{x+z+y_2}\right]^{-1}}{\left(\frac{x}{x^2+xy_2xz+x}\right)\left(\frac{y_1-x}{y_1}\right)\left(\frac{z+y_2}{x+z+y_2}\right)}\right]\left(\frac{\theta(\lambda+\gamma_2+\theta)}{\lambda}\right)$$

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$$\mu_{\overline{P_3}}(C) = \sup_{\substack{x\in S(\overline{\lambda}) \\ y_1\in S(\overline{\gamma}_1) \\ y_2\in S(\overline{\gamma}_2) \\ z\in S(\overline{\theta})}} \{\mu_{\overline{\lambda}}(x), \mu_{\overline{\gamma}_1}(y_1), \mu_{\overline{\gamma}_2}(y_2), \mu_{\overline{\theta}}(z)/C\}, \tag{4}$$

where,

$$C = \left[\frac{x+z+y_2}{z+y_2} + \frac{z(x+y_2+z)}{x} + \frac{zy_1y_2(zx+z^2+zy_2+x)(z+y_2)^2}{x+z+y_2} + \frac{x^2z(x+z+y_2)y_1}{(xy_2)^2(y_1-x)} + \frac{(x^2+2xz+z^2+zy_2)y_1-x}{x+z+y_2}\right]^{-1}$$

$$\left[\begin{array}{c} \left(\frac{xy_2(xz+z^2+zy_2+x)(y_1y_2+y_1z)}{x+z+y_2}\right) \\ \left(\frac{xy_1}{(z+y_2)(y_1-x)}\right) + \left(\frac{z(x+y_2+z)}{x^2xy_2+xz+x}\right)\left(\frac{x^3+x^2+x^2y_2+x^2z}{xy_1(x+z+y_2)}\right)\left(\frac{(x^2+xy_2+xz)xy_1}{y_1-x}\right) \\ + \left(\frac{x^2+z^2+3xz+xy_2+zy_2}{y_1(x+z+y_2)}\right)\left(\frac{y_1}{y_1-x}\right) \end{array}\right]$$

$$\mu_{\overline{E(L)}}(D) = \sup_{\substack{x\in S(\overline{\lambda}) \\ y_1\in S(\overline{\gamma}_1) \\ y_2\in S(\overline{\gamma}_2) \\ z\in S(\overline{\theta})}} \{\mu_{\overline{\lambda}}(x), \mu_{\overline{\gamma}_1}(y_1), \mu_{\overline{\gamma}_2}(y_2), \mu_{\overline{\theta}}(z)/D\}, \tag{5}$$

where

$$D = \left[\frac{\left[\frac{x+z+y_2}{z+y_2} + \frac{z(x+y_2+z)}{x} + \frac{zy_1y_2(zx+z^2+zy_2+x)(z+y_2)^2}{x+z+y_2} + \frac{x^2z(x+z+y_2)y_1}{(xy_2)^2(y_1-x)} + \frac{(x^2+2xz+z^2+zy_2)y_1-x}{x+z+y_2}\right]^{-1}}{\left(\frac{x}{x^2+xy_2xz+x}\right)\left(\frac{y_1-x}{y_1}\right)\left(\frac{z+y_2}{x+z+y_2}\right)}\right]$$

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$$\left[\begin{array}{l}\left[\begin{array}{l}\left[\frac{x-xy_2-x^2-xz}{y_1(x+z+y_2)}+\frac{z}{x}\left(\frac{x^2y_1+xzy_1+xy_1y_2-x^3-x^2z-x^2y_2+x}{y_1(x^2+xz+xy_2+x)}\right)\right.\\ \left.+\frac{x^2+z^2+2xz+zy_2}{y_1(x+z+y_2)}\left(\frac{x}{x^2+xy_2+xz+x}\right)\left(\frac{z+y_2}{x+z+y_2}\right)\right]\end{array}\right.\\ +\left[\left(\frac{(2x-x^2)(z+y_2)}{(x+z+y_2)^2}\right)\left(\begin{array}{l}\frac{xy_1-xy_2-x^2-xz}{y_1(x+z+y_2)}\\ +\frac{xy_2(xz+z^2+zy_2+x)}{(x+z+y_2)^2}\end{array}\right)\left(\frac{x}{x^2+xy_2+xz+x}\right)\right]\\ +\left[\left(\frac{2(x+z+y_2)(y_2+z+2)^2-(x+z+y_2)^2(x+y_2+z+1)}{(y_2+z+2)^2}\right)\right.\\ \left.\left[\frac{xz+z^2+zy_2}{x^2+xz+xy_2+x}-\frac{z}{y_1}+\frac{xzy_1}{x^2+xz+xy_2+x(y_1{}^2-xy_1)}\right]\left(\frac{z+y_2}{x+z+y_2}\right)\right]\end{array}\right]$$

$$\mu_{\overline{E(W)}}(E)=\sup_{\substack{x\in S(\overline{\lambda})\\ y_1\in S(\overline{\gamma}_1)\\ y_2\in S(\overline{\gamma}_2)\\ z\in S(\overline{\theta})}}\left\{\mu_{\overline{\lambda}}(x),\mu_{\overline{\gamma}_1}(y_1),\mu_{\overline{\gamma}_2}(y_2),\frac{\mu_{\overline{\theta}}(z)}{E}\right\},\tag{6}$$

where

$$E=\left[\frac{\left[\begin{array}{l}\frac{x+z+y_2}{z+y_2}+\frac{z(x+y_2+z)}{x}+\frac{zy_1y_2(zx+z^2+zy_2+x)(z+y_2)^2}{x+z+y_2}\\ +\frac{x^2z(x+z+y_2)y_1}{(xy_2)^2(y_1-x)}+\frac{(x^2+2xz+z^2+zy_2)y_1-x}{x+z+y_2}\end{array}\right]^{-1}}{\left(\frac{x}{x^2+xy_2xz+x}\right)\left(\frac{y_1-x}{y_1}\right)\left(\frac{z+y_2}{x+z+y_2}\right)}\right]$$

$$\left[\begin{array}{l}\left(\frac{x(y_1-y_2-x-z)}{y_1(x+z+y_2)}+\frac{xy_2(xz+z^2+zy_2+x)}{(x+z+y_1)^2}\right)\left(\frac{x}{x^2+xy_2+xz+x}\right)\\ +\left[\left(\frac{xz+z^2+zy_2}{x^2+xz+xy_2+x}\right)\left(\frac{x}{y_1}\right)\left(\frac{xzy_1}{x^2+xz+xy_2+x(y_1{}^2-xy_1)}\right)\right]\left(\frac{zy_2}{x+z+y_2}\right)\\ +\left(\frac{1}{y_1-x}\right)\end{array}\right]$$

Using the fuzzy analysis technique explain, we can find the membership of $\overline{P_1},\overline{P_2},\overline{P_3},\overline{E(L)},\overline{E(W)}$ as a function of the parameter α. Thus the α-cut approach can be used to develop the membership function of $\overline{P_1},\overline{P_2},\overline{P_3},\overline{E(L)},\overline{E(W)}$.

3. Performance of measure

The following performance measure are studied for this model in fuzzy environment.

Probability of the server is in a close-down period

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Based on Zadeh's extension principle $\mu_{\overline{P_1}}(A)$ is the superimum of minimum over $\{\mu_{\overline{\lambda}}(x), \mu_{\overline{Y}_1}(y_1), \mu_{\overline{Y}_2}(y_2), \mu_{\overline{\theta}}(z): A = f(x, y_1, y_2, z)\}$ to satisfying $\mu_{\overline{P_1}}(A) = \alpha, 0 < \alpha \leq 1$.
We consider the following four cases:

Case (i) $\mu_{\overline{\lambda}}(x) = \alpha,\ \mu_{\overline{\mu}}(y) \geq \alpha,\ \mu_{\overline{\theta}}(z) \geq \alpha,\ \mu_{\overline{\beta}}(s) \geq \alpha$

Case (ii) $\mu_{\overline{\lambda}}(x) \geq \alpha,\ \mu_{\overline{\mu}}(y) = \alpha,\ \mu_{\overline{\theta}}(z) \geq \alpha,\ \mu_{\overline{\beta}}(s) \geq \alpha$

Case (iii) $\mu_{\overline{\lambda}}(x) \geq \alpha,\ \mu_{\overline{\mu}}(y) \geq \alpha,\ \mu_{\overline{\theta}}(z) = \alpha,\ \mu_{\overline{\beta}}(s) \geq \alpha$

Case (iv) $\mu_{\overline{\lambda}}(x) \geq \alpha,\ \mu_{\overline{\mu}}(y) \geq \alpha,\ \mu_{\overline{\theta}}(z) \geq \alpha,\ \mu_{\overline{\beta}}(s) = \alpha$.

For case (i) the lower and upper bound of α- cuts of $\overline{P_1}$ can be obtained through the corresponding parametric non-linear programs,

$$[P_1]_\alpha^{L_1} = \min_{\Omega}\{[A]\} \text{ and } [P_1]_\alpha^{U_1} = \max_{\Omega}\{[A]\}.$$

Similarly, we can calculate the lower and upper bounds of the α-cuts of $\overline{P_1}$ for the case (ii), $(iii)$and(iv). By considering all the cases simulatuosly the lower and upper bounds of the α-cuts of $\overline{P_1}$ can be written as,

$$A = \left[\frac{\left[\frac{x+z+y_2}{z+y_2} + \frac{z(x+y_2+z)}{x} + \frac{zy_1y_2(zx+z^2+zy_2+x)(z+y_2)^2}{x+z+y_2} + \frac{x^2z(x+z+y_2)y_1}{(xy_2)^2(y_1-x)} + \frac{(x^2+2xz+z^2+zy_2)y_1-x}{x+z+y_2}\right]^{-1}}{\left(\frac{x}{x^2+xy_2xz+x}\right)\left(\frac{y_1-x}{y_1}\right)\left(\frac{z+y_2}{x+z+y_2}\right)}\right]\frac{z}{x}$$

$$[P_1]_\alpha^{L} = \min_{\Omega}\{[A]\} \text{ and } [P_1]_\alpha^{U} = \max_{\Omega}\{[A]\}.$$

such that $x_\alpha^L \leq x \leq x_\alpha^U, {y_1}_\alpha^L \leq y_1 \leq {y_1}_\alpha^U, {y_2}_\alpha^L \leq y_2 \leq {y_2}_\alpha^U, z_\alpha^L \leq z \leq z_\alpha^U$.
If both $(P_1)_\alpha^L$ and $(P_1)_\alpha^U$ are invertible with respect to α, the left and right shape function, $L(A) = [(P_1)_\alpha^L]^{-1}$ and $R(A) = [(P_1)_\alpha^U]^{-1}$ can be derived from which the membership function $\mu_{\overline{P_1}}(A)$ can be constructed as

$$\mu_{\overline{P_1}}(A) = \begin{cases} L(A), & {P_1}_{\alpha=0}^L \leq A \leq {P_1}_{\alpha=0}^U \\ 1, & {P_1}_{\alpha=1}^L \leq A \leq {P_1}_{\alpha=1}^U \\ R(A), & {P_1}_{\alpha=1}^L \leq A \leq {P_1}_{\alpha=0}^U \end{cases} \tag{7}$$

In the same way we get the following results.

Probability of the server is in a set-up period

$$\mu_{\overline{P_2}}(B) = \begin{cases} L(B), & {P_2}_{\alpha=0}^L \leq B \leq {P_2}_{\alpha=0}^U \\ 1, & {P_2}_{\alpha=1}^L \leq B \leq {P_2}_{\alpha=1}^U \\ R(B), & {P_2}_{\alpha=1}^L \leq B \leq {P_2}_{\alpha=0}^U \end{cases} \tag{8}$$

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Probability of the server is in a regular busy period

$$\mu_{\overline{P_3}}(C) = \begin{cases} L(C), & P_{3}{}^{L}_{\alpha=0} \le C \le P_{3}{}^{U}_{\alpha=0} \\ 1, P_{3}{}^{L}_{\alpha=1} & \le C \le P_{3}{}^{U}_{\alpha=1} \\ R(C), P_{3}{}^{L}_{\alpha=1} & \le C \le P_{3}{}^{U}_{\alpha=0} \end{cases} \quad (9)$$

Membership function of the mean queue length

$$\mu_{\overline{E(L)}}(D) = \begin{cases} L(D), & (E(L))^{L}_{\alpha=0} \le D \le (E(L))^{U}_{\alpha=0} \\ 1, (E(L))^{L}_{\alpha=1} & \le D \le (E(L))^{U}_{\alpha=1} \\ R(D), & (E(L))^{L}_{\alpha=1} \le D \le (E(L))^{U}_{\alpha=0} \end{cases} \quad (10)$$

Membership function of the mean waiting time

$$\mu_{\overline{E(W)}}(E) = \begin{cases} L(E), & (E(W))^{L}_{\alpha=0} \le E \le (E(W))^{U}_{\alpha=0} \\ 1, (E(W))^{L}_{\alpha=1} & \le E \le (E(W))^{U}_{\alpha=1} \\ R(E), & (E(W))^{L}_{\alpha=1} \le E \le (E(W))^{U}_{\alpha=0} \end{cases} \quad (11)$$

4. Numerical study

Probability of the server is in a close-down period

Suppose the fuzzy arrival rate $\overline{\lambda}$, fuzzy service rate $\overline{\gamma_1}$ in a regular busy period, arriving customers can be served at a mean service rate $\overline{\gamma_2}$, working vacation time $\overline{\theta}$ are assumed to be trapezoidal fuzzy numbers described by: $\overline{\lambda} = [11,12,13,14]$, $\overline{\gamma_1} = [31,32,33,34]$, $\overline{\gamma_2} = [61,62,63,64]$ and $\overline{\theta} = [71,72,73,74]$ permins respectively. Then

$$\lambda(\alpha) = \min_{x \in s(\overline{\lambda})} \{x \in s(\overline{\lambda}), G(x) \ge \alpha\}, \max_{x \in s(\overline{\lambda})} \{x \in s(\overline{\lambda}), \ge \alpha\}, \text{ where,}$$

$G(x) = \begin{cases} x - 11, 11 \le x \le 12 \\ 11, 12 \le x \le 13 \\ 14 - x, 13 \le x \le 14 \end{cases}$, using the above technique we get following results.

Probability of the server is in a close-down period

$$\mu_{\overline{P_1}}(A) = \begin{cases} L(A) \ 0.0815 \le A \le 0.2761 \\ 1, 0.2761 \le A \le 0.3918, \\ R(A), 0.3918 \le A \le 0.6583 \end{cases}$$

Probability of the server is in a set-up period

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$$\mu_{\overline{P_2}}(B) = \begin{cases} L(B), & 0.1785 \le B \le 0.4983 \\ 1, & 0.4983 \le B \le 0.5531, \\ R(B), & 0.5531 \le B \le 0.7581 \end{cases}$$

Probability of the server is in a regular busy period

$$\mu_{\overline{P_3}}(C) = \begin{cases} L(C), & 0.0974 \le C \le 0.3671 \\ 1, & 0.3671 \le C \le 0.4752, \\ R(C), & 0.4752 \le C \le 0.6816 \end{cases}$$

Membership function of the mean queue length

$$\mu_{\overline{E(L)}}(D) = \begin{cases} L(D), & 0.5412 \le D \le 1.7153 \\ 1, & 1.7153 \le D \le 4.2590. \\ R(D), & 4.2590 \le D \le 16.1363 \end{cases}$$

Membership function of the mean waiting time

$$\mu_{\overline{E(W)}}(E) = \begin{cases} L(E), & 0.5761 \le E \le 8.6583 \\ 1, & 8.6583 \le E \le 12.1107. \\ R(E), & 12.1107 \le E \le 19.1265 \end{cases}$$

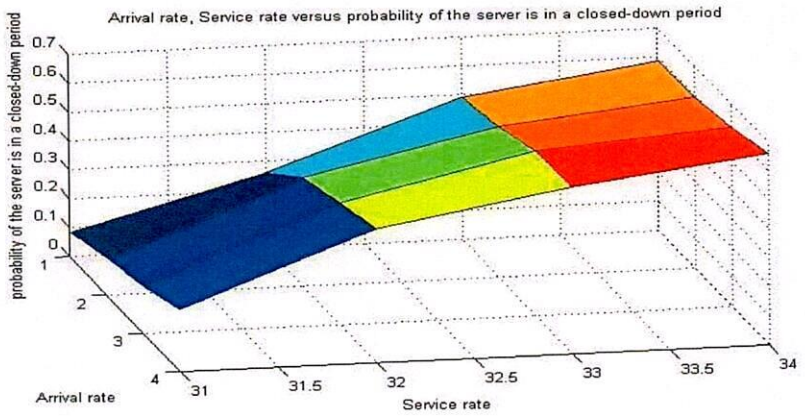

Figure 1: Arrival rate, service rate versus probability of the server is in a closed-down period

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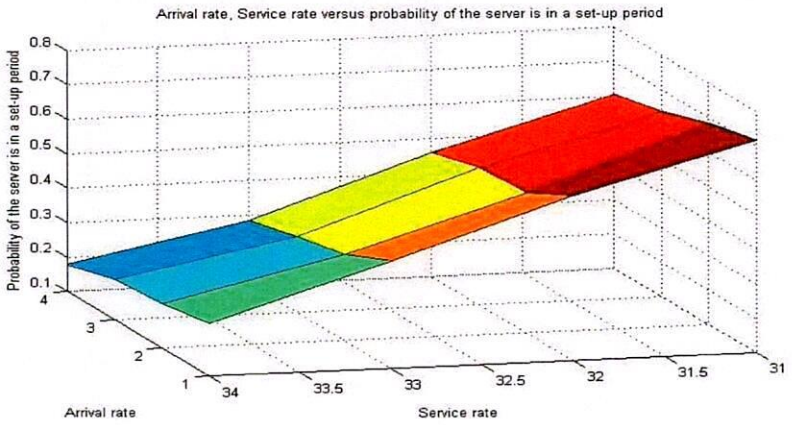

Figure 2: Arrival rate, serevice rate versus probability of the server is in a set-up period

Further by fixed the vacation rate by a crisp value $\bar{\theta} = 76.4$ and $\bar{\gamma}_2 = 61.3$ taking arrival rate $\overline{\lambda} = [11,12,13,14]$, service rate $\overline{\gamma_1} = [31,32,33,34]$ both trapezoidal fuzzy numbers the values of the probability of the server is in a closed-down period are generated and are plotted in the figure 1, it can be observed that as $\overline{\lambda}$ increases the probability of the server is in a closed-down period increases for the fixed value of the service rate, where as for fixed value of arrival rate, probability of the server is in a closed-down period decreases as service rate increases. Similar conclusion can be obtained for the case $\bar{\gamma}_2 = 63.6$, $\bar{\theta} = 73.4$ Again for fixed values of taking$\overline{\lambda} = [11,12,13,14]$, $\overline{\gamma_1} = [31,32,33,34]$ the graphs of probability of the server is in a set-up period are drawn in figure 2 respectively, these figure show that as arrival rate increases that probability of the server is in a set-up period also increases, while the probability of the server is in a set-up period decreases as the service rate increases in both the case.

It is also observed from the data generated that the membership value of the probability of the server is in a closed-down period is 0.57 and the membership value of the probability of the server is in a set-up period 0.63 when the ranges of arrival rate, service rate and the vacation rate lie in the intervals$(12,13.4), (31.5,34.6)$ and $(71.2,73.4)$ respectively.

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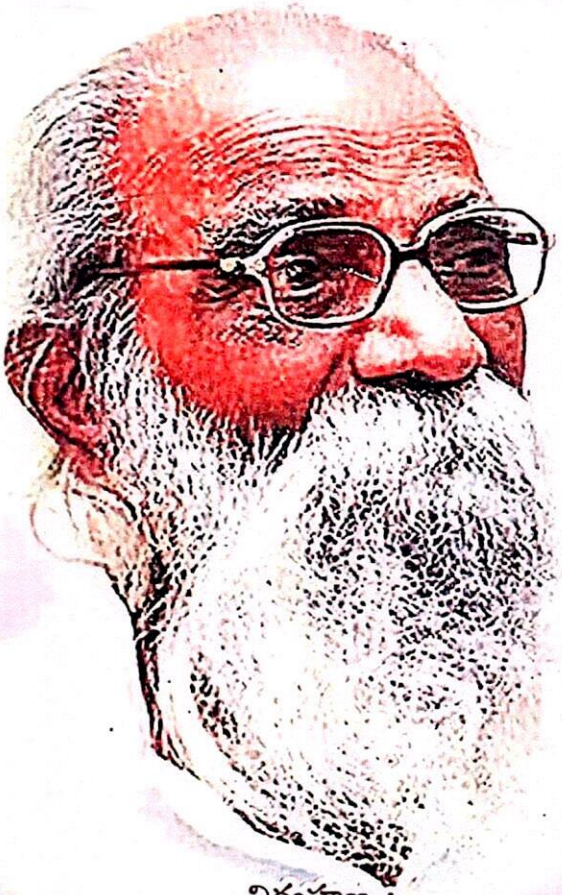

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తెలుగు విభాగం

జె.యం.జె. మహిళా కళాశాల (స్వయం ప్రతిపత్తి), తెనాలి.

&

తెలుగు మరియు ప్రాచ్య భాషా విభాగం,

ఆచార్య నాగార్జున విశ్వవిద్యాలయం, గుంటూరు.

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పాకుడురాళ్లు నవల్లోని స్త్రీ పాత్రలు దోపిడీకి ప్రతిరూపాలు

- వి. మేరికుమారి
తెలుగు శాఖాధ్యక్షులు,
జె.యం.జె. మహిళా కళాశాల, తెనాలి.

సమాజంలో నీతిని, ధర్మాన్ని అందించాల్సిన సినిమాలలో స్త్రీలు ఎన్ని విధాలుగా దోపిడికి గురౌతున్నారో తెలియజేసే నవల పాకురాళ్ళు. సినిమారంగంలోని రాక్షసులపై భరద్వాజ విసిరిన రాళ్ళ ఈ పాకుడురాళ్ళ సినిమారంగంలో పైకి కన్పిస్తున్న అందమైన రంగుల రాట్నం వెనుక నిజ జీవితంలోని ఎత్తుపల్లాలను, ఎగుడుదిగుడులను గుర్తించి, సునిశితంగా పరిశీలించి అక్షర సత్యంగా రాసిన నవల అత్యున్నతమైన, ఉత్తమోత్తమైన జ్ఞానపీఠ పురస్కారాన్ని సంపాదించింది.

ఎన్నో ఆశలతో, విపత్కర పరిస్థితులలో జానెడి పొట్ట కోసం, ప్రఖ్యాతి కోసం తెలిసో తెలియకో సినీరంగంలో ప్రవేశిస్తున్నారు. వచ్చిన తర్వాత నిలబడటం, నిలదొక్కుకోవటం విప్పుతో చెలంగాటం లాంటిది. స్త్రీ శరీరాన్ని అంగడి సరుకుగా భావించిన వారిలో పురుషులతోపాటు స్త్రీలు కూడ ఉన్నారు. సినిమాలు రంగులు వెదజల్లుతూ బాగుంటాయి. కానీ దానిలోని జీవితం చీకటి మయంగా ఉంటుంది స్థూలంగా చెప్పాలంటే మంగమ్మ అన్ని నటి జీవన ప్రస్థానమే ఈ నవల.

ఈ నవలలో మంగమ్మను నాటకాలలో తీసుకొస్తాడు, మాధవరావు. నాటక సమాజంలో తలలో నాలుకగా ఉంటున్న సమయంలో చలపతి కలిశాడు. మద్రాసు సినిమాలో హీరోయిన్‌గా రమ్మన్నాడు. అతనికి లొంగింది. సినీరంగ ప్రవేశం చేసిన తర్వాత మంగమ్మ పేరును మంజరిగా మార్చుకుంది. ఈ రంగుల ప్రపంచంలో ప్రవేశించిన తాయారమ్మ అనే బాధిత మహిళ మంగమ్మతో ఇలా అంటుంది.

"ఆ మాయ సచ్చినోడి మాటల్లో పడ్డాను. అరచేతిలో వైకుంఠం చూపించేసినాడండీ! నన్ను స్టార్ చేస్తానన్నాడు. సొంతంగా సినిమా తీస్తానన్నాడు. దొంగ సచ్చినదాన్ని అన్ని నమ్మాను. ఇంట్లో వున్న నగ, నట్ర బొర్లించేసుకొని వాడితో పట్నం వచ్చాను. వారంరోజుల కల్లా మా అయ్య, అమ్మ వచ్చారు నాలుగురోజులపాటు నన్ను బతిమాలారు. నేను రానంటే రానన్నాను. మా అమ్మ మరీ మరీ ఏడిచిందండీ! వెళ్ళబుద్ధి కాలేదు. వాళ్ళెళ్ళిపోయారు. నాలుగైదు మాసాలు ఇదిగో అదిగో అంటూ నన్ను బులిపించాడు వాడు. ఉన్న సొమ్మంతా ఖర్చుయి పోయింది. తిండికి కూడ కటకట పడ్డాను. వాడు చెప్పకుండా వెళ్ళిపోయాడు. కడుపు నాయగట్టుకొని అన్ని కంపెనీల చుట్టూ తిరిగాను. ఇదిగో అదిగో ననటమేగాని ఏమీ లాభం లేకపోయింది. ఆఖరికి ఎక్స్‌ట్రా వేషాలు కూడా సిద్ధపడ్డాను. అది అంతంత మాత్రంగానే ఉంది. రోజల్లా స్టూడియో లోపల పడిగాపులు కాస్తే అయిదారు రూపాయిల కన్నా దొరకవమ్మా! అవన్నా వెంటనే చేతుల్లో పడవు. ఆ ముష్టి అయిదు రూపాయల కోసం కాంట్రాక్టరు చుట్టూ తిరగాలి. వాడు రేపురా, మాపురా అంటూ మాసాలు కొద్ది తిప్పుతాడు. పాటికి పదిసార్లు అడిగితే ట్రబుల్ సమ్ ఆర్టిస్టు అని టాంటాం కొట్టి ఇంకోసారి పిలవడు అడక్కపోతే అసలు వసూలు కాదు. ఎప్పటికోప్పటికి వస్తుంది గదా అని సరిపెట్టుకోవడానికి వీలులేదు. సంవత్సరానికి అయిదు చిన్న వేషాలు దొరికితే అక్కడికి అదృష్టమే అనుకోవాలి. ఆ డబ్బులోను రూపాయికి పావలాలు కమీషను పోను మిగతావి చేతికి వస్తాయి. ఈ వేషాలుకయినా వొళ్ళప్పగించాల్సిందేనమ్మా నాకు రోత పుట్టింది ఫీల్డును వొగ్గేసినా, పనిచేసుకుని బతుకుతున్నాను. నా ప్రాణానికి హాయిగా ఉంది (ప్రాకుడురాళ్ళు పుట-55) అంటుంది తాయారు. ఆమె మాటలు ఎన్ని మంగమ్మ చాలనేపటికిగాని మామూలు స్థితిలోకి వచ్చింది. స్త్రీలను వంచించిన మగవారు కొందరు ఎన్నిఎత్తులైనా వేస్తారు వారిని నమ్మించి వారి పేర్లు మార్చుతారు. స్త్రీలను లొంగదీసుకోవటకు స్త్రీలనే పావులుగా వాడుకుంటారు. కళ్యాణి అనే స్త్రీ మంజరితో ఇలా అంటుంది.

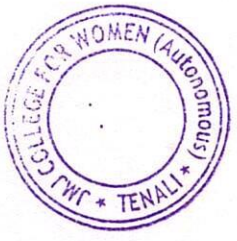
COLLEGE FOR WOMEN (Autonomous) * TENALI *

మంజురాజన్ అని నాకు తెలిసిన కోటేశ్వరుడొకాయనున్నాడు ట్రీచ్‌లో ఆయనకు చాలా వ్యాపారాలున్నాయి. ఆయన నాకు బాగా తెలుసు నన్ను కూడా ట్రీచ్‌కు తీసుకెళ్ళాడు. ఇందాకనే వచ్చి ఫోన్ చేశాడు. నా ఆరోగ్యం బావుంటే ఏ గొడవ లేకుండా నేనే వెళ్ళేదాన్ని నా బ్లూ మెర్క్యూరీ కారు అతను ప్రజెంట్ చేసినదే. నీవు నా చెల్లివని చెబుతున్నాను. నువ్వు కూడ అదే చెప్పు. మనిషి బంగారంలో మునిగి తేలుతుంటాడు. నీవు నచ్చితే నీకు ఒక కారు ప్రజెంట్ చేస్తాడు. కింద కారు రెడీగా ఉంది. నిజంగా నిన్ను అక్కడికి పంపడం నాకిష్టంలేదు. నిన్ను చూచిన కళ్ళతో నన్ను చూస్తే భూతకిలా కనపడతాను నాకిక అతను దక్కుతాడన్న నమ్మకం కూడ లేదు అని అంటుంది. మంజరి వెళ్ళడంతో తన మెడలో ఉన్న డైమండ్ నక్లెస్ చూసుకొని మురిసిపోతుంది. సాచీస్త్రీ అని చూడక మంజరిని వాడుకుంటుంది. తాను చెడిపోయింది కాక ఇతరులను కూడ చెడగొడుతుంది కళ్యాణి. ఇలాంటి సంఘటనలు సినీరంగంలో ఉన్న వారి విషయంలో కన్పిస్తాయి.

మంజరిస్థాయి పెరగడంతో ఆమె లోబడి ఉండదని ఆమె తనవద్దనే కట్టుబడి ఉండాలని ఏవో ప్రయత్నాలు చేస్తాడు చలపతిరావు. ఉత్తర భారతదేశంలో కాలుమోపి కలలను నిజం చేసుకోవటానికి చెందులాల్‌ని వాడుకుంటుంది. విదేశాలలో పర్యటించింది. ఆమె ఇంకా సాధించాలని అనుకున్న సమయంలో ఆమె దశ వెనుకకు తిరుగుతుంది, ఆరోగ్యం దెబ్బతిన్నది. జీవితంలో విషాదం డబ్బు లేకపోవడం కాదు మనల్ని ప్రేమించే వాళ్ళు లేకపోవడం. మనం ప్రేమించడానికి ఎవ్వరూ దొరక్కపోవటం మీరు లైటుగా తీసుకోండి నేనిది అక్షరాల అనుభవించి చెబుతున్నాను అని మంజరి అంటుంది. చివరిదశలో ఆకుపచ్చని కాశ్మీరపు తివాచి మీద అసువులు బాస్తుంది.

వందలకొద్ది కళాకారులు, వేలకొద్ది శ్రామికులు, లక్షల ప్రేక్షకులు, కోటానుకోట్ల వ్యాపారులు గల సినీపరిశ్రమను శాసించే అతికొద్ది మంది శక్తులకు కనువిప్పు కలిగించాలనే తపన ప్రధానంగా స్త్రీ అత్యంత జాగ్రదావస్థలో నుండి తనను తాను సంస్కరించుకుంటూ సమాజాన్ని సంస్కరించాలనే మేలుకొలుపు ఈ నవలలో అడుగడుగునా అక్షరసాక్షమై సాక్షాత్కరిస్తుంది.

చలనచిత్ర సీమలోని వాస్తవ సంఘటనల్ని లోకానికి విప్పి చూపాలనే ఉద్దేశంతో చేసిన ప్రయత్నమే ఈ నవల. దీనిని చదివితే మనిషి అనే పదానికి అర్థమేమిటో? మానవతా విలువలు ఏమైనాయో అనే భయభ్రాంతులు, అలాగే లోకం ఇలా కూడ ఉంటుందా అనే ఆవేదన కన్పిస్తుంది. ఈ విషయాల్ని చూసి కలవరపడి కలతచెంది, కార్చిన కన్నీరే ఈ పాకుడు. రాళ్ళు నేడు ఈ రాళ్ళే జ్ఞాన పీఠాన్ని వరించించాయి.



జె.యం.జె. మహిళా కళాశాల (స్వయం ప్రతిపత్తి), తెనాలి.

అనుబంధం : ఆచార్య నాగార్జున విశ్వవిద్యాలయం.

గుంటూరు జిల్లా, ఆంధ్రప్రదేశ్ – 522 201.

జె.యం.జె. మహిళా కళాశాల (స్వయం ప్రతిపత్తి), తెనాలి.

గుంటూరు జిల్లా - 522 201. ఆంధ్రప్రదేశ్.

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జాతీయ సదస్సు

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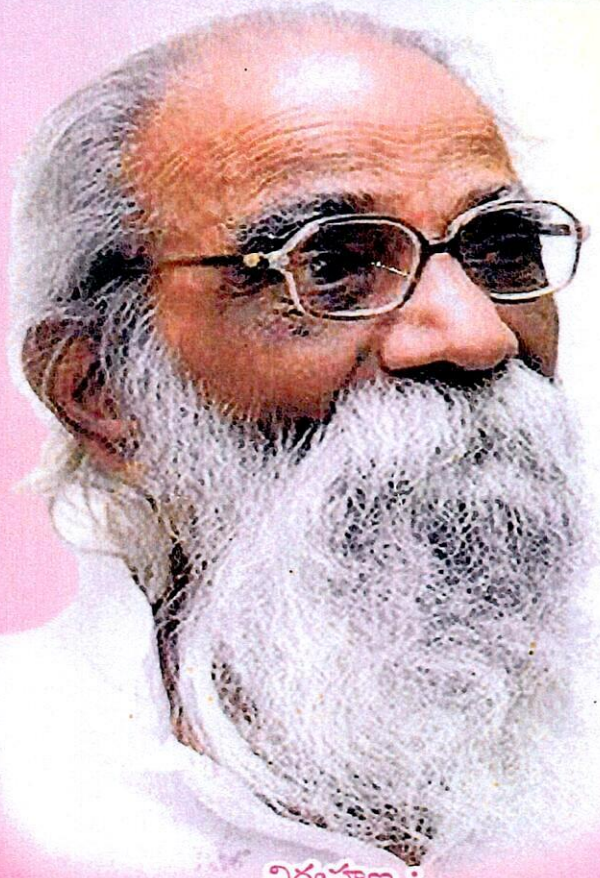

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నిర్వహణ :

తెలుగు విభాగం

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&

తెలుగు మరియు ప్రాచ్య భాషా విభాగం,

ఆచార్య నాగార్జున విశ్వవిద్యాలయం, గుంటూరు.

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అనంత భావాల లోగిలి భరద్వాజ సాహిత్యం

– రొంపి సాంబశివరావు
పూర్వ రిజిస్ట్రారు,
ఆచార్య నాగార్జున విశ్వవిద్యాలయం, గుంటూరు.

కవులతో, పండితులతో, ఉత్తమ ఉపాధ్యాయులతో, జిజ్ఞాసాపరులతో, సాహితీ ప్రియులతో నిండిన ఈ సభకు ముందుగా నమస్కారం.

తెలుగు లెంకతుమ్మల అంటారు –

"కృతి రచియించు లోక హితమెంచి కవి మౌళి;
త్రచ్చి బుధుద్రు చాటు దాని సొగసు;
మ్రాను విరిని గాంచు, మారుత మద్దాని
వలపునెల్ల దెసల నలము కొల్పు"

అయితే నేను బుధుణ్ణి అని చెప్పుకునేంత విరగబాటు నావద్ద లేదు. ఇక్కడ బుధులు మీరని చెప్పటమే నా ఉద్దేశం.

కవికంటే విమర్శకుని పాత్ర రసపూరితం. ఇక్కడికి దగ్గర్లోనే తుమ్మపూడి అనే గ్రామం వుంది. ఆ గ్రామాన్ని సంస్కృతీ పరంగా విశ్వపటానికి అతికించిన మహానుభావుడు – సంజీవదేవ్ ఉండేవారు. ఆయన ఏమన్నారంటే కవితండ్రి వంటివాడు; విమర్శకుడు అతనికి అల్లుని వంటివాడు అని అష్టకష్టాలు పడి తల్లిదండ్రులు కనిపెంచి పెద్ద జేస్తే అనుభవ మంతదా అల్లునిది. ఈ చమత్కారాకేమీగాని కవిప్రతిభ కలదే. అయితే సద్విమర్శకుని పాత్రను తక్కువగా అంచానా వేసేందుకు లేదు అని చెప్పటమే వారి ఉద్దేశ్యమైనా, నా ఉద్దేశ్యమైనా ఇక్కడ పత్ర సమర్పకులు వక్తల రూపంలో పలువురు ఉన్నారు. ఎవరిపేరిట అయితే మన విశ్వవిద్యాలయం నెలకొల్పబడిందో ఆ ఆచార్య నాగార్జునుడు వక్తల్ని మూడు రకాలుగా వర్గీకరించారు:

"మధురముగ మంచి బోధించు మాన్యుడొకరు
నిజము సూటిగ పల్కు పునీతుడొకరు
కల్లలను బెల్లమనిపించు కపటి ఒకరు
కలరు వక్తలు మూడు వర్గాలవారు"

అంటూ ఆచార్య నాగార్జునుని పలుకులను ఆంధ్రీకరించారు గజ్జెల మల్లారెడ్డి గారు. కనుక మనలోని ఎవ్వరం మూడో వర్గం కాపు కాయకుండ మొదటి రెండు వర్గాలకే పరిమితమవుదాం. అందులో డా॥ రావూరి భరద్వాజ వంటి నిష్కపటి విషయంలో కాపట్యానిక తావెక్కడిది? డా॥ సంజీవ దేవ్ ఒక సందర్భంలో ఇలా చెప్పారు:

"Man is not what he appears to be ..... no saint is completely free from sin while no sinner is stripped of all virtues.... The entire creation itself is a harmoneous blend of contrasts and conflicts, confirmations and contradictions dawns and dusks, living and dying .... This is a psychological variety not merely in fiction but in real life as well".

"మనకు కనిపించే మనిషి మాత్రమే మనిషికాదు... ఎంతటి మౌని అయినా అసలు ఏ పాపము ఎరుగని వాడని చెప్పజాలము. అలాగే పాపి అనే వానిలో ఇసుమంత సుగుణం ఉండదని చెప్పజాలం... అసలు ఈ సృష్టి అంతా తేడాల, ఘర్షణల, సమ్మతుల, అసమ్మతుల; సూర్యోదయాల, అస్తమయాల; జీవన్మరణాల సుందర సమన్వయం. ఈ రకపు మనో వైజ్ఞానిక వైవిధ్యాన్ని రచనల్లోనే కాదు నిజజీవితంలో కూడ చూడవచ్చు.

ఈ నిత్య జీవిత సత్యం భరద్వాజ జీవితానికి ఎంతగా అతికినట్లుగ ఉంటుందో మీరు మీ పత్రాలతో నిగ్గుదేల్చ గలరనే ఆశ నాకున్నది.

"..... నూతనాంశమేదో యొకతేనియున్ దెలుపనోపని గ్రంథ సమూహమేటికో" అంటారు తమ కవితా వ్యవ సాయంతో గట్టి గింజలు పండించి నూతనాంశములు రాశులు పోసిన ఈ పట్టణపు ఒకనాటి పురపాలక సంఘ ధ్యక్షులు, కవిరాజు బిరుదాంకితులు త్రిపురనేని రామస్వామి గారు. భరద్వాజ ఎంతగా నూతనాంశముల రాశులు పోయకపోతే దాదాపు ఒక 190 వుస్తకాలు వెలు

కానీ పిల్లలందరూ అచ్చుగుద్దినట్లు స్వామివారిపోలికే. ఈ కథ ద్వారా దొంగస్వాములు ప్రజల నమ్మకాలను ఆసరా చేసుకొని వారిని ఏవిధంగా మభ్యపెడుతున్నదీ కళ్లకు కట్టి నట్టు చూపించాడు రచయిత. ఇటువంటివి అరికట్టా లంటే ప్రజలు మూఢనమ్మకాలు వదలి వాస్తవికతతో ఆలోచిం చాలని సూచిస్తున్నాడు.

ఈ విధంగా రావూరి భరద్వాజ సమాజంలో అను నిత్యం మన కళ్ళముందు జరిగే అనుకానేక సంఘటనలనే వస్తువు లుగా స్వీకరించి సామాజాన్ని మానసిక, పరివర్తనలో నడిపే ప్రయత్నం తన రచనల ద్వారా బలంగా చేసినది స్పష్ట మైతుంది. ఒక రచయిత కేవలం వాస్తవాన్ని అందించడం వేరు, సామాజిక దృక్పథంతో కూడిన వాస్తవ చిత్రీకరణ చేయడడం వేరు. అయితే నవలలో సామాజిక దృక్పథంతో కూడిన వాస్తవ చిత్రీకరణ జరగాలంటే ఆ రచయితకు భౌతికవాదం, వర్గ చైతన్యం, వర్గదృక్పథాల పట్ల అవగా హనతో పాటు, పరిచయం కూడా అవసరం. వీటన్నిటితో పరిచయమున్న రచయిత యొక్క రచనల్లో సామాజిక చైతన్యం మరింత స్పష్టంగా ,మరింత బలంగా వుంటుంది. రావూరి భరద్వాజ రచనలలో వర్గదృక్పథం, వర్గచైతన్యం, భౌతికవాద ధోరణి కూడిన లక్షణాలు చాలా స్పష్టంగా కనిపిస్తాయి. సామాన్య జీవితాలకు పట్టంకడుతూ అద్భుత మైన సాహిత్యాన్ని సృజించిన రావూరి అనేకానేక రచనల్లో ఒకటైన పాకుడురాళ్ళు కు జ్ఞానపీఠ్ పురస్కారం లభించట మనేది, 'సహితస్యభావం సాహిత్యం' అనే లోకోక్తికి పట్టాభి షేకం జరగటమే. అందుకే ముందు చెప్పినట్లుగా రావూరి భరద్వాజ రచనల్లోని కలానికున్న బలం, బీదువారిన మానవ మెదళ్ళను దున్నే బలమైన నాగలి కర్రుకున్నట్టి పదునైన తత్వం, అదే మానవత్వంతో నిండిన యదార్థత్వం.

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"బీడువారిన మెదళ్ళను దున్నే నాగలి – రావూరి భరద్వాజ సాహిత్యం"

('లోకం కోసం' నుండి కొన్ని కథల సమాహారం)

- దొనకొరి విజయలక్ష్మి
తెలుగు అధ్యాపకులు,
జె.యం.జె మహిళా కళాశాల(స్వయం ప్రతిపత్తి), తెనాలి.

శర్వరీ దీపకోశ్చంద్ర:
ప్రభాతో దీపకో రవి:
త్రైలోక్య దీపకో ధర్మ:
సుపుత్ర కుల దీపక:

అని పండితుల మాట...! అంటే రాత్రికి చంద్రుడు వెలుగునిస్తే, పగటికి సూర్యుడు వెలుగునిస్తాడు, ముల్లోకాలనూ ధర్మమే వెలిగిస్తుంది, (భూమిమీద వున్న మనం, ఉందో లేదో తెలియని స్వర్గ, నరకాన్ని విశ్వసిస్తున్న కర్మ భూమి మనది. ఈ నేలపై యేనాటికైనా అంతిమంగా వర్ధిల్లాల్సినది ధర్మమే కాబట్టి) వంశాన్ని నిలబెట్టేవాడు మరియు వెలిగించేవాడు కొడుకే అని అర్థం.

నిజమే...! వాస్తవానికి ఈ సమాజపు ఆలోచనల ధోరణి కూడా, గచ్చపొదలతో దట్టంగా నిండి బీడువారినట్లుంది. అటువంటి ఈ మానవ సమాజాల యొక్క మెదళ్ళను దున్ని, నూతన సమాజానికి దారులు వేసేది, ఈ సమాజాల్ని సస్య శ్యామలభరితం చేయగలిగేది ఒక నిబద్ధుడైన సాహిత్యకారుడు మాత్రమే. అటువంటి బలమైన నిబద్ధ సాహిత్యకారుడు రావూరి భరద్వాజ. శ్రీశ్రీ అన్నట్లు 'నాలో కదిలే నవ్య కవిత్వం, కార్మిక లోకపు కళ్యాణానికి, శ్రామిక లోకపు సౌభాగ్యానికి, సమర్పణంగా, సమర్చనంగా త్రికాలాలలో, త్రిలోకాలలో, బావి వేదముల జీవనాదముల జగత్తుకంగా చవులిస్తానోయ్'. అన్నట్లు రావూరి భరద్వాజ గారి సాహిత్యం కూడా సామాజిక హితమైనదే.రావూరి భరద్వాజ సామాజిక పరిస్థితులకు వాస్తవ రూపాన్నిస్తూ, మానవ వ్యక్తిత్వాలను సమున్నతంగా తీర్చిదిద్దే ప్రయత్నాన్ని బలంగా చేసిన అక్షర సేద్యగాడు.

గతించిన చరిత్ర తాలూకూ అనుభవాలు, వర్తమాన సమాజానికే కాక, కాక భవిష్యత్తు సమాజాలకూ ఒక ప్రేరణ. అలాంటి ప్రేరణను అనునిత్యం కలిగిస్తూ, ఈ సమాజాన్ని ఉన్నచోటునుండి ఉన్నతమైన చోటుకి నడిపించే ఒక అద్భుత మైన ప్రక్రియ సాహిత్య ప్రక్రియ. మంచి సాహిత్యం సమాజాన్ని నిరంతరం ప్రేరేపిస్తుంది. అలాంటి ప్రేరణను కలిగించే సాహిత్యాన్ని, సాహిత్యకారులను స్మరించుకోవట మనేది నేటి సమాజానికి చాలా అవసరం. అటువంటి సాహిత్యకారుల్లో డాక్టర్ రావూరి భరద్వాజ ఒకరు. వీరి రచనల్లోని కలానికున్న బలం, బీడువారిన మానవ మెదళ్ళను దున్నే బలమైన నాగలి కర్రుకున్నట్టి పదునైనతత్వం, అదే మానవత్వం. "చిన్న తనంలో లేమికారణంగానే నేను చదువు కోలేక పోయాననే భావం, నా ప్రతీ రక్త కణాన్ని ఎంత సంక్షోభానికి గురిచేసిందో నాకు తెలుసు. లేమి కారణంగా ఎవ్వరూ చదువుకోకుండా వుండరాదనేది నా నిశ్చితాభి ప్రాయం, అదే నా జీవితేచ్ఛ". అని తన వ్యక్తిత్వాన్ని ప్రక టించుకున్న రావూరి భరద్వాజ, అట్టడుగు మనుష్యుల ఇతి బాధల్ని కథలుగా అల్లి ఒక ఉద్యమంలా తీసుకువచ్చారు. అందుకే భరద్వాజ సాహిత్య రంగంలో ఏదిరాసినా.... ఏదిచేసినా ' రావూరి వారిది – రతనాల వారధి,' అంటూ సాహిత్య విమర్శకులు పేర్కొంటారు. అటువంటి వారధిని నిర్మించారు కాబట్టే రావూరికి జ్ఞానపీఠ్ అవార్డు వెతుక్కుంటూ వచ్చింది.

పేదరికంలో పుట్టినతనని యెన్నో అష్టకష్టాలు కోరి వరించేవి. కానీ వాటన్నిటినీ భరద్వాజ నిజాయతీతో అధిగమించిన అభ్యుదయవాది. చిన్న వయసునుండే రచనా వ్యాసాంగ మార్గాన పయనిస్తూ, మానవీయ బంధాలను, సంబంధాలను అనునిత్యం పరిశీలించిన స్వీయ అభ్యాసకుడు. తన జీవితంలో అనునిత్యం యెదురైన అనేకానేక పరిస్థితులను, అనుభవాలను, పుస్తకాల కళ్ళజోడుతోగాక అనుభవ నేపధ్యంతో గ్రహించి, లోకమనే విశ్వవిద్యా

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ద్రవీభవిస్తుంది. మానవీయ విలువలు హృదయాలలో విత్తే సాహిత్యాన్నే రావూరి అక్షరరూపంలో పట్టంకట్టాడు. సమాజంలో జరిగిన, జరుగుతున్న లోపాలను, జరగబోయే కాలంలో చేసుకోవాల్సిన మార్పులను సరైన రీతిలో అక్షర రూపంలో సమాజానికి అందించే సాహితీకారుడు సృజన శీలుడు మన రావూరి. ఈ కోవలో ప్రథమవరుసలో చెప్పుకోదగ్గ అక్షరశిల్పి. అందుకే ఆయన సాహిత్యం మానవీయ విలులు విత్తే సాహిత్యం.

1959లో రావూరి 'పాకుడురాళ్ళు' నవలను మొదట కృష్ణా పత్రికలో సీరియల్‌గా రాశారు. అది 1965నాటికి తొలి ముద్రణలోకి వచ్చింది. ఇప్పటి వరకూ ఆరు ముద్రణలు పొందింది. (1959లో పాకుడురాళ్ళు నవల పేరు 'మాయా జలతారు' తరువాత 1965లో శీలా వీర్రాజు ఈ నవలకు 'పాకుడురాళ్ళు' అనే పేరును సూచించారు)

86 సంవత్సారాల అక్షరకృషి దాదాపు 150పైకి పుస్తకాలు (రచనలు) రచించారు. అందులో దాదాపు 600 దాకా కథానికలు, 19 నవలలు, బాలలకోసం 7 నవలికలు, 3 వ్యాససంపుటాలు, 33వైజ్ఞానిక వ్యాసాలు, 8 నాటకాలు మొ॥వి ఇంతటి విస్తృతమైన సాహితీ సేద్యంలో భరద్వాజ రచనా శిల్పం విశిష్టమైనది. గుడిపాటి వెంకటచలం నుండి ఎంతో ప్రేరణపొందిన భరద్వాజ రచనల్లోని శిల్పం చదివే పాఠకుడికి యే రచన భరద్వాజదో యే రచన చలం ది అని పోల్చుకునేందుకు కొంచెం కష్టంగా అనిపించక తప్పదు. దీనిని బట్టి రావూరిపై చలం ప్రభావం చెప్పకనే కనిపిస్తుంది. అంతటి ప్రతిభామూర్తి రావూరి భరద్వాజ కథానికల సంపుటాలలో మనం వెతికితే దొరకని అంశమంటూ కన్పించదు. అందుకే భరద్వాజది చూడగలిగిన దృష్టి, రాయగలిగిన నేర్పుతో కూడుకున్నది. వారి రచనా శైలి చాలా విలక్షనమైనది, యే చిన్న సన్నివేశాన్ని చూసినా దానిలోని లోతు పాతులను అవగాహనతో కూడిన ఆకళింపు చేసేకునిఆ అఉభూతులను అనుభవాలను తన రచనల్లో పొందు పరుస్తాడు. ' భరద్వాజ ప్రత్యేకత యేమిటంటే ఎవరికీ పనికి రాని దానిలో నుండి కొందరికైనా పనికొచ్చే అంశాన్ని ప్రస్థావిస్తూ రచనలు చేయటం రావూరి ప్రత్యేకత. ఈయన కథానికలలో ఒక్కోక్క దానికి ఒక్కోక్క ప్రత్యేకత వుంది. అందులో లోకం కోసం అనే కథానికల సంపుటిలో మొత్తం పదకొండు కథలున్నాయి. దీనిని 1956లో రచించారు. అవి 1) లోకంకోసం,2) ఆహిరి, 3) నీతిస్తంభం, 4)అనుమానం, 5) కన్నకడుపు, 6) సంతానం, 7)పల్లెపటు, 8) అభ్యుదయం, 9)కడుపుతీపి, 10) ప్రవృత్తులు, 11) అద్దెకొంప - ఈ కథానికల్లో కొన్ని కథలను సంక్షిప్తంగా విశ్లేషిస్తే

లోకంకోసం :

మొదటి కథ "లోకం కోసం" నరసమ్మ పెళ్ళైన స్త్రీ. భర్త ముసలివాడు, బలం లేనివాడు కాదు. కానీ మరొకరితో రహస్యంగా సంబంధం పెట్టుకుంది. ఆ విషయం నరసమ్మ భర్తకు తెలిసినప్పటికీ ఏమీ అనదు కారణమేమిటో తెలీదు. నరసమ్మ ఈ విషయం తన ప్రేమికునికి చెప్తుంది. అప్పటి నుండి ఇద్దరూ సంబంధాన్ని బహిరంగంగానే కొనసాగిస్తారు. తన కళ్ళ ముందే వాళ్ళ వ్యవహారాలను సహించలేక నరసమ్మ భర్త అతన్ని కొడతాడు. దీనంతటికి కారణం మన సంబంధం బహిరంగం కావడమేనని అందుకే అతడు ఇలా ప్రవర్తించాల్సి వచ్చిందని నరసమ్మతో చెప్తాడు తాను సంబంధం పెట్టుకున్న వ్యక్తి. ఇది కథా సారాంశం.

లోకం సహించలేని, అంగీకరించలేని ఏ సంబంధానైనా రహస్యంగానే కొనసాగించాలి. ఎందుకంటే సమాజం కోసం అని రచయిత చెప్పుకొస్తాడు. ఏ పనికైనా కష్టపడాల్సిందే లేకపోతే సుఖం వరించదని హితబోధ చేస్తాడు రచయిత "సుఖం అనే లాభానికి ఈ కష్టం పెట్టుబడి లాంటిది".

(పేజి. నెం.3 లోకం కోసం)

"అందులో ఇది మాములు సుఖం కాదు అన్నింటి కంటే గొప్పది". అన్నింటి కంటే లోకంలో లైంగిక సుఖం గొప్పది అంటాడు రచయిత. కనుకనే నరసమ్మ మొగుడు అంగీకరించాడు. కానీ ఎందుకు ఇలా ప్రవర్తించాడంటే "లోకం దృష్టిలో తన విలువ నిలబెట్టుకోలేని దాని కోసం కనీసం నిలబెట్టుకొన్నాడనే ఆత్మ తృప్తి కోసం, అతనిపని చేశాడే

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మొదట ఇది తప్పుగా అన్పించలేదు. కారణం లలిత రాజా రావును ప్రేమించింది. అతని భార్య కావాలనుకొంది. ఆమె ప్రేమలో నిజాయితీ ఉంది. కానీ పరిస్థితులు అనుకూలించ లేదు. ఇప్పుడు మాత్రం రాజారావు ఉద్దేశ్యం వేరు. లలితకు దగ్గరవ్వడానికి కారణం భార్య పుట్టింటికి వెళ్లడం. తన అవసరంకోసం లలితను వాడుకున్నాడు. అది గ్రహించిన లలితకు, తన భర్త కూడా తను పుట్టింటికి వెళ్తానంటే ఎందుకు సరే అన్నాడో అర్థమైంది. తనకాపురాన్ని నిలబెట్టు కోవాలనుకొని వెంటనే భర్త దగ్గరకు చేరుకుంది. ఈ కథ సమాజంలో దిగజారుతున్న నైతిక విలువలకు, సంబంధ బాంధవ్యాలను కాపాడుకోవాల్సిన అవసరం ఏమేరకు ఉం దనే విషయాన్ని తెలియజేస్తుంది. .

'భార్యలు పుట్టింటికి పోయినప్పుడు భర్తలు మరొక స్త్రీలను ఆశ్రయించడం అన్న అంశాన్ని తీసుకోని కథ నడిపిం చిన రచయిత ఈ కథకి ఆహిరి అని పేరు పెట్టడం లో స్త్రీరాగ విశేషంగాను, రెండు శరీరాలు మనస్ఫూర్తిగా దగ్గరయ్యినపుంపడు వారిరువురి హృదిలో అవతరించే సుసంగీత రాగవిశేషంగా వర్ణించటమే . ఈ కథలో లలిత రాజారావును ప్రేమించినప్పటికీ తల్లిదండ్రులు అంగీకరిం చకపోవటంతో శంకరం ను పెండ్లి చేసుకుంటుంది, ఈ శంకరం మాత్రం అన్నయ్య అని పిలిచే రాంమూర్తి భార్య శారద పై కన్నెస్తాడు. అలాగే రాంమూర్తి లలితపై వ్యామో హంతో ప్రవర్తిస్తాడు. పైకి మాత్రం అమ్మాయ్ అంటూనే లోపల మరో బుద్ధి పెట్టుకోని పైకి నటిస్తాడు. ఈ విషయాన్ని రచయిత "వీడు తనను అమ్మాయ్" అంటున్నాడు తను వీణ్ణి అన్నగారు అంటుంది. అటువంటి వాడు ఈ పని చేశాడంటే ఎవ్వరూ నమ్మరు. పైగా తనే రద్ది పడాలసోస్తుంది. (లోకం కోసం, ఆహిరి, పేజి. నెం.17) మగవాడు ఏం చేసినా నాటి నుండి నేటి వరకు అతడు సమాజంలో చెలా మణి అవుతాడు. ఈ విషయాన్ని చాలా సున్నితంగా చెప్ప గలిగాడు రచయిత.

శరీరేచ్ఛలను తీర్చుకోవడానికి వావివరుసలు అడ్డు రావని, అక్కడ ఆడ, మగ అన్న భావన తప్పా మరేమీ పని చేయవని చెప్పడానికి మంచి ఉదాహరణ ఈ కథలో నుండే "ఆ శాస్తుర్లు గారి కూతుర్ని 'అక్కాయ్ అక్కాయ్' అంటూనే వారాల కుర్రాడు లేపుకెళ్ళలేదూ? అప్పుడే వరసలు అడ్డొచ్చాయ్ గనుక?" అని ప్రశ్నిస్తాడు. "స్త్రీ, పురుష సంబం ధాలలో మొట్టమొదటి మార్పు వావి ఏర్పడటం, తరాల భేదం లేకుండా ఏరర్పరుచుకొనే సంబంధాల నుండి మార్పు". ఇలా వావి వరుసలు ఏర్పరుచుకోవడం వల్లే ఆనాటి గుంపులు, మెరుగైన సంతానాన్ని పొంది అభివృద్ధి చెందగలిగాయి. ఆ మార్పుని నేడు తిరిగి మార్చాలనే ప్రయత్నం జరుగుతోందని రచయిత ఆనాడే హెచ్చరిం చాడు.వావి వరుసల్ని కూడా సమాజంలో గౌరవాన్ని పోగొట్టుకోకూడదనే ఒక నెపంతో ఉపయోగించుకుంటు న్నారు ఈ జనాలు. దీనితోపాటు వూర్లకెళ్తేనే మరో స్త్రీ పంచన చేరే మగవాళ్ళను దృష్టిలో పెట్టుకొని "ఈ మగాళ్ళకున్న అహంకారానికి పెళ్ళాలే గనుక లేకపోతే లోకం మగ్గమండి పోదూ...? అంటాడు లలితలాగా ఎంతమంది పారిపోవల్సి వస్తుందోనన్న సందేహాన్ని వ్యక్తం చేశాడు. రచయిత.

నీతిస్తంభం :

ఈ కథలో రచయిత మానవసంబంధాల ప్రాధాన్యతను తెలియజేశాడు. ప్రతివ్యక్తీ వారివారి వ్యక్తిగత జీవితం కోసం కొంత సమయం కేటాయించాలి. సమాజ సేవతో పాటు వ్యక్తిగత జీవితం కూడా ప్రధానమైనదే. అప్పుడే సంబంధాలు నిలబడతాయని, పెళ్ళైన తొలిరోజుల్లో ప్రేమగా అన్పించినది తర్వాత నీచంగానూ, తుచ్ఛంగానూ అన్పించకూడదంటారు రచయిత. దీనికి ఉదాహరణ పార్వతి పాత్ర. ఆమె పూజలు, నోములు, వ్రతాలు అంటూ గడుపుతున్నప్పటికీ, భర్తనుంచి ప్రేమాభిమానాలు ఆశించింది. అవి దొరక్కపోయేసరికి మరొకరితో వెళ్ళిపోయింది. ఇది తప్పైనా, వ్యక్తి తన కుటుంబ సభ్యులను నిర్లక్ష్యం చేస్తే కలిగే అనర్థాలను తెలిపాడు. ఇది ఆవ్యక్తి గుణపాఠంగా స్వీకరించకగా భావిం చాలి.

"నీతిస్తంభం" కథలో ఇద్దరు వ్యక్తుల మధ్య వాదన జరుగు తుంది. నాగభూషణం చలాన్ని సమర్థిస్తాడు. సుబ్బారావు

జె.యం.జె. మహిళా కళాశాల (స్వయం ప్రతిపత్తి), తెనాలి.

గుంటూరు జిల్లా - 522 201. ఆంధ్రప్రదేశ్.

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భావవీణ ప్రత్యేక సంచిక

జ్ఞానపీఠ పురస్కార గ్రహీత డా॥ రావూరి భరద్వాజ సాహిత్యం - సామాజిక స్పృహ

జాతీయ సదస్సు

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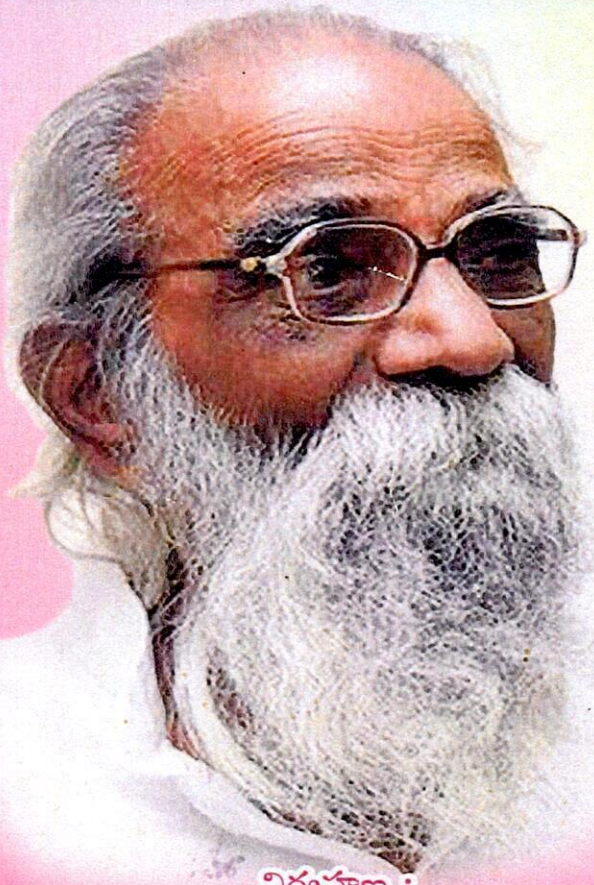

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నిర్వహణ :

తెలుగు విభాగం

జె.యం.జె. మహిళా కళాశాల (స్వయం ప్రతిపత్తి), తెనాలి.

&

తెలుగు మరియు ప్రాచ్య భాషా విభాగం,

ఆచార్య నాగార్జున విశ్వవిద్యాలయం, గుంటూరు.

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అనంత భావాల లోగిలి భరద్వాజ సాహిత్యం

- రొంటాల సాంబశివరావు
పూర్వ రిజిస్ట్రారు,
ఆచార్య నాగార్జున విశ్వవిద్యాలయం, గుంటూరు.

కవులతో, పండితులతో, ఉత్తమ ఉపాధ్యాయులతో, జిజ్ఞాసాపరులతో, సాహితీ ప్రియులతో నిండిన ఈ సభకు ముందుగా నమస్కారం.

తెలుగు లెంకతుమ్మల అంటారు –

"కృతి రచియించు లోక హితమెంచి కవి మౌళి;
త్రచ్చి బుధుడ్రు చాటు దాని సొగసు;
మ్రాను విరిని గాంచు, మారుత మద్దాని
వలపునెల్ల దెసల నలము కొల్పు"

అయితే నేను బుధుణ్ణి అని చెప్పుకునేంత విరగబాటు నావద్ద లేదు. ఇక్కడ బుధులు మీరని చెప్పటమే నా ఉద్దేశం.

కవికంటే విమర్శకుని పాత్ర రసపూరితం. ఇక్కడికి దగ్గర్లోనే తుమ్మపూడి అనే గ్రామం వుంది. ఆ గ్రామాన్ని సంస్కృతీ పరంగా విశ్వపటానికి అతికించిన మహానుభావుడు – సంజీవదేవ్ ఉండేవారు. ఆయన ఏమన్నారంటే కవితండ్రి వంటివాడు; విమర్శకుడు అతనికి అల్లుని వంటివాడు అని అష్టకష్టాలు పడి తల్లిదండ్రులు కనిపెంచి పెద్ద జేస్తే అనుభవ మంతదా అల్లునిది. ఈ చమత్కారాకేమీగాని కవిప్రతిభ కలదే. అయితే సద్విమర్శకుని పాత్రను తక్కువగా అంచానా వేసేందుకు లేదు అని చెప్పటమే వారి ఉద్దేశ్యమైనా, నా ఉద్దేశ్యమైనా ఇక్కడ పత్ర సమర్పకులు వక్తల రూపంలో పలువురు ఉన్నారు. ఎవరిపేరిట అయితే మన విశ్వవిద్యాలయం నెలకొల్పబడిందో ఆ ఆచార్య నాగార్జునుడు వక్తల్ని మూడు రకాలుగా వర్గీకరించారు:

"మధురముగ మంచి బోధించు మాస్యుడొకరు
నిజము సూటిగ పల్కు పునీతుడొకరు
కల్లలను బెల్లమనిపించు కపటి ఒకరు
కలరు వక్తలు మూడు వర్గాలవారు"

అంటూ ఆచార్య నాగార్జునుని పలుకులను ఆంధ్రీకరించారు గజ్జెల మల్లారెడ్డి గారు. కనుక మనలోని ఎవ్వరం మూడో వర్గం కాపు కాయకుండ మొదటి రెండు వర్గాలకే పరిమితమవుదాం. అందులో డా॥ రావూరి భరద్వాజ వంటి నిష్కపటి విషయంలో కాపట్యానిక తావెక్కడిది? డా॥ సంజీవదేవ్ ఒక సందర్భంలో ఇలా చెప్పారు:

"Man is not what he appears to be ..... no saint is completely free from sin while no sinner is stripped of all virtues.... The entire creation itself is a harmoneous blend of contrasts and conflicts, confirmations and contradictions dawns and dusks, living and dying .... This is a psychological variety not merely in fiction but in real life as well".

"మనకు కనిపించే మనిషి మాత్రమే మనిషికాదు... ఎంతటి మౌని అయినా అసలు ఏ పాపము ఎరుగని వాడని చెప్పజాలము. అలాగే పాపి అనే వానిలో ఇసుమంత సుగుణం ఉండదని చెప్పజాలం... అసలు ఈ సృష్టి అంతా తేడాల, ఘర్షణల, సమ్మతుల, అసమ్మతుల; సూర్యోదయాల, అస్తమయాల; జీవన్మరణాల సుందర సమన్వయం. ఈ రకపు మనో వైజ్ఞానిక వైవిధ్యాన్ని రచనల్లోనే కాదు నిజజీవితంలో కూడ చూడవచ్చు.

ఈ నిత్య జీవిత సత్యం భరద్వాజ జీవితానికి ఎంతగా అతికినట్లుగ ఉంటుందో మీరు మీ పత్రాలతో నిగ్గుదేల్చ గలరనే ఆశ నాకున్నది.

"..... నూతనాంశమేదో యొకతేనియున్ దెలుపనోపని గ్రంథ సమూహమేటికో" అంటారు తమ కవితా వ్యవసాయంతో గట్టి గింజలు పండించి నూతనాంశములు రాశులు పోసిన ఈ పట్టణపు ఒకనాటి పురపాలక సంఘాధ్యక్షులు, కవిరాజు బిరుదాంకితులు త్రిపురనేని రామస్వామి గారు. భరద్వాజ ఎంతగా నూతనాంశముల రాశులు పోయకపోతే దాదాపు ఒక 190 వుస్తకాలు వెలు

సమున్నత సాహితీ శిఖరం – జ్ఞానపీఠ్ రావూరి భరద్వాజ

- డా॥ సెందుర్తి మేరిపద్మలత
గణిత శాస్త్ర విభాగాధిపతి,
జె.యం.జె మహిళా కళాశాల (స్వయం ప్రతిపత్తి), తెనాలి.

తెలుగు సాహిత్యంలో తన వంతు పాత్రను చాలా చక్కగా పోషించిన వారితో డా. రావూరి భరద్వాజ ప్రథమ వర్గానికి చెందిన వారిగా చెప్పవచ్చు. డా.రావూరి భరద్వాజ అత్యంత సామాన్య జీవితాన్ని తానే స్వయంగా అనుభవించి, ఆ విషయాలనే తన సాహిత్య విషయ వస్తువులుగా నెంచి వాటికి జీవం పోసి కఠిన హృదయులను సైతం మృదువు తరం గలగా మార్చిన నిగర్వి, డా.రావూరి భరద్వాజ గారు.

అందరికీ బహుమతులు బహువిధాలుగా కీర్తిని తెస్తాయి. కాని భరద్వాజ గారికి అది సరిపోల్చదు. బహుమానానికే బహుమానం వంటి వారు వీరు. తెలుగు సాహిత్యాన్ని తపనతో తడిమిన తపస్వి, తేజస్వి డా.రావూరి భరద్వాజ గారు. కథ, నవల, నాటకం బాలసాహిత్యం, జీవిత చరిత్ర. ఇలా అనేక ప్రక్రియల్లో వినూత్న ప్రయోగాలు చేసి తెలుగు సాహిత్యాన్ని సునంపన్నం చేసిన కళాప్రపూర్ణ డా.రావూరి భరద్వాజను 2012 సంవత్సరానికి జ్ఞానపీఠ పురస్కారం వరించడం తెలుగు వారికే గర్వకారణం.

భరద్వాజ గారు ఉన్నత పాఠశాల, కళాశాల, విశ్వ విద్యాలయం, వీటి మెట్లు ఏనాడూ చూడని వాడు. చితికి పోయిన కుటుంబ పరిస్థితుల వల్ల, దారిద్ర్యం వల్ల ఏ దశలో కూడా చదువుల అవకాశం దోరకక శ్రామిక జీవితమే దిక్క యింది. జీవితంలోని ఒడిదుడుకులే, రకరకాల అనుభవాలే, సంఘర్షణలే ఆయన సాహిత్య సృజనకు మూలాలయ్యాయి. అకలి, అవసరం, అవమానం నుంచి పాఠాలు నేర్చుకున్నా నని అయనే ఒక సందర్భంలో చెప్పాడు. వ్యక్తిగత జీవితానికి, సాహిత్య జీవితానికి ఎలాంటి అన్యాన్య సంబంధాలు ఏర్పడ తాయో, ఎంతటి విషమంగా వుంటాయో తెలిసి తాను పోట్టుకూడ కోసం రచనలు ఒకప్పుడు చేశానని ఒప్పుకొన్న నిజాయితీ పరుడు భరధ్వాజ.

రావూరి భరద్వాజ తన 86 యేళ్ళ జీవితంలో దాదాపు 7 దశాబ్దాలు రచనలు చేశారు. శతాధిక గ్రంధాల కర్తగా తెలుగు సాహిత్యలోకానికి దగ్గరయ్యారు. కథా రచయితగా, నవలా కారుడుగా, బాలసాహిత్య స్రష్టగా, మాత్రా చరిత్ర కారుడిగా, నాటక రచయితగా, వ్యాసరచయితగా, పత్రికా రచయితగా, రేడియో కార్యక్రమాల ప్రయోక్తగా, స్మృతికావ్య కర్తగా చేపట్టిన మాటల ప్రపంచంలో ఆయన సాహిత్య అంతరంగం ప్రస్పుటంగా కన్పిస్తుంది. భరధ్వాజ 37 కథా సంపుటాలు, 17 నవలలు, 6 నవలికలు, 5 పిల్లల కథా సంపుటాలు ఇవన్నీ నేటి జీవితాన్ని ప్రతిభింబిస్తాయి.

భరధ్వాజ రచనలు వెనకు ప్రేరణలను, ఆయన సాహిత్య జీవితాన్ని ప్రత్యక్షంగానో, పరోక్షంగానో అంతో, ఇంతో ప్రభా వితం చేసిన అలనాటి సాహిత్య మిత్రులుకు ఆలూరి భుజంగ రావు, ఆలపాటి రవీంద్రనాథ్ చౌదరి, ధనికొండ హను మంతరావు, త్రిపురనేని గోపిచంద్ మొదలైన వారు అత్మీయస్నేహాలు.

వేదాలు పుట్టుక క్రీ.పూ. 15000 సంవత్సరాల నుండి క్రీ.పూ. 1500 సంవత్సరాల మధ్యకాలంలో ఉండవచ్చునని పండితులు భిన్నాభిప్రాయాలు వ్యక్తం చేస్తున్నారు. ఈనాడు బహిరంగంగంగా చెప్పుకోవడానికి కొంచెం విద్దూరంగా అన్పించినా, ఆదిమ సమాజం స్త్రీని ఉత్పత్తి సాధనంగానే పరిగణించింది. ఒక నూతన సృష్టి జరగడానికి ఆధారభూత మైన గొప్పశక్తిగి స్త్రీ అని ఆనాటి వారు భావించారు. దానికి ఉదాహరణంగా పంటలు, చెట్టు, అడవులు ఇచ్చే భూమిని భూదేవిగా చిత్రించడం. నదులను కూడా స్త్రీ పరంగానే పిలవడం అంటే సృష్టి కొనసాగింపుకు ఏవి ఆధారభూతాలో అవన్నీ గొప్పవే, అందుచేత వాటన్నింటి పట్ల ఆనాటి పురుషులు గౌరవభావంతో ఉండేవారు.

ఆ తరువాత తరాల గడిచినా స్త్రీ తలరాతలు మారలేదు. భూమి పరిపాలకుల స్వాధీనంలో ఉన్నట్లే స్త్రీ కూడా

ప్రేమించింది.అతని పేరు జమాలుద్దీన్ యాకూబ్ అలాగే బ్రిటిష్ సింహాసనానికి వారసురాలైన ఎలిజిబెత్ రాణి ఒక మామూలు ఫోటోగ్రాఫర్‌ను ప్రేమించింది ఇలాంటి గాధలు లోక విధితం.

మన సాహిత్యాన్ని చూసే ఎవో కోరికల సాఫల్యం కోసం మహారణ్యాలను చేరి గోరమైన తప్పస్సుసచేస్తున్న ఋషుల తప్పస్సును భగ్నంచేసేందకు దేవేంద్రుడు దేవవేశ్యలను పంపించిన సందర్భాలు చాలా కనిపిస్తాయి. రంభ, ఊర్వశి, మేనక, తిలోత్తమ అపురూప సుందరీమణులు స్వర్గ లోకంలో ఉండేవారు. స్వర్గానికి వచ్చిన వారిని సుఖసంతోషాలలో ఓలలాడించడంవారి వృత్తి,అదొక నేరంగాగాని దోషంగా గాని ఆనాటి వారు భావించలేదు.భారత దేశాన్ని పాలించిన అందరి పాలకుల అంత:పురాల్లోనూ రాణులసంఖ్య అధికంగానే ఉండేది సంస్థానాధీశులు సైతం ఇందులోని మంచిచెడులని గురించి చర్చించబొయే ముందు ఇటువంటి వ్యవస్థ ఒకటి చిరకాలంగా ఉన్నసత్యాన్ని మనం గుర్తించుకోవాలి. దేవుని కూడా సేవచేయవలసింది స్త్రీలే అయినపుడు ఆ దేవునిలోను తన లక్షణాలను మానవుడు ప్రవేశ పెట్టాడు.తన అభిరుచులని ఆయన కంటగట్టాడు. తనకు ఆనందం కలిగించేవన్నీ దేవునికి ఆనందంకలిగిస్తాయని భావించాడు, అందుకనే దేవదాసిలంటూ ఒకప్రత్యేక వర్గానికి తయారు చేసి వారికీ మిగతా సమాజానికి మధ్య ఆగడ్తను ఏర్పాటు చేసాడు.

ఆనాటి కాలంలో దేవదాసి వ్యవస్థ ఏ ఉద్దేశంతో ప్రారంభం అయినప్పటికి రానురాను ఆ ఉద్దేశాలన్నీ రూపు మాసిపోయి, వారు వెలయాండ్రగా తయారయ్యారు. ఇలాంటి తయారు కావడానికి వెనుక ఆర్థిక పరిస్థితులే ప్రధాన కారణం, డబ్బు ప్రవేశించిన ప్రతి రంగంలోను చోటు చేసుకోవడం చాలా సహజం, ఈ వృత్తికూడా ఒక వ్యాపారం అయిపోయింది. పెట్టుబడిదారి సమాజానికి లాభాలే ముఖ్యంగానీ లాభార్జన విధానాలు ఎంత మాత్రం ముఖ్యం కావు. చాలామంది తల్లిదండ్రులు భయంకరమైన పేదతనాన్ని భరించలేక తమ కుమార్తెలను మధ్య దళారీలకి అమ్ముకుంటున్నారు. వస్తువులతోవ్యాపారం చేసినట్లుగానే ఈ దళారీలు ఆడపిల్లలను చౌకగా కొని, ఎక్కువఖరీదుకు వేశ్య గృహాలకు అమ్ముకుంటున్నారు, ప్రేమించినవారు మోసం చేయడంవల్ల కొంతమంది,అత్తారింటి ఆరళ్ళను భరించలేక మరికొంతమంది, అద్భుతమైన కలలుగంటూ,ఆ స్వాప్నిక ప్రపంచంలో జీవించాలని పేరాసలకు పోయి దగా బడిన కొంతమంది, విధిలేక ఈ వ్యభిచార గృహాలకు చేరుతుంటారు.

ఈ నేపథ్యంలో భరద్వాజ కథలను ఒకసారి పరిశీలిద్దాం. 1948 చివరి మాసాలలో భరద్వాజ తెనాలి చేరుకున్నారు, అంతకుముందు ఆయన నెల్లూరులో "జమీన్ రైతు", 'దీన బంధు' అనే రెండు వార ప్రతికలలో పనిచేశాడు. దీన బంధులో పనిచేస్తున్నప్పుడే ఆయన మొదటి సారిగా నాగ రత్నం అన్న ఒక వేశ్యను చూశాడు. ఆమె పెంపుడు కూతురు పేరు రోహిణి. అక్కడే ఆయనకు పడుపువృత్తి చేసుకొని బ్రతుకుతున్న కొందరు స్త్రీలతో పరిచయం అయ్యింది. విషయ సేకరణకు గాను వారిని తరుచూ కలుసుకుంటుండే వారు. భరద్వాజ వారిలో విశ్వాసాన్ని కల్గించాడు. తన వ్యక్తిత్వానికి ఎక్కడా భంగం కలగకుండానే వారికి ఆత్మీయులై నారు. ఆ కారణంగా దయనీయమైన తమ గాధలను స్వయంగా చెప్పారు.

భరద్వాజ గారు ఆ స్త్రీల గాధల్లో నుండి తన కథలకు పనికి వచ్చేసన్నివేశాలను ఎన్నుకొని వాస్తవికతను బయట పెట్టారు. నిజానికి ఈ కథలను చదివినప్పుడు మనకళ్ళు చెమర్చాలి, మనగుండెలు బితుకు బితుకుమనాలి. దురదృష్ట వంతులైన ఈ స్త్రీ పట్ల మన మనస్సుల్లో కరుణాతరంగాలు పెల్లుబకాలి. కాని ఈ కథలు ఆయా పనులను ఎంతో కొంత చేశాయి, కాని పూర్తీగ చేయలేక పోయాయి.ఈ సందర్భన్నే ప్రస్తావిస్తూ భరద్వాజ జీవిత సాహిత్యాలను చాలా లోతుగా, విపులంగా అధ్యయనం చేసిన త్రిపురనేని సుబ్బా రావు గారు అందుకు కారణాలు తెలిపారు. ఉండవలసినంత అనుభవం లేకపోవడం, రచయిత వయస్సు ప్రధానకారణం

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Analysis on different types of cancers using Machine Learning Algorithms: A Survey

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Abstract:

A healthy nation is a wealthy nation.Healthcare is important to the society because many people suffer with various diseases. The ageing population, increase in types of disease and costs for medical treatment are a major concern worldwide.Among the many diseases, cancer is a disease which is found in many patients, the diagnosis and treatment is also expensive. These problems give importance to devising smarter methods to diagnose the disease.Big data analytics is a major area in which large volumes of patient records are stored,processed analysed and healthcare solution are provided.Big data Technology has given new path towards the world. With reference to cancer, there are many types of cancerslikeLung,Breast,liver, Skin, bladder, kidney, pancreatic, prostate, ovarian, colon and rectal etc,.Major diagnosis includes diagnosis and based on that diagnosis from multiple patients to decide on a cost effective and efficient treatment methodology.Major challenges in big data analytics include the structure of the data and irregularity and sparse nature of data.This paper presentsApplications of Big Data in health care and literature review has been done to study various Machine Learning Algorithms implemented and the tools used for the classification, identification and treatment ofCancer patients.

Keywords: Big Data, Cancer, Machine Learning Algorithms, Literature Review.

1. INTRODUCTION

What is Big data?

Big data is defined in various forms by different authors.It is basically deriving a concrete solution from large amount of data captured via different sources.One of the popular definitions submitted to the U.S congress in 2012 states big data as large volumes of high velocity,complex and variable data which needs advanced techniques to capture,store,distribute,manage and analyze information.[1].Big data is also defined as a way of finding new insights into some existing data,to analyze and get the unknown facts. The data is captured from various sources,stored,managed,analyzed, visualized and the information is delivered for decision making.More confident and efficient decision making in big data analytics needs high data accuracy

Characteristics of Information

The data differs in size,speed,complexity which mandates devising new algorithms and hardware to process and visualize the data to develop smarter systems.Volume, Variety,

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Velocity,veracity,variability and volume are the six major characteristics of data collected for analysis.Volume,Variety and Velocity are the three characteristics which many researchers have discussed extensively[2][3].

Volume notifies the rich volume of data produced the organization.These numerous amount of data challenges data storage and analysis .These days the amount of data produced occurs in terabytes(10^{12} bytes), Petabytes(10^{15}bytes) or Exabytes(10^{18} bytes).The data is likely to increase to Zettabytes(10^{21}bytes) and Yotta bytes(10^{24} bytes).

Variety denotes the different types of data in healthcare namely organized,unorganized or semi organized data[4].Laboratory data,clinical data,sensor data and data acquired from relational databases are categorized as organized data.Data stored in XML format is categorized as semi organized data [5].Data with no precise design such as manual images,X-rays,other medical images,patient discharge summaries,measured signals,healthcare data from social media and mobile phones are said to be unorganized data.Nearly 90 percent of the data for data analytics is in the form of unorganized data.

Velocity refers to the rate at which the data is generated and to be handled[6].The data generated can either be in batch or realtime.

Benefits of Big data in Healthcare Sector

Store huge volume of Patient Details: The large volumes of patient details are stored in the data base and useful for analysis. The healthcare concerns can provide treatment at reduced costs.

Advanced Patient Care: Patients can be given advanced care with digital medical records collected from medical lab test,clinical data,diagnosis and medical conditions.

Finding solution to cure diseases:A particular brand of medicine may come out to be successful for one patient who may not work for some other.It is not possible to test for all genomes.In such situations the data collected for big data analytics will be of major help.

Improve operational efficiency: Medication errors can be reduced by reducing readmissions and the patients may be saved from spending lot of money for medication purposes.

2. CANCER AND BIG DATA ANALYTICS

There are uncountable types of data that is collected for biosciences.Cancer research is an area that is attaining predominant advantage due to big data analytics. Numerous early deaths in the world occur due to cancer.Since every type of cancer has a unique characteristic diagnosing the cause is difficult and the disease outcome varies from one patient to other.

Due to the analysis of large volumes of data it is possible to find an innovative mechanism to treat cancer,predict the prognosis of the disease etc.Companies have even gone to the extent of introducing genome sequencing.exome sequencing and single cell transcriptome analysis that

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will quickly indicate cancer prone genes in the DNA, mRNA and polypeptide chains respectively.The availability of large amount of data in cancer related databases are serving to produce marker genes that helps in identifying oncogene monitoring and drug discovery.

Interdisciplinary researchers are using artificial intelligence to scan,interact and make decisions from huge amount of data.Some of the active research in data analytics in cancer include machine learning methods to select feature of gene profiles,predicting cancer,designing of new drugs,QSAR study of anticancer drugs etc,. Cancer diagnosis at molecular level is made possible by gene expression profiles and hence it is possible to go for personalized medicine.In this method from a pool of innumerable number of genes a minimum number of gene samples to make an efficient model.In this method set of genes that best discriminate biological samples of different types is used for feature selection[10].

Literature Review

Qiang Su, Yina Wang, Xiaobing Jiang, FuxueChen,Wen-cong Lu, in the paper titled "A cancer Gene Selection Algorithm based on K-S Test and CFS" introduced a selection algorithm based on aggregating *Support Vector Machines (SVM)* on eight random subspaces of gene expression profiles. Support Vector Machine (SVM) and Relevance Vector Machine (RVM) are best ways to **classify breast cancer** dataset because the clinical data set of cancer is very huge. Their method provided a tool for the high dimension and small sample selection that may lead to overfitting and huge computing pressure [10].

In the paper on "Prediction and analysis of Key genes in Glioblastoma based on Bioinformatics" by Hao Long, ChaofengLiang, Luxiong Fang, uses a network of differentially expressed genes to study the occurrence and development of glioma which is the most **malignant brain tumor** in humans [11].

EGFR stands for Epithelial Growth Factor Receptor which is a protein that is present in both normal cells and cancer cells. Research is on for the development of EGFR inhibitors [12].

"An ensemble Correlation based gene selection algorithm for cancer classification with gene expression data" by YongjunPiao, MinghaoPiao, Kiejung Park, Keun Ho Ryu, speaks about an idea of **selecting a subset of genes** to differentiate the cancer genes using *correlation based feature selection algorithm* to select the genes [13].

Bing Niu, Peter B.Harrington, Guozheng, in the paper titled "Analysis and Modelling for Big data in cancer Research" used *Elastic Net Partial Least Square algorithm*.They built a model for herb Radix Astragali extracts on the basis of chemical finger printing profiles.Through this prediction platform bioactivity related chemical components of the herb that is helpful to discover potential novel drugs were identified.[14].

Breast cancer is one of the top cancers that occur in woman.It is the second main leading reason for death of woman in U.S and Asia.If this disease is identified at an early stage then it can be cured.This can be done by big data analytics.A set of authors used *k-nearest neighbor algorithm* to find classification accuracy to implement on Rtool.[15]

One of the challenges in big data analysis is that even if there are a huge amount of data collected from Electronic health records processing of the huge volumes of data to go for a decision is complex.The main difficulty in existing methods is the need for synonyms or ontology dictionaries that is presently available in English only.So a group of authors proposed a *Natural Language Processing (NLP)* based algorithm to process and structure the EHRs.[16]

There are other challenges in big data in cancer in terms of data protection,collection and sharing of health data and data usage [15]. Issues such as privacy, security, standards and governance are to be researched [16].

Big data analytics with the use of sophisticated technologies has the potential to transform the data repositories and make informed decisions. Information such as nanoparticulatecancer-starvation therapy on cancer treatment could also be incorporated in big data to provide an overview and best treatment for cancer especially when nanotechnology is important in drug delivery in cancer treatment.

In breast cancer, the big data driven genomics has generated numerous "cancer signatures" which are being adopted into standard practice [22] such as the OncoTypeDX andMammaprint.The "big data" analytics has also been used recently to **predict** if a patient is suffering from **aggressive triple-negative breast cancer**, slower-moving cancers or non-cancerous lesions with 95 percent accuracy.

Many research organizations rely on genomic data for cancer detection and treatment. In this methodology human genomes are analysed to find the root cause of the occurrence of the malignancy through DNA.But research institutions that adopt this methodology has to deal with huge pairs of genes and when the data is sampled there is a need to process many trillion bytes of data from the big data database.Hence they adapted **data reduction methods** to data analytics. This data reduction method leads to loss of information.The researchers were not able to figure out which particular set of data is not essential for data analytics. Researchers wanted a way to analyse the data sets of many patients simultaneously.A scalable cluster server that uses genomic data to do parallel processing was modeled to analyse the datasets of multiple patients simultaneously.In this model the number of steps needed to process the data was reduced and hence the problem of degradation of data was not very influential. [20]

Prostate cancer is the most widely occurring type of cancer in men around the world.Conservative MRI is a method to define the presence and extent of cancer.For Prostate cancer therapy segmentation of MRI images is done to analyse the accurate location of the

malignancy.Some researchers suggested non invasive detection and staging as invasive detection will be very painful [17].

In prostate cancer research the volume of the prostrate malignancy is calculated and it is provided to the Support vector machine classifier with a set of 30 MRI images.The researchers used the data obtained from patients at different stages of cancer at varying age groups.**Cloud computing** was used to store data in clusters and Map reduce method is used for compression of data.The **MapReduce technique** consists of two stages namely Map and Reduce.Searching,Sorting and filtering of the provided data set is done in the Map stage and the summary of the operations in Map stage is done by the Reduce operation [17].

Lung cancer is a heterogeneous disease, with characteristics that differ between patients and even among regions of the same tumor. One of the main challenges of precision medicine is the integration and analysis of clinical data. Electronic Health Records (EHR) are comprised of clinical notes and medical reports written in free text containing information from each patient that remains stored in the EHR system unused. In one methodology clinical data from 706 patients diagnosed with lung cancer from 2012 to 2017 and treated at the Medical Oncology Department at Puerta de Hierro University Hospital was obtained. A total of 7,146 clinical reports and 171,878 clinical notes were analyzed, post-anonymization. A framework built on top of Apache UIMA, which analyses large volumes of unstructured information and ingests the text provided by the hospital and performs Natural Language Processing tasks to structure the information and allows performing complex queries and retrieve new knowledge is built. A **descriptive analysis** of the population and **Kaplan Meier tests** were performed. Initial subsets of variables were analyzed and survival curves were obtained. Long survivors were considered those patients still alive after two years since diagnosis.Correlation was observed between presence of risk factors, such as dyslipidemia, high blood pressure, smoking habit and COPD, and significant decrease in survival. Survival in females was significantly higher than in males, despite the smoking habit, stage and comorbidities; the age of diagnosis in all stages was predominantly 55-65 years old.

It is concluded that this process is capable of processing large amounts of data (thousands of reports from hundred of patients) and provide a unified knowledge base with all the information from the patients. It is believed that with this information, physicians will be able not only to retrieve complex information about their patients but also create predictive models that will lead to a personalized medicine approach. [21]

"Data Meter –German Research Center" developed a pilot project using data collected from many different cancer centers to develop a model for predictive analysis.They used all different datasets namely genomic profiles,tumor samples,patient treatment histories, imaging details etc.They developed a **model** by name **ConSoRe**which uses diverse data from multiple French Cancer institute and provides a meaning full diagnosis.[20]

The report published by National cancer Institute of USA brings to notice that in India 27 % of Women diagnosed with cancer are suffering from breast cancer and 50% of these patients are not able to survive due to very expensive medical expenses.Biopsy is one of the major diagnosis methods for breast cancer.Researchers have used these data sets such as the biopsy reports and cell behavior and used machine learning approaches such as **Support Vector Machine(SVM)**and **Relevance Vector Machine(RVM)**to have useful impact on pattern classification and useful for diagnosis and prognosis of cancer.Since the data sets will be very large in size a popular pattern extraction technique namely Map reduce is employed to extract patterns for decision making.[19]

3. CONCLUSION

In this paper we have made an understanding of big data analytics,characteristics and the different types of data,need for big data analytics in healthcare. We made an extensive survey of various Machine Learning Algorithms implemented on different types of cancer datasets for diagnosis and treatmentof cancer patients.

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Fuzzy Multiple Queue and Multiple Sever Queuing System

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Abstract: We discuss about the deals for analysis of multiple queue and multiple server queuing system with fuzzy parameter, we obtain some system characteristic such as the average number of customers in the system and the average time a customer spends waiting in the system. Finally numerical results for some performance measures are presented to show the effects of system parameters.

Keywords: FM/FM/S model; membership values; pentagonal fuzzy numbers

I.Introduction

Lines of individuals or customers waiting for their turn to receive service operators is called queues or waiting lines. The human beings or physical entities are the customers waiting to receive service in such place as airport, bank, petrol bunk, railway station, among others. In Nigeria queue is everyday experience, especially in banks and filling stations. As sharma(2013) stated queue is formed when either the number of customers requiring service be greater than the number of facilities or the server do not perform properly well such that it gives more time then necessary to serve a customer. Balking and Reneging are the resulting consequence of customer waiting lines create worries to managers of service providers for the customers. Due to long waiting lines the stress and more serious mistake generates, in addition to cost by both the waiting customers and the facility operators, see Uche and Ugah (2014) in other words customer via Reneging and Balking when a long queue is formed, customers lose their precious time and the serviceproviders also lose valuable

Finally, increase the number of servers by the operator would reduce the waiting time of customers, but increasing the operating cost of the services. Yuncheng and Liang (2002) introduced that the queue problem is a problem about a difference between average waiting of customers and the idle time of particular occasion in a service station. Queuing theory is a best method use in different situations where it is not possible to accurately predict the arrival rate of customers and service rate operation servers. It is find the level of service that would give effective use of time both to the customer and the service operator. Ezeliora et al (2014), he studied queuing system management of Shoprite Plaza, Enugu, using single-line multiple server analysis. They introduced a decrease in the number of servers to minimize the operating cost of the system and idle time of the servers.

Fuzzy queuing model was first introduced by Lie and Lee, further explained this model by many authors namely Negi, Lee and Chen. Chen (2006) described by arrival queuing model with fuzzy parameters and different batch sizes using Zadehs extension principle and he analyzed FM/FM/1 queuing models. LotfiA.Zadeh (1965) introduced new concept namely fuzzy set theory, It has been applied with great success in many various fields. Kao et al (1999) explained the member ship functions of systems characteristic for fuzzy queues. Apurba Panda and Madhumangal Pal (2015)introduced the pentagonal fuzzy number. G.Kannadasan and N.Sathiyamoorthi (2017) defined the FM/FM/1 queue with single working vocation with N-policy, using non-linear programming method. In this paper we study on some performance measure associated with pentagonal fuzzy number using membership function.

II. Crisp model

This M/M/S model is defined by infinite calling population with first come, first served multiple server queue system (D/FCFS). In this type there is multiple identical servers in parallel line that provide the same service to the customers. Customer on arrival joins any queue and remains their until he receives service.

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Data Article

Synthesis, characterization, DNA binding propensity, nuclease efficacy, antioxidant and antimicrobial activities of Cu(II), Co(II) and Ni(II) complexes derived from 4-(trifluoromethoxy)aniline Schiff bases

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ABSTRACT

A series of binary metal complexes $[M(L_1)_2]$ and $[M(L_2)_2]$, (where M = Cu(II), Co(II), Ni(II)) of Schiff bases, **HL_1** = 2-((E)-(4-(trifluoromethoxy)phenylimino)methyl)-4-methylphenol, **HL_2** = 2-((E)-(4-(trifluoromethoxy)phenylimino)methyl)-5-methoxyphenol, were synthesized and characterized by different analytical and spectral techniques. The spectral studies revealed that the complexes possess a square planar arrangement around the metal ions. DNA binding studies were investigated against calf thymus DNA and found that the compounds bound to DNA through an intercalation mode. The role of compounds in oxidative and photolytic cleavage of supercoiled pBR322 DNA was considered and emphasized that the complexes can cleave the DNA efficiently. The antioxidant activity of ligands and their complexes was evaluated by DPPH assay method and observed that the complexes found to be potent free radical scavengers. Finally, the in vitro antimicrobial activities by paper disc methods have shown that the complexes are more biocidally active than the free Schiff base ligands.

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Specifications table

Subject area	Bioinorganic chemistry
Compounds	4-(trifluoromethoxy)benzenamine derivatives
Data category	Synthesis, spectral and biological studies
Data acquisition format	Elemental analysis, NMR, IR, UV–Visible, Mass spectra, ESR, TGA.
Data type	Process, Analysis.
Procedure	Schiff base metal complexes: syntheses, characterization and bio-efficacy studies
Data accessibility	Data is provided in this article.

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1. Rationale

The chemistry of Schiff bases is a significant area of research creating huge interest due to their simple synthesis process, versatility, uncomplicated possible and the diverse range of applications for their metal complexes, e.g., in the treatment of cancer, antioxidant, antibactericidal, antifungicidal, antiviral and for other biological properties [1]. Development of a new chemotherapeutic Schiff bases and their metal complexes is presently attracting the considerable attention of particularly medicinal chemists. Fluorinated Schiff's base compounds have gained a huge interest because of their vast applications in various fields of chemistry [2–5]. A lot of fluorinated moities have been used in the synthesis of pharmacologically active compounds because of their peculiar characters [6–8]. Fluorinated drugs have a huge range of pharmaceutical applications from anesthetics to chemotherapeutics [9]. For example, 2-amino-6-(trifluoromethoxy)benzothiazole (Riluzole) is the drug that has been approved for the treatment of Amyotrophic Lateral Sclerosis (ALS) [10]. Particularly, the OCF_3 group has highest lipophilic nature compared to that of the CH_3, OCH_3, F and even CF_3 groups [11]. Molecules containing such higher lipophilic groups show remarkable enhancement in their *in vivo* uptake and transport in biological systems [12–14]. These eminent features of fluorinated compounds encourage us to focus on and extend their biological applications in different ways.

According to statistics, since past several decades the number of people diagnosed and died from cancer has been considerably enhanced [15,16]. The metal-based anticancer drugs like cisplatin, carboplatin and oxaliplatin have been widely used in clinics [17], but there are drawbacks due to the drug resistance over a period of time and more adverse side effects [18–20]. These challenges created enormous interest among the chemists to develop alternative strategies to get better clinical effectiveness based on different metals for maximum efficient, minimum toxic and target-specific non-covalent DNA binding anticancer drugs [21,22]. In order to overcome these limitations, several attempts are being done to replace cisplatin with suitable alternatives and hence a huge number of transition metal complexes have been examined for their anticancer activity. Among the transition metals, the Cu(II), Co(II) and Ni(II) complexes which can simply bind and cleave DNA under physiological conditions are considered as vital agents [23–25]. Information on DNA interaction parameters of these molecules explores their remarkable potential applications, since their interaction mode could be associated with their capacity to cause DNA degradation. This DNA degradation leads to the inhibition of uncontrolled growth of cancerous cells. Additionally, it has been illustrated that free radicals can damage lipids, proteins and DNA base pairs, leading to enhanced rates of cancer [26]. Fortunately, antioxidants can halt this damage, due to their free radical scavenging activity [27]. Hence, it is necessary to develop compounds with both potential antioxidant and DNA-binding properties for effective cancer therapy. For last few years, from our laboratory, we have been reported synthesis, characterization, antimicrobial, DNA binding and cleavage studies of Cu(II), Ni(II) and Co(II) complexes of various Schiff bases [28–30]. Keeping the above facts in our mind, we here in focused on the synthesis, characterization and various pronounced biological applications along with DNA interaction studies of complexes with 4-trifluoromethoxy aniline Schiff bases.

2. Procedure

2.1. Materials and instrumentation

All required chemicals and solvents were purchased from Finar, Merck, Sigma-Aldrich and Hi media Ltd. The solvents were purified according to the standard procedures [31].

Microanalyses (C, H, N) of all compounds were carried out on Perkin Elmer 240C elemental analyzer. FT-IR spectra were achieved using a Perkin–Elmer infrared model 337 within 4000–250 cm^{-1} range as KBr discs. Electronic spectral data were performed by the aid of Shimadzu UV–Visible spectrophotometer (UV-2600) in the range of 200–800 nm. Metal content of the complexes was estimated by atomic absorption spectroscopy employing GBC Avanta 1.0 AAS. Melting points (m.p) of the all compounds were determined on a Polmon instrument (model no. MP-96). NMR spectra measurements of the Schiff bases were performed at room temperature on Bruker 400 MHz NMR instrument using TMS (tetra methyl silane) as internal standard. The mass spectra recorded on Shimadzu IR Prestige-21 spectrophotometer. Fluorescence studies were investigated on a JASCO spectrofluorometer FP-8500. Magnetic susceptibility moment values for powder samples of all metal complexes were carried out on Gouy balance model 7550 with using $Hg[Co(NCS)_4]$ as the calibrant. TGA of complexes were performed by a Mettler Toledo Star system under dynamic nitrogen atmosphere (20 mL min^{-1}) with a heating rate of 10 °C min^{-1} from ambient temperature up to 1000 °C. ESR spectra of metal complexes were recorded at liquid nitrogen temperature using JES-FA200 ESR spectrometer (JEOL-Japan) applying DPPH as an external standard.

2.3. Synthesis of Schiff bases and their binary metal complexes

2.3.1. Synthesis of Schiff bases HL_1 and HL_2

The Schiff bases were synthesized by mixing the hot methanolic solutions of (25 mL) of 4-(trifluoromethoxy)benzenamine (10 mM) and (25 mL) of 5-methyl salicylaldehyde (10 mM)/4–methoxy salicylaldehyde (10 mM) in 1:1 ratio with stirring and refluxing at 60–70 °C temperature on an oil bath for 2–4 h. The yellow colored precipitates resulted were isolated by filtration and recrystallized from methanol.

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HL_1: ($C_{15}H_{12}F_3NO_3$), Anal. Calc (%): C, 61.02; H, 4.10; N, 4.74. Found: C, 60.82; H, 4.03; N, 4.68. ^{1}H-NMR (400 MHz, $CDCl_3$) (δ): 12.73 (s, 1H); 8.52 (s, 1H); 7.24 (m, 4H); 7.19 (d,d, 1H, J = 8.533 Hz); 7.16 (s, 1H); 6.92 (d, 1H, J = 8.282 Hz); 2.30 (s, 3H) (Fig. S1). ^{13}C NMR (100 MHz, $CDCl_3$): δ = 163.46, 158.93, 147.73, 147.35, 134.49, 132.42, 128.35, 124.33, 122.37, 122.03, 121.78, 119.22, 118.64, 117.1, 20.31 (Fig. S2). MP-165 °C.

HL_2: ($C_{15}H_{12}F_3NO_3$), Anal. Calc (%): C, 57.88; H, 3.89; N, 4.50. Found: C, 57.79; H, 3.80; N, 4.41. ^{1}H-NMR (400 MHz, $CDCl_3$) (δ): 13.46 (s, 1H); 8.52 (s, 1H); 7.31–7.28 (m, 5H); 6.54–6.52 (d, 2H); 3.87 (s, 3H) (Fig. S1). ^{13}C NMR (100 MHz, $CDCl_3$): δ = 164.25, 163.69, 162.33, 147.39, 147.29, 133.74, 122.22, 122, 121.78, 119.23, 116.67, 112.96, 107.35, 101.08, 55.46 (Fig. S2). MP-193 °C.

2.3.2. Synthesis of binary metal complexes

Complexes were synthesized by using metal salts and ligands in 1:2 molar ratio. Hot methanolic solutions of 10 mM of metal acetate [M = Cu(II)/Co(II)/Ni(II)] and Schiff base ligands [**HL_1/HL_2**] (20 mM) were mixed and refluxed for 2–4 h at 70–80 °C. This solution was kept aside at RT for slow evaporation. The red colored precipitate was filtered off, washed thoroughly with methanol and dried in desiccators. An outline of synthetic procedure presented in Scheme 1.

2.4. DNA binding studies

2.4.1. Absorption spectral studies

The binding ability of metal complexes with DNA was investigated by UV–Vis absorption titration method. This study was executed by upholding the metal complexes concentration fixed while increasing the concentration of CT-DNA. The UV absorbance at 260 and 280 nm of CT-DNA in TAE buffer solution consecrated a ratio of 1.8–1.9 denoting the DNA was free from protein [32]. With known molar extinction coefficient value 6600 M^{-} cm^{-1} at 260 nm, the CT-DNA concentration per nucleotide was studied spectrophotometrically [33]. The CT-DNA stock solution was prepared by debasing DNA in Tris–HCl/NaCl buffer (pH = 7.2, 50 mM NaCl and 5 mM Tris–HCl). While measuring the absorption spectra, equal amount of CT-DNA was added to both the composite solution and referral solution to extinguish the absorbance of CT-DNA itself. From the absorption titration data, the intrinsic binding constant (K_b) was calculated from a plot of [DNA]/($\varepsilon_a - \varepsilon_f$) versus [DNA] using the equation:

$$[DNA]/(\varepsilon_a - \varepsilon_f) = [DNA]/(\varepsilon_a - \varepsilon_f) + 1/K_b(\varepsilon_b - \varepsilon_f) \quad (1)$$

where, [DNA] is the concentration of DNA in base pairs, and ε_a, ε_f and ε_b are the apparent absorption coefficients of the compound in the presence of DNA, free and fully DNA-bound forms, respectively [34].

2.4.2. Fluorescence quenching study

The fluorescence competitive binding of the metal complexes with ethidium bromide (EB) against CT-DNA was investigated in TAE buffer (pH 7.4) at 25 °C with fixed concentration of EB-bound-DNA system by changing the compound concentration from 0 to 60 µM. The excitation wavelength was set at 510 nm. The emission intensity of EB-DNA system can be quenched by successive increments of the compound. The fluorescence quenching constant (K_{SV}) was determined from the slopes of the lines from the plot of fluorescence versus complex concentration using the following Stern–Volmer equation.

$$I_o/I = 1 + K_{SV}[Q] \quad (2)$$

where, I_o and I are the fluorescence (emission band) intensities in the presence and absence of the quencher, respectively and [Q] is the quencher concentration.

2.4.3. Viscosity study

The viscosity measurements were determined by an Ostwald capillary viscometer which is immersed in a thermostatic water bath maintained at 30 ± 1 °C. The metal complexes concentration was differed (0–200 µM) and keeping the DNA (200 µM) concentration fixed. For each complex, the flow time was calculated using digital stop watch and recorded the measurements for thrice to obtain a mean flow time. To analyze the impact of DNA binding on the viscosity of the metal complex, here the results were presented as $(\eta/\eta_o)^{1/3}$ versus [complex]/[DNA], where the relative viscosities for DNA in the presence (η) and absence ($\eta°$) of the complex. Values of viscosity were measured out of the experimental flow time of CT-DNA comprising solutions corrected from the flow time of buffer only.

2.5. DNA cleavage study

Nuclease efficacy experiments of prepared compounds were monitored against pBR322 DNA at pH 7.2 in TAE buffer solution by using agarose gel electrophoresis method. The oxidative and photolytic cleavages were performed by treating pBR322 DNA with prepared compounds. The loading dye which is 0.25% bromophenol blue has mixed with the samples and prepared a total volume of 16 µL. Proper mixed DNA samples were incubated at room temperature for 2 h. Finally, the samples were filled in the agarose gel. The electrophoresis was performed by using constant voltage 70 V for 1 h. The nuclease efficacy can be measured by comparing the band patterns obtained from untreated and treated (without and with test compounds) plasmid DNA. The extent of efficiency can be monitored by the conversion of DNA from Form I (circular supercoiled) to Form II (nicked) and Form III (linear form) [35].

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2.6. Antioxidant activity

The radical-scavenging assay of DPPH (1,1-diphenyl-2-picryl hydrazyl) was used to evaluate the antioxidant activity of all compounds. The scavenging capacity of DPPH was determined by using UV–Visible spectrophotometer [36,37]. In the present investigation, **s**tock solutions of the ligands and their complexes were prepared in DMSO. From the stock solutions, various concentrations (20, 40, 60, 80 and 100 mM) of Schiff base ligands and the title complexes were prepared by serial dilutions. 3 mL of each complex solution of variable concentrations were loaded in different test tubes and 1 mL of a 0.3 mM DPPH solution was mixed and incubated in a dark room for 30 min at room temperature. After incubation, the absorbance values of each solution were recorded at 517 nm in UV–Vis spectrophotometer. Ascorbic acid (AA) was employed as the standard or positive control and the percentage of the antioxidant activity of the tested samples expressed as percentage inhibition of DPPH, evaluated according to the below mentioned formula

$$IC_{50}(\%) = (A_o - A_t)/A_o \times 100$$

where, A_o is the absorbance of blank in particular time and A_t is the absorbance of tested sample. Percent inihibition plotted against log concentration and the equation for the line was used to get IC_{50} value. A lower IC_{50} value pointed higher scavenging activity.

2.7. Antimicrobial activity

All prepared compounds were examined for *in vitro* antibacterial activity against Gram-negative (*P. aeruginosa* and *E. coli*) and Gram-positive (*B. subtilis* and *S. aureus*) bacteria as well as antifungal activity against *A. niger* and *C. albicans* using the agar well diffusion method and sabouraud dextrose agar broth. *Ampicillin* and *Ketoconazole* were the standard drugs for antibacterial and antifungal activity, respectively. The plates were incubated at 37 °C for 24–48 h. Finally, the activity was investigated by calculating the diameters of inhibition zone (mm). And the MIC method was also investigated for the same compounds.

3. Data, value and validation

The prepared compounds are good at yields (70–79%), stable to air and moisture for extended periods, and soluble in Chloroform, DMF and DMSO. The compounds are well characterized by elemental analysis, NMR, Mass, IR, UV, ESR and TGA.

3.1. Spectral characterization

The analytical data of metal complexes is in good agreement with calculated values for 1:2 stoichiometric ratios of metal to ligand. This is further supported by the mass spectra. Both the ligands displayed $[M+H]^+$ peaks at m/z 296 and 312, respectively. Their metal complexes give peaks at m/z 653 **[Cu(L$_1$)$_2$]**, 684 **[Cu(L$_2$)$_2$]**, 648 **[Co(L$_1$)$_2$]**, 680 **[Co(L$_2$)$_2$]**, 678 **[Ni(L$_1$)$_2$]** and 679 **[Ni(L$_2$)$_2$]**, shown in Fig. S3.

The FT-IR analysis was carried out using KBr pellets in the range of 4000–250 cm^{-1}, illustrated as Fig. S4. The **HL$_1$** and **HL$_2$** exhibited a characteristic band of phenolic –OH group at 3451, 3467 cm^{-1}, which is not identified in the spectra of complexes, indicating its coordination to central metal ion by deprotonation. This is further confirmed by a strong intense band noticed at 1174–1155 cm^{-1} in the ligands due to phenolic C–O stretching, is changed to higher frequency region 1190–1175 cm^{-1} indicating the ligands coordinated through the phenolic oxygen. Another important band of ligands visible at 1622 cm^{-1} due to the azomethine stretching vibration, shifted to 1600–1612 cm^{-1} representing its coordination also via azomethine nitrogen. Additionally, the formation of complexes was also determined by the appearance of two medium intensity bands in the area 563–500 and 435–423 cm^{-1} which is assigned to υ(M–O) and υ(M–N), respectively [38,39].

The UV–Vis spectra of the ligands displayed two bands at the ranges of 260–280 nm and 320–385 nm, are assigned to π–π^* and n–π^* transitions of aromatic moieties and azomethine group, respectively [40,41]. These are shifted to 262–272 nm and 312–345 nm in complexes supporting the coordination of the ligands to central metal ion (Fig. S5). In addition, the whole complexes show a characteristic broad d-d transition band in the range of 400–600 nm, due to $^2B_{1g}$–^2E_g for Cu(II) complexes [42], $^1A_{1g}$–$^1A_{2g}$ and $^1A_{1g}$–$^1B_{1g}$ for Ni(II) complexes [43] and $^1A_{1g}$–$^1B_{1g}$ transition for Co(II) complexes, respectively [44,45]. The Cu(II) and Co(II) complexes give magnetic moments as 1.72 **[Cu(L$_1$)$_2$]**, 1.8 **[Cu(L$_2$)$_2$]**, 2.11 **[Co(L$_1$)$_2$]** and 2.18 **[Co(L$_2$)$_2$]** respectively, whereas Ni(II) complexes have diamagnetic nature. These results are consistent with a square planar geometry for all the complexes.

ESR spectra of copper complexes were recorded in DMSO at liquid nitrogen temperature, shown in Fig. S6. The parameters $g_{\|}$, $g_{\perp}$ and G values have been calculated. The trend in g values $g_{\|} > g_{\perp} > g_e$ (2.0023) reveals the unpaired electron is present in $d_x{}^2{}_{-y}{}^2$ orbital with $^2B_{1g}$ ground state indicates square planar geometry [46]. The 'G' [$G = (g_{\|} - 2.0023)/(g_{\perp} - 2.0023)$] values are found to be 2.20 as **[Cu(L$_1$)$_2$]** and 2.04 as **[Cu(L$_2$)$_2$]** suggesting considerable exchange coupling interactions between metal centers [47]. As $g_{\|} < 2.3$, these are covalent in nature [48].

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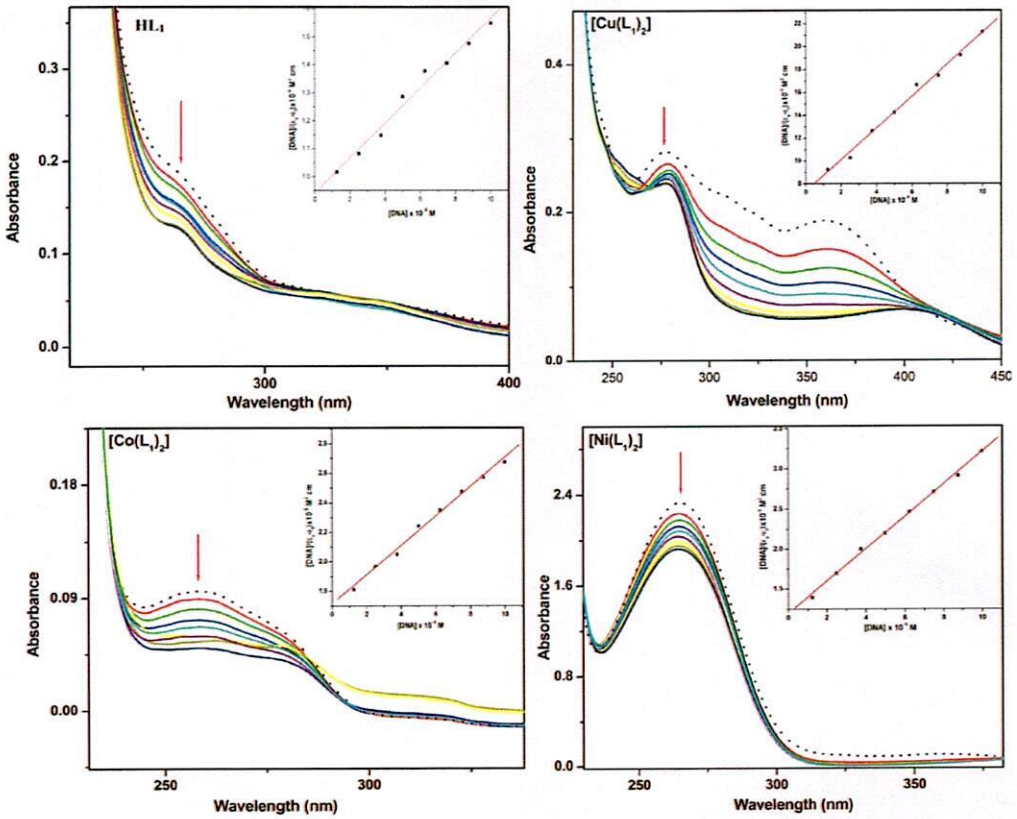

Fig. 1. UV–Vis absorption spectra of $\mathbf{HL_1}$, $\mathbf{HL_2}$ and complexes $[\mathbf{Cu(L_1)_2}]$, $[\mathbf{Cu(L_2)_2}]$, $[\mathbf{Co(L_1)_2}]$, $[\mathbf{Co(L_2)_2}]$, $[\mathbf{Ni(L_1)_2}]$ and $[\mathbf{Ni(L_2)_2}]$ in the absence (dashed line) and presence (solid lines) of increasing concentrations of CT-DNA in TrisHCl/Nacl buffer (pH 7.2). Conditions: [Ligand] or [Complex] = 10 μM, [DNA] = 0–10 μM.

3.2. DNA binding and cleavage study

Electronic absorption spectroscopy is an useful technique for probing drug-DNA interactions [49,50]. The electronic absorption spectra of ligands and their complexes showed intensive absorption bands in the range of 258–296 nm assigned to intra ligand π–π^* transitions. Upon each addition of DNA, the intensity of the π–π^*transition band reduced by 8–25% (hypochromism) with a slight red shift of 2–5 nm, shown in Fig. 1. Using the Eq. (1), the binding constant (K_b) is measured from the slope to intercept ratio. The K_b values are found to be, 6.17 ± 0.02 × $10^4 M^{-1}$ ($\mathbf{HL_1}$), 5.13 ± 0.02 × 10^4 M^{-1} ($\mathbf{HL_2}$), 1.41 ± 0.02 × 10^5 M^{-1} $[\mathbf{Cu(L_1)_2}]$, 1.34 ± 0.02 × 10^5 M^{-1} $[\mathbf{Cu(L_2)_2}]$, 1.19 ± 0.02 × 10^5 M^{-1} $[\mathbf{Co(L_1)_2}]$, 1.13 ± 0.02 × 10^5 M^{-1} $[\mathbf{Co(L_2)_2}]$, 0.97 ± 0.02 × 10^5 M^{-1} $[\mathbf{Ni(L_1)_2}]$ and 0.66 ± 0.02 × 10^5 M^{-1} $[\mathbf{Ni(L_2)_2}]$, respectively. These values proved that the binding strength of the complexes is more potential than their respective ligands, among these, the copper complexes showed stronger binding affinity. However, the binding affinity of complexes is lower than that of potential intercalator like ethidium bromide (EB) ($K_b = 7 \times 10^7$ M^{-1}) [51].

This is further supported by ethidium bromide (EB) displacement method. EB is a sensitive fluorescent probe which showed high emission intensity in presence of DNA because of its strong intercalation between the DNA base pairs. On addition of compound, the fluorescence intensity of EB-DNA adduct was gradually decreased at 590 nm, shown in Fig. 2. Such degradation is due to the displacement of the EB molecule from the intercalating site by the test compounds [52]. The fluorescence quenching expressed in terms of K_{SV} values calculated from the slope of plot I_o/I versus Q. The fluorescence quenching constants of the test compounds are found to be 6.4–3.32 × 10^3 M^{-1}. The order of K_{SV} values is well consisted with the series of electronic absorption titration results.

The viscosity results also gave further evidence of intercalative binding mode of the test compounds. A molecule binds to DNA, in a classical intercalation, can cause an increase in the viscosity of DNA since it increases the separation between base pairs at intercalation site, hence it leads to overall increase in double helix length. A non-classical interacalation binding can reduce the effective length of DNA, thereby quenching the viscosity [53]. In our study, the relative viscosity of DNA was gradually increased upon successive addition of test compounds. The effects of test compounds on the viscosity of DNA at 30 ± 1 °C are shown in Fig. 3.

The oxidative and photo induced cleavage patterns of $\mathbf{HL_1}$, $\mathbf{HL_2}$ and their metal complexes against supercoiled pBR322 DNA are illustrated in Figs. 4 and 5. In oxidative method, no DNA cleavage was identified in lane 1 (DNA control), lane 2 (DNA + H_2O_2) and lane 3 ($\mathbf{HL_1}$) whereas the lane 4 $[\mathbf{Cu(L_1)_2}]$, lane 5 $[\mathbf{Co(L_1)_2}]$ and lane 6 $[\mathbf{Ni(L_1)_2}]$ exhibited Form-II level of DNA cleavage. In photolytic method, similar to above, the lane 1(DNA control) and lane 2 ($\mathbf{HL_1}$) didn't show

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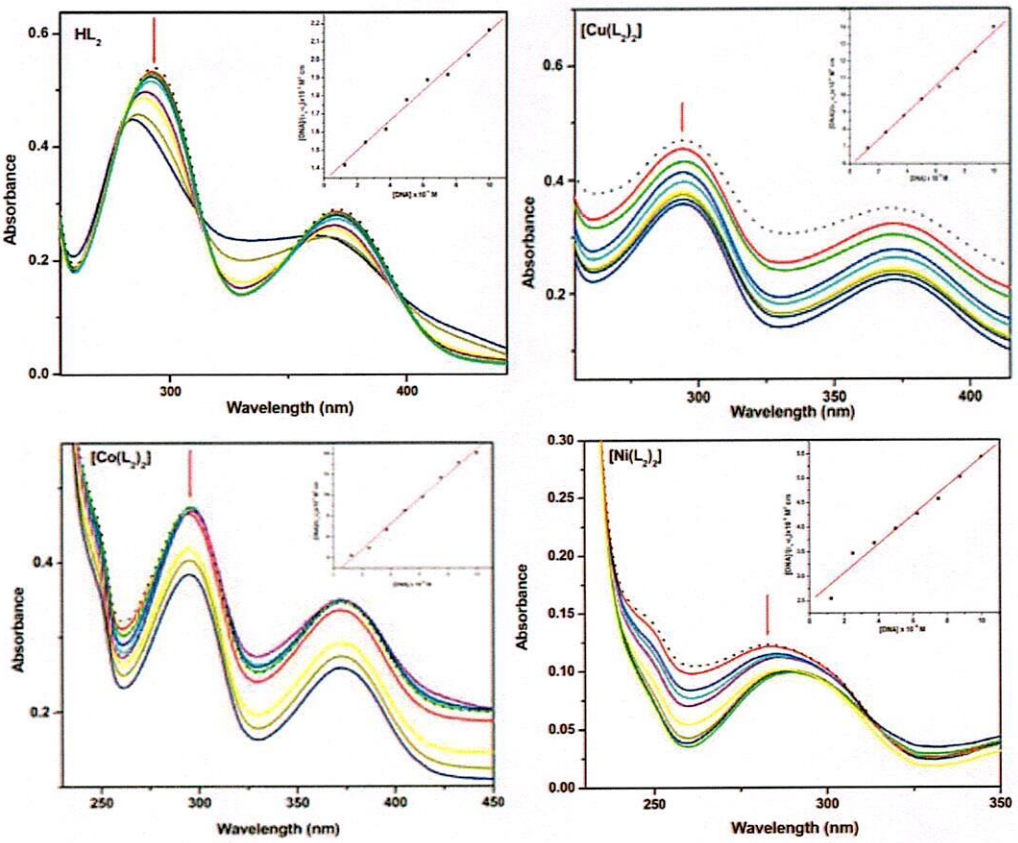

Fig. 1. Continued

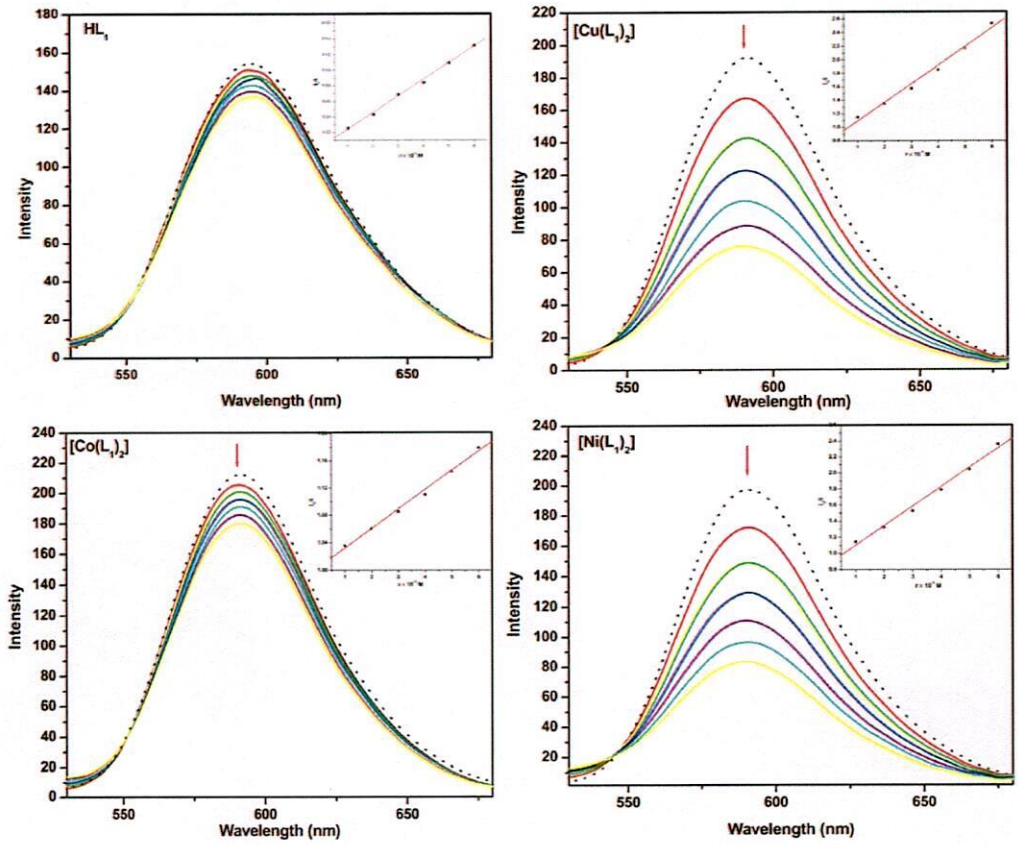

Fig. 2. Emission spectra of EB bound DNA in the absence and presence of increasing concentration of compounds, **HL_1**, **HL_2**, **$[Cu(L_1)_2]$**, **$[Co(L_1)_2]$**, **$[Ni(L_1)_2]$**, **$[Cu(L_2)_2]$**, **$[Co(L_2)_2]$** and **$[Ni(L_2)_2]$** in Tris HCl buffer (pH 7.2) at 25 °C. Conditions: [Compound] = 0–60 μM, [DNA] = 125 μM, [EB] = 12.5 μM.

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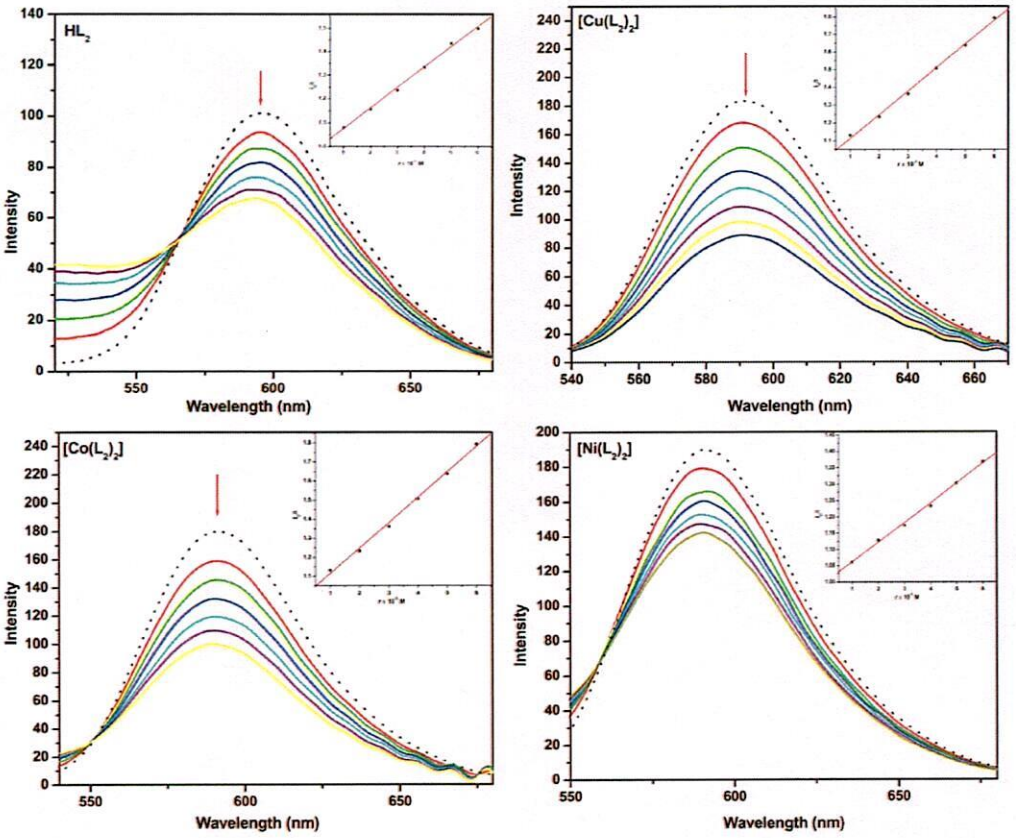

Fig. 2. Continued

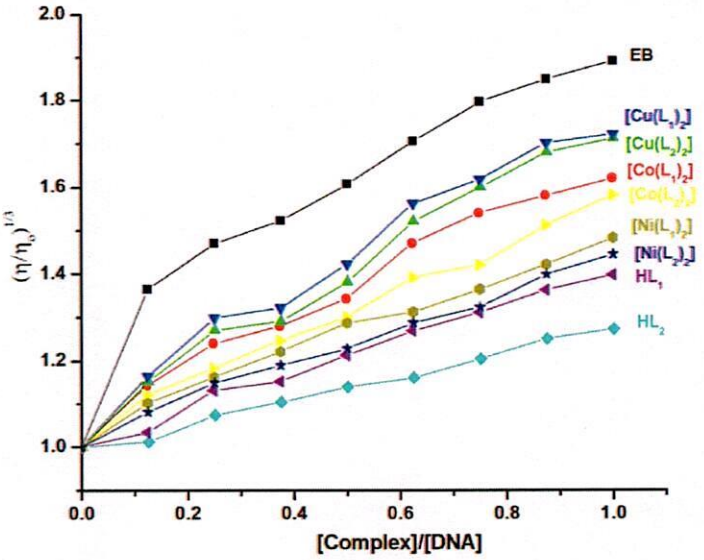

Fig. 3. Effect of increasing amounts of EB, ligands and their complexes on the relative viscosity of CT-DNA at 30 ± 0.1 °C.

any cleavage whereas the lanes 3–5 (complexes) show potential cleavage of DNA. All the complexes exhibited prominent potential cleavage than parent ligands.

3.3. Antioxidant activity

The antioxidant potency of the synthesized compounds was estimated by the reduction of absorbance of DPPH at 517 nm (blank) and expressed in terms of IC_{50} values which were measured by plotting the concentration (μM) on the x-axis and percentage scavenging activity on the y-axis, shown in Fig. 6. Compared to reference compound (Ascorbic acid), the complexes displayed moderate activity. Statistically, the scavenging effect of the compounds with DPPH radical follows the

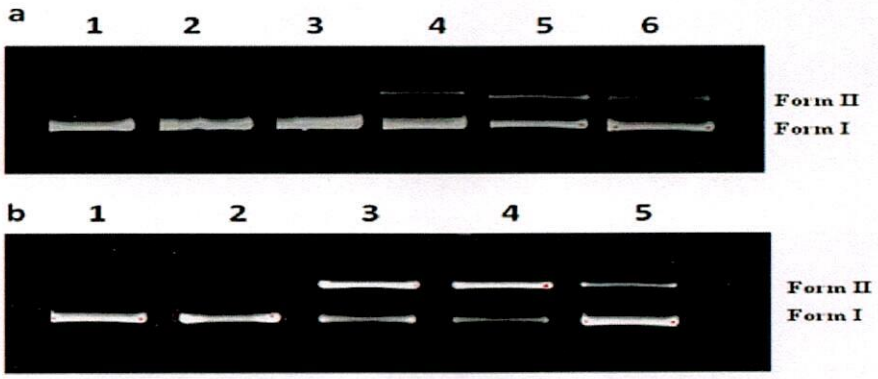

Fig. 4. **(a)** Oxidative cleavage of supercoiled pBR322 DNA (0.2 μg, 33.3 μM) at 37 °C in 5 mM Tris HCl/5 mM NaCl buffer. Lane 1, DNA control; Lane 2, DNA +H_2O_2 (1 mM); Lane 3, DNA + H_2O_2 (1 mM) + **HL_1**; Lane 4, DNA + H_2O_2 (1 mM) + **$[Cu(L_1)_2]$** (20 μM); Lane 5, DNA + H_2O_2 (1 mM) + **$[Co(L_1)_2]$** (20 μM); Lane 6, DNA + H_2O_2 (1 mM) + **$[Ni(L_1)_2]$** (20 μM). **(b)** Photoactivated cleavage of supercoiled pBR322 DNA (0.2 μg, 33.3 μM) at 37 °C in 5 mM Tris HCl/5 mM NaCl buffer. Lane 1, DNA control; Lane 2, DNA + **HL_1** (20 μM); Lane 3, DNA + **$[Cu(L_1)_2]$** (20 μM); Lane 4, DNA + **$[Co(L_1)_2]$** (20 μM); Lane 5, DNA + **$[Ni(L_1)_2]$** (20 μM).

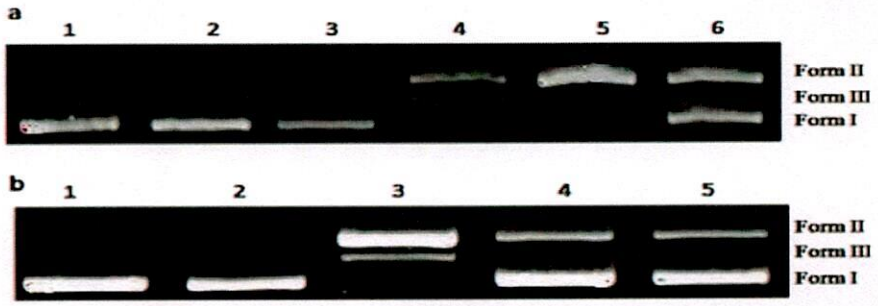

Fig. 5. **(a)** Oxidative cleavage of supercoiled pBR322 DNA (0.2 μg, 33.3 μM) at 37 °C in 5 mM Tris HCl/5 mM NaCl buffer. Lane 1, DNA control; Lane 2, DNA + H_2O_2 (1 mM); Lane 3, DNA + H_2O_2 (1 mM) + **HL_2**; Lane 4, DNA + H_2O_2 (1 mM) + **$[Cu(L_2)_2]$** (20 μM); Lane 5, DNA + H_2O_2 (1 mM) + **$[Co(L_2)_2]$** (20 μM); Lane 6, DNA + H_2O_2 (1 mM) + **$[Ni(L_2)_2]$** (20 μM). **(b)** Photoactivated cleavage of supercoiled pBR322 DNA (0.2 μg, 33.3 μM) at 37 °C in 5 mM Tris HCl/5 mM NaCl buffer. Lane 1, DNA control; Lane 2, DNA + **HL_2** (20 μM); Lane 3, DNA + **$[Cu(L_2)_2]$** (20 μM); Lane 4, DNA + **$[Co(L_2)_2]$** (20 μM); Lane 5, DNA + **$[Ni(L_2)_2]$** (20 μM).

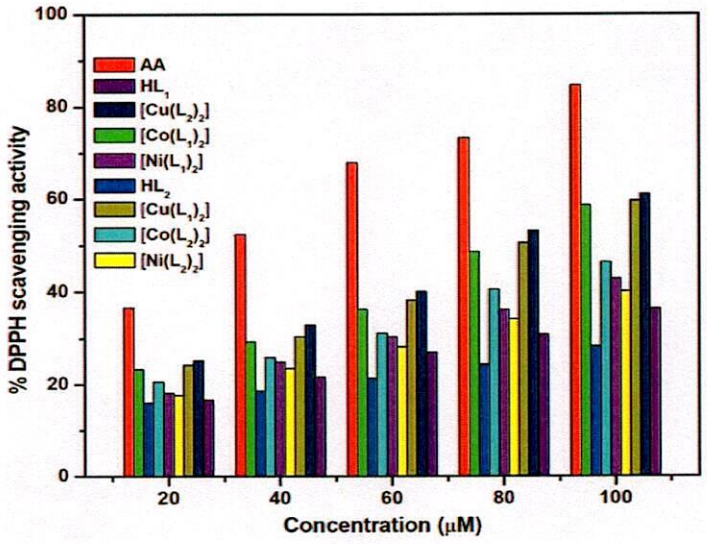

Fig. 6. DPPH radical scavenging activity of the ligands and their metal complexes at different concentrations (20, 40, 60, 80 and 100 μM).

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order, **$[Cu(L_1)_2]$** > **$[Cu(L_2)_2]$** > **$[Co(L_1)_2]$** > **$[Co(L_2)_2]$** > **$[Ni(L_1)_2]$** > **$[Ni(L_2)_2]$** > **HL_1** > **HL_2**. These results clear that the Cu(II) complexes have somewhat higher activity than the complexes remaining. Such a little difference in the activity of metal complexes may be due to the coordination environment and the redox properties. In general, the redox properties of the complex depend on various factors such as chelate ring size, axial ligation, degree of unsaturation in the chelate ring [54,55].

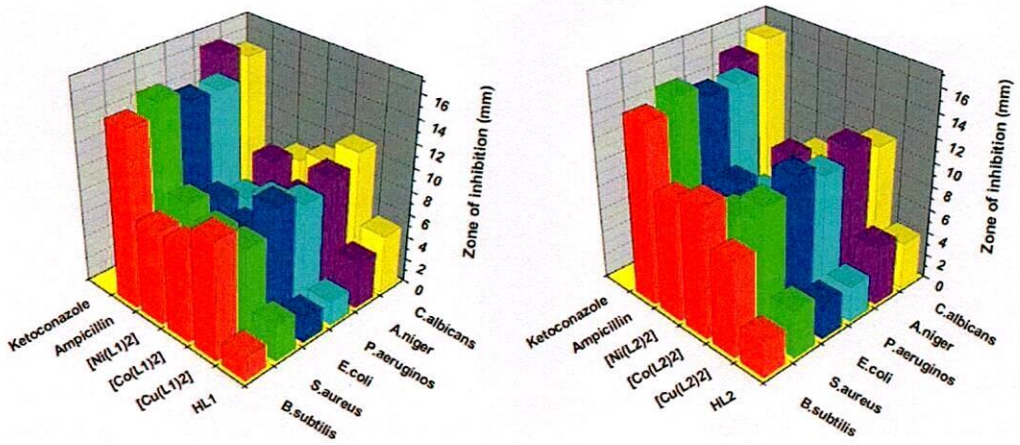

Fig. 7. The 3-D bar diagrams of the antibacterial and antifungal activities of ligands and their metal complexes.

Table 1
Antimicrobial activity data of ligands and their metal complexes at 500 μg/mL.

Compound	Bacteria (mm)				Fungi (mm)	
	Gram-positive		Gram-negative			
	B. subtilis	*S. aureus*	*E. coli*	*P. aeruginosa*	*A. niger*	*C. albicans*
HL_1	2	3	2	2	4	5
$[Cu(L_1)_2]$	10	8	10	9	10	11
$[Co(L_1)_2]$	8	8	7	8	7	9
$[Ni(L_1)_2]$	8	9	8	7	9	8
Ampicillin	15	16	15	15	–	–
Ketoconazole	–	–	–	–	16	15
HL_2	3	4	3	3	5	4
$[Cu(L_2)_2]$	8	11	12	11	12	11
$[Co(L_2)_2]$	11	9	7	9	7	7
$[Ni(L_2)_2]$	10	8	9	7	9	8
Ampicillin	15	16	15	15	–	–
Ketoconazole	–	–	–	–	15	16

Table 2
MIC (μg/mL) of ligands and their complexes against the growth of microbial species.

Compound	Bacteria				Fungi	
	B. subtilis	*S. aureus*	*E. coli*	*P. aeruginosa*	*A. niger*	*C. albicans*
HL_1	>100	>100	>100	>100	>100	>100
$[Cu(L_1)_2]$	25	50	25	25	25	25
$[Co(L_1)_2]$	50	50	25	25	25	50
$[Ni(L_1)_2]$	50	50	25	50	25	50
HL_2	>100	>100	>100	>100	>100	>100
$[Cu(L_2)_2]$	25	50	25	25	25	25
$[Co(L_2)_2]$	50	50	25	50	25	25
$[Ni(L_2)_2]$	75	50	25	50	25	50
Ampicillin	12.5	12.5	12.5	12.5	–	–
Ketoconazole	–	–	–	–	12.5	12.5

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3.4. Antimicrobial activity

The inhibition zone (Fig. 7) and MIC values of the ligands and their complexes against the growth of microbial species are presented in Tables 1 and 2, respectively. Both the free ligands exhibited very less activity, and their metal complexes showed moderate to good activity compared to the standard drugs used. In general, upon the coordination, the inactive or less active compounds become more active, this can be explained on the basis of Overtone's concept and Chelation theory [56]. The remarkable antimicrobial activity of the metal complexes can be attributed to the fact that the lipid membrane that surrounds the cell favors the passage of only the lipid-soluble materials which makes liposolubility as a main factor that controls the antibacterial activity. On chelation, the polarity of metal ion will be decreased to a higher extent because of the overlap of the ligand group orbital and partial sharing of the positive charge of the metal ion with donor groups. Furthermore, the chelation enhanced the delocalization of electrons over the entire chelate ring and also increases the lipophilicity

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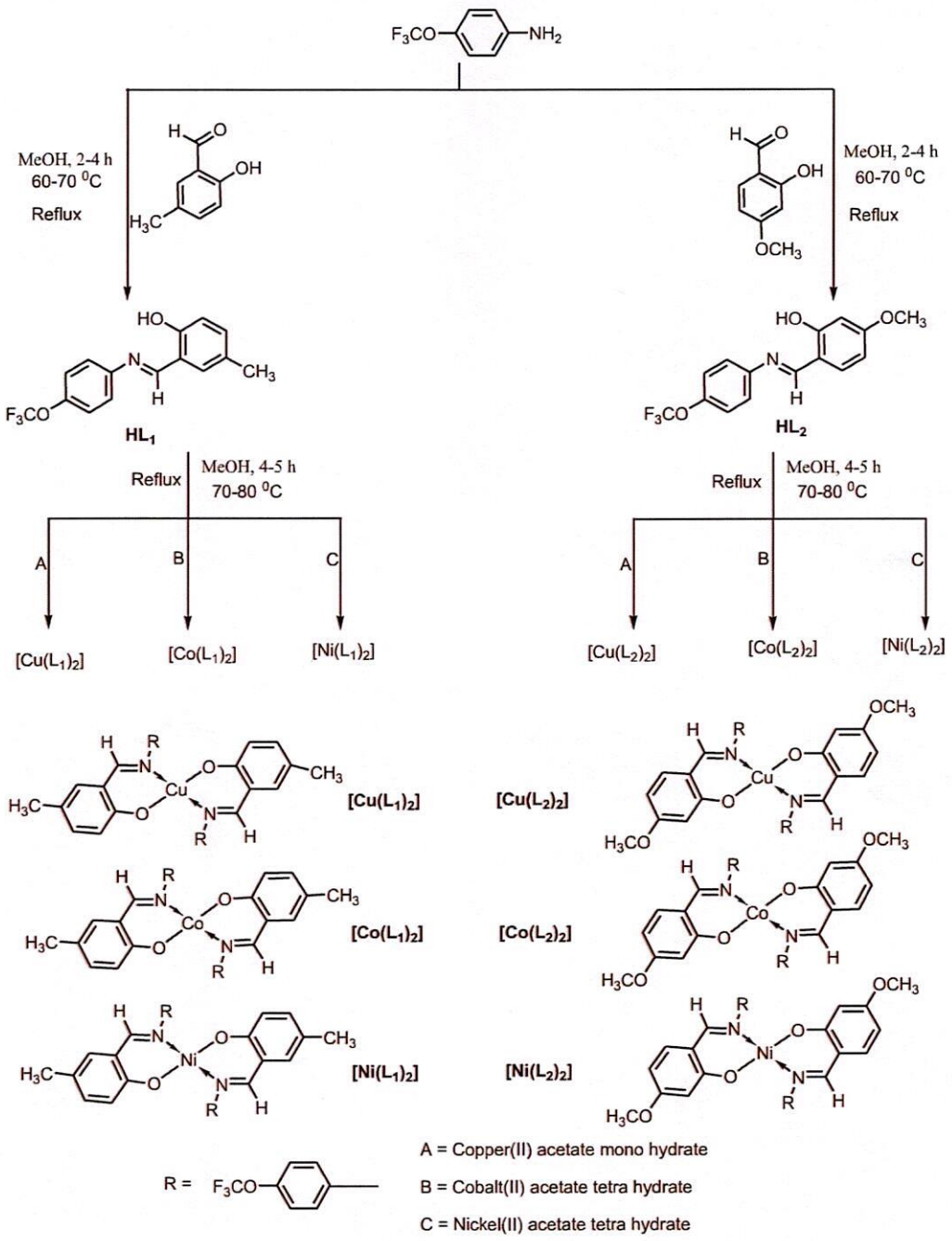

Scheme 1. Synthesis of Schiff base ligands and their complexes.

of the metal complexes [57]. Besides this, there are so many other factors for remarkable antimicrobial activities of the compounds, among those the effect of substituent(s) is one itself [58]. Between the both series, the series of HL_1 having somewhat good activity may be due to the substituent methyl group plays a key role in increasing the lipophilic nature of metal complex.

These results clear that none of the compound is potent against the tested microbials compared to the standard antibiotics like *Ampicillin* and *Ketoconazole*.

4. Conclusion

Two Schiff base ligands and corresponding mononuclear binary Cu(II), Co(II) and Ni(II) complexes have been synthesized and well characterized. Spectral data confirmed that the geometry is square planar for all metal complexes. The DNA binding titrations concluded that the synthesized complexes bind the DNA in intercalation manner. Gel electrophoresis experiments inferred that the complexes cleaved supercoiled pBR322 DNA potentially compared to their parent ligands. The antioxidant efficacy was also investigated by DPPH free radical scavenging method and show significant free radical scavenging activity

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compared to ligands. The complexes are examined for antimicrobial activity and revealed that complexes show higher potency than free ligands. These results will encourage us to design the effective drugs with maximum curative potential by some modifications.

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Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:10.1016/j.cdc.2019.100213.

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జె. యం జె మహిళా కళాశాల [స్వయం ప్రతిపత్తి] తెనాలి.

ఎరీ జోన్స్

ఈమె వేల్స్ దేశానికీ అమ్మాయీ 16 డిసెంబర్ 1784 లో జన్మించింది. తండ్రి జాకబ్ జోన్స్,తల్లి మెన్ని వీరిద్దరూ ప్రార్థనా రులు . ప్రతి రోజు ఆదివారం తల్లి తండ్రిలతో చర్చికి వేళ్ళది. చర్చిలో ఫాదర్ హాఫ్ చెప్పే నోవాహు ఇస్సాకు గోలయ్తు వీదు గారి కథలను సరదాగా అలకించేది నా దగ్గర బిబ్లె లేదు ఉంటే చదువుకునే దాన్ని దాన్ని ఎలాగైనా ంపాదించాలి అని అనుకుంది. మేరీ జోన్స్ చదువు కోలేదు ఎందుకంటే వాళ్ళ ఊర్లలో స్కూల్ లేదు ఎప్పుడైతే ఈ మ్మాయీ బిబ్లె గురించి ఆరాటపడుతుందో అప్పుడు వాళ్ళ నాన్న మన వుర్లోకో స్కూల్ వస్తుంది అని చెప్పాడు . ఆ ధంగా స్కూల్ రావటం ఆమె స్కూల్లో జాయిన్ అవటం చదవటం రాయటం నేర్చుకుంది .బిబ్లె సంపాదించాలంటే కువ ఖర్చుతో కూడుకున్నది కాదు డబ్బు ఎక్కువ కర్చు చేయాలి. డబ్బు కోసం గుడ్లు , తేనె అమ్మేది చిన్న పిల్లలకి హాయం చేసేది బట్టల కుట్టేది ఇలా 6 నెలలు సంపాదించిన డబ్బుతో బిబ్లె కోనోక్కోవాలని అసపడింది సంపాదించిన ంపాదనతో ఫాదర్ను కలిసి బిబ్లె కోనోక్కోవాలని చెప్పినది అందుకు ఫాదర్ రెవ ఛార్లెస్ దగ్గర బిబ్లె ఉంటాయని ెప్పాడు . బాలా అనే ఊర్లో ఆ ఫాదర్ ఉంటాడు అక్కడికి 25 మయుళ్ళు నడుచుకుంటూ వెళ్ళాలి కొండలు ,గుట్టలు, ట్టలతో ఆ ప్రదేశము భయం కలిగించేల ఉంటింది. అయన వదలకుండా 25 మయుళ్ళు నడుచుకుంటూ వెళ్ళింది రాత్రికి ఎద్వార్డ్ గారి ఇంట్లో ఉన్నది మరసతి రోజు ఫాదర్ రెవ ఛార్లెస్ను కలిసి బిబ్లె కోనోక్కడానికి వచ్చాను నాకు వ్వమని బ్రతిమలాడింది. అది రేటు ఎక్కువ ఇవ్వడానికి ఒక్కటే ఉన్నది నీ దగ్గర అంట ధనమున్నదా ంవత్సరానికి ఒక్కసారే బిబ్లె అమ్మేది . నా దగ్గర ఒక్కటే బిబ్లె ఉన్నది. అది వేల్సు భాషలో ఉన్నది అని ఫాదర్ ెప్పారు దానితో ఆమె పెద్దగ ఏడ్చినది ఆమె భాదను అర్థం చేసుకున్న ఫాదర్ ఉన్న ఒక్క బిబ్లేను ఆమెకు ఇవ్వటానికి ప్పుకున్నాడు దానితో ఆమె తన ఊరుకు తిరిగి వాచినది తన దగ్గర ఉన్న బిబ్లె ఉ అందరకి చూపించింది చా ర్లెస్స్ రుజోన్స్ కష్టాన్ని గుర్తించి రెలిజేయిన్ ట్రాక్ సొసైటీ ని స్తాపించారు . ప్రపంచమంతా బిబ్లె పర్చురించాలని నిర్ణయం సుకున్నారు . ఈ విధముగా మేరీ జోన్స్ సోసిఎతి స్తాపనకు కారణమయీంది.

ుస్స్న వెస్లీ

669 జనువరి 20 శామ్యూల్ వెస్లీ మేరీ వీటిక కు 25 వ కుమార్తెగా జన్మించారు 1688 ఈమె శామ్యూల్ వేస్లితో వివాహం రిగింది. వీరికి 19మంది పిలలు వారిలో 4 గురు కవలలు ,9 మంది చనిపోయారు 10 మంది పిల్లలను పెంచారు ఈమె వేవుని మీద ఆధారపడేది 10 మంది పిల్లలను పెంచడానికి భార్య భర్తల మద్య ఎప్పుడు గొడవలు జరుగుతూ ఉండేవి

భర్త దెంగటనం సేయ్యకుని తస్నాతు త్రోవలో పయనించారు బారత దేశంలోనుక తురకు రాస్ట్ర మిస్ ఇండి పిల్లలమ పెట్టికుని వారికీ లోటు రాకుండా చక్కగా చేసేది ప్రతి రోజు ఒక పిల్లవాడితో ఒక గంట సేపు ప్రార్థన తనకు ఉన్న చిన్న ఇంట్లో ఒక మూల చిన్న స్కూలు , కుర్చీ పెట్టుకుని ప్రార్థించేది ఆమె ప్రార్థన చేయడంతో పిల్లలు ఎవ్వరు మాట్లాడేవారు కారు ఆమె ఇంటికి రెండు సార్లు అగ్ని ప్రమాదం జరిగింది రెండు సార్లు కాపాడుకుంది . సోహస్ వేస్లిని అగ్నిప్రమాదం కాపాడింది. ఆమె కు చర్చులో ఫారు చేస్తారుకాబట్టి పిల్లలను కూర్చోపెట్టుకుని పాటలు పాడి వాక్యం చదివి వారికి వినిపించేది ఈమె చేసే పిల్లల ప్రక్కలవారు ఈమె ఇంటికి వచ్చేవారు దానితో 200 మంది సభ్యులు అయ్యారు ఈమె కన్న బిడ్డలు సువర్తికులయ్యారు వారిలో ఒకరు బాస్ వెస్లీ. చార్లీ వెస్లీ. బాస్ వెస్లీ తన మాటలలో బిబ్లే కాలాలలో కన్న నేర్చుకున్న విషయాలే ఎక్కువ అని చెప్పేవారు సుసన్న తన పిల్లలను జాగర్తగా పెంచడానికి అనేక పాటించింది . అవి ఉదయన్నే ప్రార్థన చేసుకోవాలి ఇతర వారి వస్తువులను దొంగిలించకూడదు . ఆడ చదువుతో పటు ఇంటి పనులు నేర్చుకోవాలి. క్రమము తప్పకుండా మందులు వడలి తప్పి దొంగతనం సరిదిద్దుకుని మరల రెండవ సరి చేయకుండా ఉండాలి అని పిల్లలతో చెప్పేది పిల్లలకు ధైవ భక్తి పట్ల భారాన్ని కూడా మోసే విధానం నేర్పించేది . ఈ విధంగా ప్రార్థనతో పటు ప్రపంచప్రభోదకి గొప్ప బిడ్డలను రీలను తాయారు చేసి దైవ సేవకు పంపింది.

మేరీ సేస్నర్

ఈమె 1848 డిసెంబర్ 2 ష్కాట్ ల్యాండ్ దేశంలో గిల్కంస్టాండ్ దేశంలో జన్మించింది. ఈమె తండ్రి రాబర్ కుట్టేవాడు వేరి తండ్రికి ఉన్న 7 సంతానంలో ఈమె 2 సంతానం . తల్లి ధైవభక్తి పరురాలు అనేకమంది పిల్ల కథలును చెప్పి వారిని దేవునివైపుకు మల్లించేది వేరి అన్నయ్య సేవకు వెళ్ళ అయన చనిపోయాడు తండ్రి తగి ఇంటికి వచ్చి తల్లిని కొట్టేవాడు రాత్రంతా వేరి సి బయట నిలబెట్టేవాడు సొంతముగా సండే స్కూల్ నడిపేది సండ స్కూల్ టీచర్ ఐయ్యింది 1874 స ఆఫ్రికా దేశములో ఉన్న మిషనరీ లివింగ్ స్టోన్ మరణించాడు వేరి సంఘం యొక్క ప్రోత్సాహంతో 1871 ఆగష్టు 6 కాలేబాల్ వెళ్ళింది అప్పటి సంవత్సరాలు ప్రార్థన పట్టుదలతో ధైర్యస్థైర్యలతో ఆ ప్రాంతానికి వెళ్ళింది ఆమె వేళ్లే నాటికీ అకడ ఉన్న సభయులు136 మంది మాత్రమే అక్కడ ఉన్నవారికి ముద్దచారాలు ఎక్కువ వారిలో ఎవరికైనా కవలలు పుడితే చేత తండ్రి బాధింప బడేవాడు అని ఆ పిల్లలును చంపి పులులుకు ఆహారముగా వేసేవారు వర్రి నాయకుడు బానిస స్త్రీలను ,పురుషలను 8 మందిని చంపేవారు ఇలాంటి ముధచారాలతో అక్కడ ఉన్న జనం ఉండే వా ప్రసవించే సమయం నాటికీ వారి దగ్గరకి వెళ్లి కవలలను కాపాడింది 1888ఒకేయన్ చేరింది అక్కడ చేత ఎక్కువగా ఉండేవి ఆ ప్రదేశానికి వెళ్లటానికి పురుషులు కూడా భయపడేవారు వారు మనుష్యులను చంపి తీ బానిస భార్యలను హింసించేవారు వారికీ పిల్లలును ఎల్లా పెంచాలో నేర్పించేది వారు ప్రేమగా మేరీ ని మ పిలేచేవారు . వారికీ వస్తరు ఎలా కట్టుకోవాల్లో నేర్పించేది అమ్మ వేల్లుతున్నప్పుడు పులులు గుమికుడే సమయములో డేనియల్ దేవా నన్ను రక్షింపుము అని ప్రార్థించేది . ఈ విధముగా పరిచర్య చేసి జనాన్ని సాంఘిక దుర్చారాలను మనిప దేవుని వైపు తిప్పిన స్త్రీ మూర్తిగా తెలుసుకోవచ్చు.

ఆధార గ్రంధాలు;

అంతర్జాలం

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5. Determination of Flecainide acetate and its degradation impurities by UPLC-MS

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Abstract

A sensitive UPLC-MS method was developed for the determination of Flecainide acetate in the presence of four its related impurities (Impurities: A,B,D and E). The forced degradation study of Flecainide acetate was carried out under acidic, alkali, neutral and oxidative conditions. The degradation was observed under acidic, neutral and oxidative conditions and four degradation products (impurities) were observed. Successful chromatographic separation of Flecainide acetate and its degradation products were achieved on a Waters Acquity BEH C18 column (100 mm x 2.1 mm x 1.7µ) using a mobile phase of solvent A (10 mM Ammonium formate) and solvent B (acetonitrile) in gradient elution. The gradient program employed to achieve the separation was (T_{min}/%Solvent B): 0/15, 1/15, 3/90, 5/90, 7/15, 9/15. The flow rate was maintained at 0.3 mL/min. The impurities were characterized and the fragmentation pathways for the impurities were proposed.

Keywords: Flecainide acetate; Forced degradation; UPLC; ICH, LC-MS method.

Introduction

Flecainide acetate, N-(2-piperidinyl-methyl)-2,5-bis(2,2,2-trifluoroethoxy) benzamide monoacetate, is an anti-arrhythmic agent that is used to treat ventricular arrhythmias by blocking sodium causing a decreased intra-cardiac conduction velocity (1) and is brand under Tambocor. Forced degradation is a process where the natural degradation rate of a drug or drug product is accelerated by the application of an additional stress (2). Stress testing is designed to estimate degradation pathways and intrinsic stability of the drug molecule. The chemical structures of Flecainide acetate and its studied impurities are presented in Fig. 1.

Some regular chromatographic methods have been available in the literature for the determination of flecainide acetate in its bulk powder, in pharmaceutical formulations or in the presence of its enantiomer, metabolites or other antiarrhythmic drugs. In the last decade, four liquid chromatographic methods (3-6), one capillary zone electrophoretic method (7), one Thin Layer Chromatographic (TLC) method (8) have been reported. Only one spectro-fluorimetric method (9] and one electrochemical method (10) were reported. Also, the stability of flecainide acetate in an extemporaneously compounded oral suspension was studied by High Performance Liquid Chromatographic (HPLC) methods (11-12) and only one stability-indicating TLC-densitometry and HPLC methods (13) were reported. No stability indicating method for the analysis of Flecainide acetate and its impurities under stress degradation conditions using LC-MS has been reported. Therefore, the aim of the present study is designed to develop a LC-MS compatible procedure for the determination of Flecainide acetate in the presence of its related substances. The present contribution of the work was to

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evaluate the opportunities offered by LC-MS for determining the impurities of the cited drug.

Materials and Methods

Chemicals and Reagents : Flecainide Acetate (purity e" 99%) bulk drugs were obtained as gift sample from a renowned manufacturer. 10 mM ammonium formate (Analytical- reagent grade) was purchased from Merck Pvt. Ltd., whereas acetonitrile (HPLC- grade) were purchased from Sigma Aldrich. All other reagents used like hydrochloric acid, hydrogen peroxide, and sodium hydroxide was of analytical grade (Merck Pvt. Ltd.). HPLC grade water (Milli Q water purification system) was used throughout the analysis.

Instrumentation and Chromatographic conditions : The separation was achieved on a UPLC separation module, Waters Acquity BEH C18 column (100 mm x 2.1 mm x 1.7µ) using a mobile phase of solvent A (10 mM Ammonium formate) and solvent B (acetonitrile) in gradient elution. The gradient program employed to achieve the separation was (T_{min}/ %Solvent B): 0/15, 1/15, 3/90, 5/90, 7/15, 9/15. The flow rate was maintained at 0.3 mL/min. The column temperature was maintained at 25 °C and the autosampler at 10 °C. The detection wavelength was 245 nm where the drug and the impurities showed optimum response for quantification and the injection volume was 2 µL. This method was transferred to LC-MS analysis by LC system to Agilent Q-TOF 6540 series, Agilent Technologies.

The capillary voltage applied was 4000 V. The temperature of the gas was set at 325 °C, using nitrogen as nebulizing gas and drying gas. Drying gas flow at 10 L/min, nebulizer pressure 40 psi and fragmentor 130 V. Mass spectra were acquired over an m/z range of 50-1000 and CID gas was high pure nitrogen (99.99 %). Mass Hunter Software was used for monitoring output signal, controlling acquisition and processing of the mass data.

Sample preparation for LC-MS analysis : Stress samples were collected and made up to volume with mobile phase whereas solid samples were directly dissolved and diluted with mobile phase. Sample concentration of 1 mg/mL was used to conduct degradation studies. All the samples were filtered through 0.22 µm membrane filter and injected into LC-MS system.

Forced degradation study : Forced degradation studies were performed as per ICH guidelines. All stress decomposition studies were performed with control solution i.e. prepared and treated similarly to the respective stress conditions without active component. Acidic degradation was performed by refluxing of sample at 1 mg/mL of 1 N HCl at 70 °C for 22 h. Alkaline degradation was performed by refluxing of sample with 1 mg/mL of 0.1 N NaOH at 70 °C for 28 h. The neutral degradation was performed by refluxing of sample with 1 mg/mL of H_2O for 48 h. Oxidative degradation was performed with 1 mg/mL of 10 % H_2O_2 at room temperature for 48 h. All the forced degraded samples were filtered and then injected into LC-MS system.

Results and Discussion

Optimization of the method : Flecainide Acetate is relatively non polar compound and was found to retain on traditional C18 bonded phases. To improve the selectivity and retention and further the peak shape bonded phases of stationary phase was tried. The initial trials were carried out with aqueous buffer solutions of pH 3.0, 4.0, 5.0, 5.5 and 6.0 with organic phase being methanol or acetonitrile. The method was optimized in keeping view of adequate separation of the impurities from the main peak.

Different columns with variable chemistries like Acquity CSH C18, Acquity HSS C18, Acquity HSS Cyano were tried with different combinations of mobile phase containing different proportions of buffer system and organic modifiers. The critical aspect of optimizing the method was based on the resolution obtained among the peaks. After a thorough screening of various buffers, organic modifiers and other chromatographic parameters the final separation was achieved on a Waters Acquity BEH C18

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column (100 mm x 2.1 mm x 1.7 µ) using a mobile phase of solvent A (10 mM Ammonium formate) and solvent B (Acetonitrile) in gradient elution. The final chromatogram of Flecainide acetate standard was shown in **Fig. 2**.

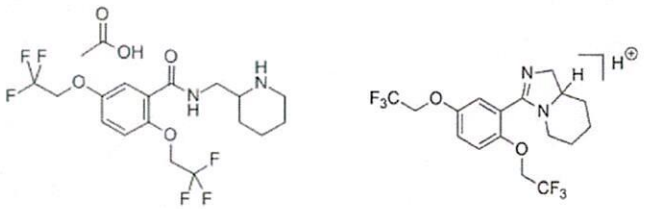
Forced degradation studies : In the present study, Flecainide acetate was subjected to different stress conditions, including acid, alkali and oxidative degradation as stated by International Conference on Harmonization guidelines (ICH, 2003). The drug shows the absence of degradation products under basic conditions **(Figure 3)**. Flecainide acetate was degraded upto 6.09 % and 25.95 % during neutral and peroxide degradation, respectively followed by formation of one major degradation product (Impurity-A) and the respective chromatograms are shown in **Figures 4 & 5**. Another degradation product (Impurity-D) was found under acidic condition and Flecainide acetate was degraded upto 4.55 % (**Figure 6**). The separation of all the impurities (Impurity-A, B, D & E) using the final optimized chromatographic conditions is shown in **Figure 7**, indicates the selectivity of the method.

The identification of impurity products was also very effective for knowing the pathways of impurity of drug substances or drug products. Therefore, the impurity products were subjected to LC-MS study to elucidate structural details. Results were tabulated in **Table 1** and mass spectrums were shown in **Figures 8 & 9**.

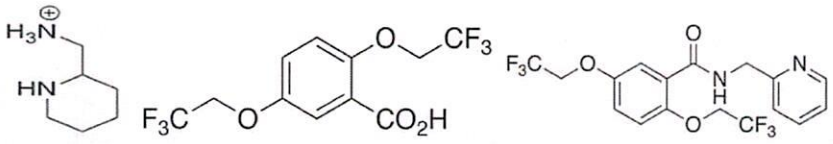
Mass spectrum shows pure drug at m/z

Table 1: Characterization of impurity products by LC-MS

Impurity products	Experimental mass	Best possible molecular formula
Impurity - A	397.13	$C_{17}H_{20}F_6N_2O_2$
Impurity - B	115.12	$C_6H_{15}N_2$
Impurity - D	319.04	$C_{11}H_8F_6O_4$
Impurity - E	409.09	$C_{17}H_{14}F_6N_2O_3$



a) Flecainide acetate b) Impurity **A**



c) Impurity **B** d) Impurity **D** d) Impurity **E**

Fig.1: Structures of Flecainide acetate and its impurities **A, B, D & E**

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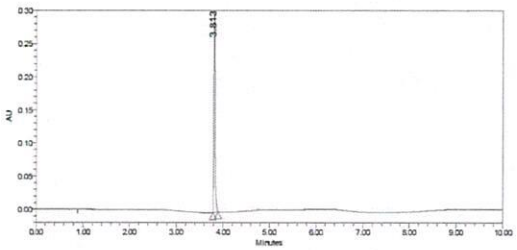

Fig. 2: Chromatogram of Flecainide Acetate standard

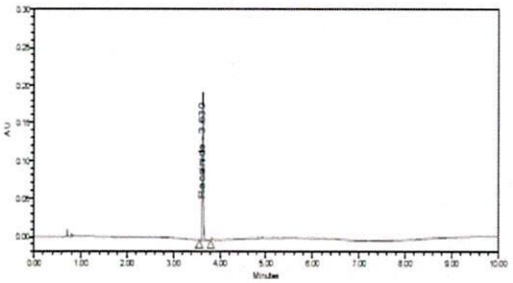

Fig. 3: Chromatogram of Flecainide acetate under base degradation

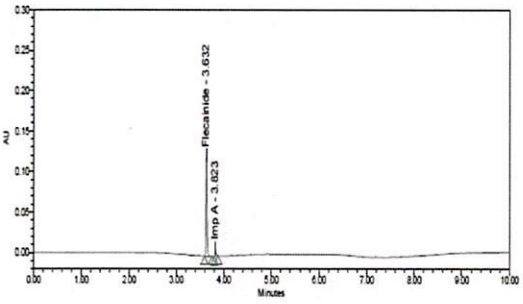

Fig. 4: Chromatogram of Flecainide Acetate under neutral degradation

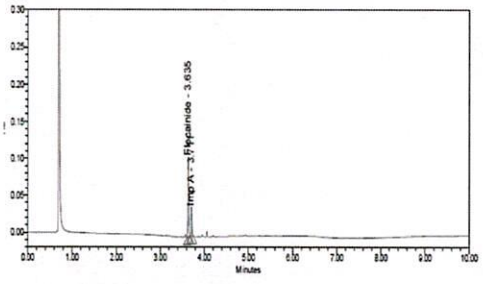

Figure 5: Chromatogram of Flecainide Acetate under peroxide degradation

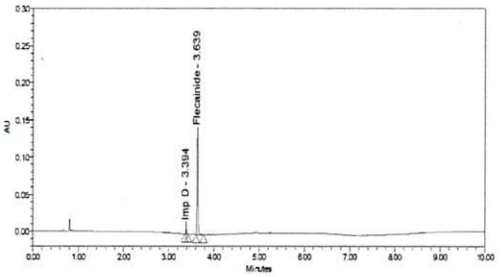

Figure 6: Chromatogram of Flecainide Acetate under acidic degradation

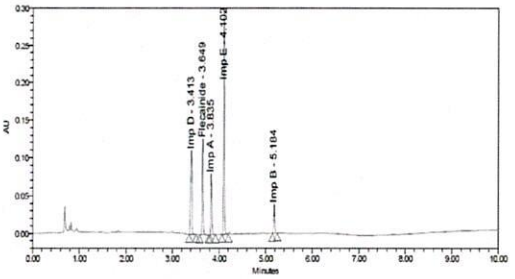

Figure 7: Representative chromatogram showing the selectivity of the method

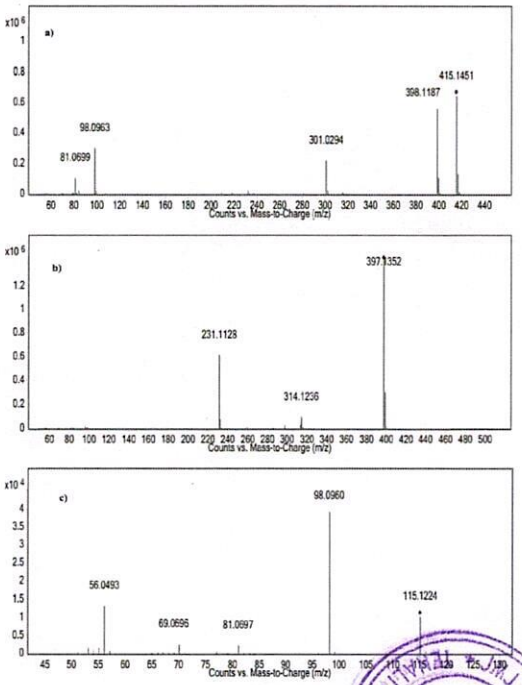

Fig. 8: MS/MS spectra of a) Flecainide acetate; b) Impurity A; c) Impurity B

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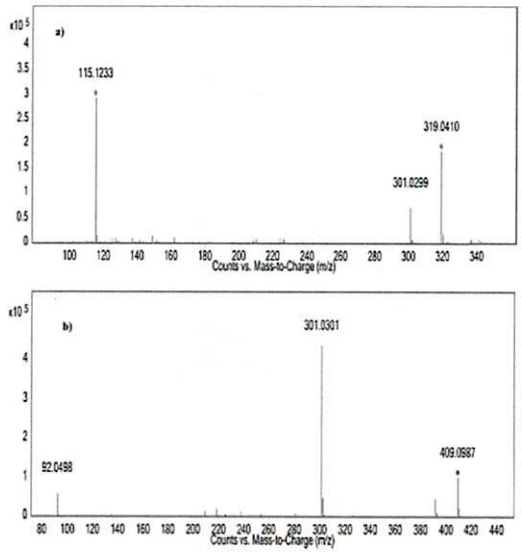

Fig. 9: MS/MS spectra of a) Impurity D; b) Impurity E

415.14, Impurity–A, with m/z 397.13 was obtained in neutral and peroxide degradation, Impurity–D with m/z 319.04 in acidic degradation and Impurity–B & E with m/z 115.12, 409.09 along with A & D in mix and the fragmentation pathways of impurity products were shown in **Figures 10-13**.

Conclusion

The degradation behaviour of Flecainide acetate was studied under various stress conditions. The degradation study indicated that the selected drug was stable to alkali treatment while susceptible to neutral, peroxide and acidic stress. LC-MS study results reveal the formation of four impurity products in the chromatogram and the fragmentation pathways of the so used impurities were also identified. The developed method can be used to construct a profile for Flecainide acetate.

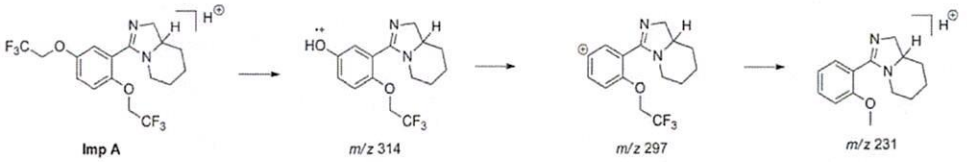

Fig. 10: Fragmentation pathway for Impurity A

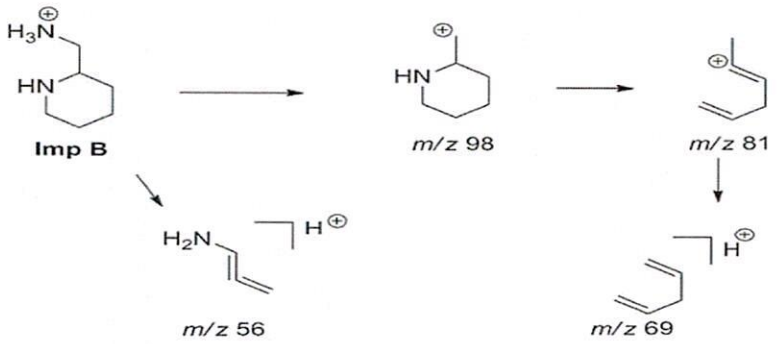

Fig. 11: Fragmentation pathway for Impurity B

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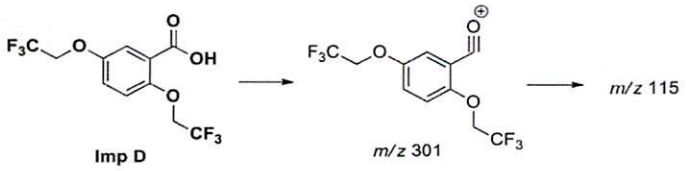

Fig. 12: Fragmentation pathway for Impurity D

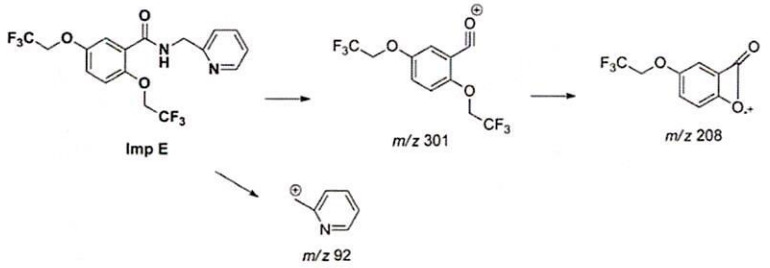

Fig. 13: Fragmentation pathway for Impurity E

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Conflict of interest: The authors declare that there is no conflict of interests regarding the publication of this paper.

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2019

CHALLENGES FACED BY THE ELDERLY - SOLUTIONS

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Abstract

The article discusses some of the challenges faced by the elderly such as finance, poverty, lack of social support, medical support, infrastructure and concerns and solutions to improve the quality of life of the elderly. The traditional Indian society with an age-old joint family system has been instrumental in safeguarding the social and economic security of the elderly people. The traditional norms and values of Indian society also laid stress on showing respect and providing care for the elderly. However with the emerging prevalence of nuclear family set-ups in recent years, the elderly are exposed to emotional, physical and financial insecurity. And rapid advancements in technology and media have required new skills and smart people and older members are affected with it in their workplace. Many strategies have explored by the Programme Managers of the Public Health Care to solve the challenges faced by the elderly. It is the responsibility every member in the family to take care of the elderly and secure their life benefitting from their experience and wisdom.

Introduction

Care for the elderly is a critical element of both the public and private concern. The needs and problems of the elderly vary significantly according to their age, socioeconomic status, health, living status and other such background characteristics. In many modern nations, industrialization contributed to the diminished social standing of the elderly. The average age of corporate executives was fifty-nine years old in 1980. In 2008, the average age had lowered to fifty-four years old (Stuart 2008). Some older members of the workforce felt threatened by this trend and grew concerned that younger employees in higher level positions would push them out of the job market. Rapid advancements in technology and media have required new skills and smart people and older members are affected with it in their workplace. Changes happened not only in the workplace but also at home. In agrarian societies, a married couple cared for their aging parents. The oldest members of the family

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contributed to the household by doing chores, cooking, and helping with child care. As economies shifted from agrarian to industrial, younger generations moved to cities to work in factories. The elderly began to be seen as an expensive burden. They did not have the strength and stamina to work outside the home. Hence, the elderly people have to live alone apart from their growing children.

Mistreatment and abuse of the elderly is a major social problem. With the biology of aging, the elderly sometimes become physically frail. This frailty renders them dependent on others for care sometimes for assistance with basic functions like eating and toileting. The care taker of the elderly intentionally deprives the senior person the expected care and harms the person without any mercy. Caregivers may be family members, relatives, friends, health professionals, or employees of senior housing or nursing care. The elderly may be subject to many different types of abuse. In a 2009 study on the topic led by Dr. Ron Acierno, the team of researchers identified five major categories of elder abuse: 1) physical abuse, such as hitting or shaking, 2) sexual abuse, including rape and coerced nudity, 3) psychological or emotional abuse, such as verbal harassment or humiliation, 4) neglect or failure to provide adequate care, and 5) financial abuse (Acierno 2010).

Some of the Important Challenges Faced by the Elderly:

a) Finance & Poverty

Elderly often do not have financial protection such as sufficient pension and other form of social security in India. The single most pressing challenge to the welfare of older person is poverty. Due to their financial dependence, elderly persons though they are most vulnerable to infections, they give low priority to their own health. Migration of younger generation, lack of proper care in the family, insufficient housing, economic hardship and break-up of joint family have made the old age homes more relevant even in the Indian context.

b) Lack of Social Support

Social isolation and loneliness has increased. Pension and social security is also restricted to those who have worked in the public sector or the organized sector of industry. In a study by Lena et al., almost half of the respondents felt neglected and sad and felt that people had an indifferent attitude towards the elderly. It was also found that 47% felt unhappy in life and 36.2% felt they were a burden to the family. All the elderly are not seen in the same view as

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the needs and problems of elderly are rejected to a vast extent as government classifies these people based on caste and other socio cultural dimensions. In a case study, it was found that a major proportion of the elderly women were poorer; received the lowest income per person; had the greatest percentage of primary level education; recorded the highest negative affective psychological conditions; were the least likely to have health insurance coverage.

c) Lack of Medical Support

In India, the elderly people suffer from dual medical problems, i.e., both communicable as well as non–communicable diseases. This is further compounded by impairment of special sensory functions like vision and hearing. A decline in immunity as well as age-related physiologic changes leads to an increased burden of communicable diseases in the elderly. The prevalence of tuberculosis is higher among the elderly than younger individuals. A study of 100 elderly people in Himachal Pradesh found that most of the patients came from a rural background. They were also smokers and alcoholics. It is shown that among the population over 60 years of age, 10% suffer from impaired physical mobility and 10% are hospitalized at any given time, both proportions rising with increasing age. In the population over 70 years of age, more than 50% suffer from one or more chronic conditions. The chronic illnesses usually include hypertension, coronary heart disease, and cancer. According to Government of India statistics, cardiovascular disorders account for one-third of elderly mortality. Respiratory disorders account for 10% mortality while infections including tuberculosis account for another 10%. Neoplasm accounts for 6% and accidents, poisoning, and violence constitute less than 4% of elderly mortality with more or less similar rates for nutritional, metabolic, gastrointestinal, and genito-urinary infections.

An Indian Council of Medical Research (ICMR) report on the chronic morbidity profile in the elderly states that hearing impairment is the most common morbidity followed by visual impairment. However, different studies show varied results in the morbidity pattern. A study conducted in the rural area of Pondicherry reported decreased visual acuity due to cataract and refractive errors in 57% of the elderly followed by pain in the joints and joint stiffness in 43.4%, dental and chewing complaints in 42%, and hearing impairment in 15.4%. Other morbidities were hypertension (14%), diarrhea (12%), chronic cough (12%), skin diseases (12%), heart disease (9%), diabetes (8.1%), asthma (6%), and urinary complaints (5.6%). A similar study that had been conducted among 200 elderly people in rural and urban areas of Chandigarh in Haryana observed that as many as 87.5% had minimal to severe disabilities.

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The most prevalent morbidity was anemia, followed by dental problems, hypertension, chronic obstructive airway disease (COAD), cataract, and osteoarthritis.

In a community based study conducted in Delhi among 10,000 elderly people, it was found that problems related to vision and hearing topped the list, closely followed by backache and arthritis. Elderly people who belong to middle and higher income groups are prone to develop obesity and its related complications due to a sedentary lifestyle and decreased physical activity. Elderly people are highly prone to mental morbidities due to ageing of the brain, problems associated with physical health, cerebral pathology, socio-economic factors such as breakdown of the family support systems, and decrease in economic independence. The mental disorders that are frequently encountered include dementia and mood disorders. Other disorders include neurotic and personality disorders, drug and alcohol abuse, delirium, and mental psychosis.

The socio-economic problems of the elderly are aggravated by factors such as the lack of social security and inadequate facilities for health care, rehabilitation, and recreation. Also, in most of the developing countries, pension and social security is restricted to those who have worked in the public sector or the organized sector of industry. Many surveys have shown that retired elderly people are confronted with the problems of financial insecurity and loneliness.

d) Lack of Infrastructure

Lack of physical infrastructure is a major deterrent in providing comfort to the aged. Many elder citizens need better access to physical infrastructure, both in their own homes and in public spaces. Unattended chronic disease, unaffordable medicines and treatment and malnutrition are part of old age life in India as there is no system of affordable health care. Family care of the elderly seems likely to decrease in the present scenario with the economic development of the nation and modernization.

Strategies to improve the Life Style of the Elderly:

The life style of the elderly can be improved through rehabilitation and with the support and collaboration of the family. Rehabilitation includes (i) provision of visual aids/mobility aids at geriatric health facilities, (ii) the availability of physiotherapy services, and (iii) imparting health education about staying mobile and providing practical tips. Rehabilitation comprises of provisions for counselling services wherein older persons can benefit from psychological

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assistance in the face of stressful life events, interpersonal conflicts, and changes imposed by ageing. Health care facilities should aim for holistic development by organizing training workshops in accordance with the skills of the elderly. This calls for advocacy with NGOs and charitable organizations. Community leaders can play an important role in identifying the felt needs of the elderly.

Day care hospitals could play an important role in providing close supervision and follow-up of patients with chronic diseases. Moreover, the cost of a day care centre is comparatively less than that of a nursing home. NGOs, charitable organizations, and faith-based organizations could play an important role in this field.

The children in the family have to spend more time with the elderly irrespective of their busy schedule. They need to visit and take their aging parents to social gatherings. If they are very busy, they need to arrange a Caregiver who can really take care of the elderly and often enquire about their welfare.

Conclusion

In conclusion, increased life expectancy, rapid urbanization and lifestyle changes have led to an emergence of varied problems for the elderly. Hence, care to the elderly is possible only with the involvement and collaboration of family, community and the Government. India should prepare to meet the growing challenge of caring for its elderly population. All social service institutions in the country need to address the social challenges to elderly care in order to improve their quality of life. There is a need to initiate mandatory and more appropriate social welfare programmes to ensure a quality life for the elderly.

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HEALTH AND WELL BEING OF ELDERLY WOMEN

-Ms. P. Hema Latha -Dr. S. Sravya Chamundeswari

Introduction:

The world population is growing older and majority of the older people are women. Thus, the ageing women make up a significant proportion of the world's population and their numbers are growing. The number of women age 60 and over will increase from about 336 million in 2000 to just over 1 billion in 2050. In 2013, the global sex ratio was 85 men per 100 women in the age group of 60 years or over and only 62 men per 100 women in the age group 80 years or over. By 2050, older people will account for 20 percent of the population in developing countries, the same aging demographic currently experienced in developed countries. Aging comes with many challenges. The loss of independence is one potential part of process.

Active ageing depends on a variety of "determinants" that surround individuals, families and nations. These factors directly or indirectly affect well-being, the onset and progression of disease and how people cope with illness and disability. The determinants of active ageing are interconnected in many ways and the interplay between them is important. For example, women who are poor (economic determinant) are more likely to be exposed to inadequate housing (physical determinant), societal violence (social determinant) and to not eat nutritious foods (behavioral determinant).

The main challenge facing by the elderly women are health issues. The current trends in global population on health problems reveals that there is a transition from the predominance of infectious disease to non-communicable diseases or chronic diseases, due in large part to ageing. Chronic diseases have a significant effect on disability. People reporting two or more chronic diseases are nearly 20 times as likely to report disability as people with none. This reality is especially challenging in developing countries like India as population ageing is happening very quickly and often they do not have the time and resources to prepare for the growing health care and to meet the needs of older people. The increasing number and proportion of elderly will have a direct impact on the demand for health services and pension and social security payments

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(Rajan, 2005) The Indian population has been ageing over the years and the proportion of older people has been growing. But this increase in life expectancy will not be an unqualified success until adequate provision for the care of the elderly is made. At present, the elderly often suffer abuse and, as in any group, women suffer worse than men. (Karkal & Malini, 1999)

In Indian society, old age has been associated with virtues, knowledge and wisdom. The Indian joint family itself provides an element of social security as well as status to the aged and mitigates the loneliness to some extent. The Indian women suffer more socially, economically as well as emotionally. Woman in India, throughout her life, is considered a liability on others, no matter whether she is educated or an earning individual. "It needs to be stressed that in the Indian context, quite like in older countries in South Asia, older women are particularly disadvantaged because they face structural and social and economic inequalities throughout the course of their lives" (Shankardass, 2002). Indian society has been a hierarchal, rigid and patriarchal system. Passages are often quoted from the Manusmriti to illustrate the subservient role of women. The Hindu Dharma Shastras (religious books) give a subordinate status to women. However, during the recent period, aged people have been assigned a negative role by all the societies. They are portrayed as dependent individuals, characterized by lack of social autonomy, isolation and neglect. They are considered as if posing a threat to the living standards of younger age groups by being a burden, who only consume without producing. Number of studies reveal that widowhood leaves women often as destitute. In India, it is observed that widowhood is one of the leading factors associated with poverty, loneliness and isolation since a widow suffers much indignity, often losing her self-reliance and respect (Shankardass, 2002).

Psychological wellbeing's of elderly women is another important area to analyze. Psychological wellbeing and health are closely related, and the link may become more important at older ages, if only because the prevalence of chronic illness increases with advancing age. As life expectancy increases and treatments for life-threatening disease become more effective, the issue of maintaining wellbeing at advanced ages is growing in importance. Studies of older people indicate that evaluations of quality of life are affected by the person's state of health, but the frequent finding that average self-reported life evaluation in the population increases with age suggests that psychological wellbeing is affected by many factors other than health. These include material conditions, social and family relationships, social roles and activities, factors

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that also change with age. There is a growing research literature suggesting that psychological wellbeing may even be a protective factor in health, reducing the risk of chronic physical illness and promoting longevity. It has also been argued that psychological wellbeing should be addressed in measures of health valuation, and be considered in health care resource allocation. This article summarizes the current state of evidence linking psychological wellbeing with health in an ageing population.

Review of literature

Among older adults, higher support and lower strain received from each of the four relational sources (spouse/partner, children, family, and friends) were associated with reduced loneliness and improved well-being and that loneliness might mediate the relationship between support/strain and well-being. Structural equation modeling was conducted using a national sample of adults aged 50 years and older ($N = 7,367$) from the Health and Retirement Study. Findings indicated that support from spouse/partner and friends alleviated loneliness, while strain from all the four sources intensified loneliness; higher support and lower strain from various sources directly and indirectly improved well-being, with indirect effects mediated through reduced loneliness. It was concluded that, in later life, various sources of support/strain engender distinct effects on loneliness and well-being, and loneliness serves as one of the psychological pathways linking support/strain to well-being.

A study done on recently retired people was published by Susan A (2009) in The Journal of Gerontology. The author reported that retirement provides a sense of psychological well-being in the short term. However when longer times are considered, retirement does not provide a sense of purpose and psychological well-being goes down rather quickly after the first few months of retirement.

Geritol (2010) stated that old age as an anti depressant based on the telephonic survey of 340,000 people aged 18 to 85 conducted by the Gallup organization, in which older people scored much higher than younger people on global well being. In this study, each person who was called ranked overall life satisfaction on a 10-point scale, as well as answered questions about their

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recent experience of enjoyment, happiness, stress, worry, anger, and sadness. Contra stereotypes, 85 year olds were more satisfied with life than 18 year olds or 50 year olds.

Prieto-Flores ME, Fernández-Mayoralas G, Rojo-Pérez F (2005), conducted a study to analyze the relationships of emotional wellbeing with socio demographic and health factors. A survey on QoL among older people living in family housing of Madrid province (CadeViMa-2005) was used in this study. . Multivariate analyses were applied for generating an indicator of emotional wellbeing which integrated positive and negative affects, as well as personal coping resources. A logistic regression model was created to explain a positive emotional wellbeing, according to socio demographic and health characteristics. Results showed that people without anxiety or depression problems were around three times more likely to evaluate their emotional wellbeing positively than those who had problems. Older adults whose health was better than in the previous 12 months, seemed to be five times more likely to report a high emotional wellbeing, compared to those who experienced a health decline. Individuals with a very good perceived health status were 26 times more likely of having a high emotional wellbeing than people with a negative health perception. Those with middle and upper social class were three times more likely to experience a positive emotional wellbeing than those belonging to a low social class.

The review of studies on the quality of life and problems of elderly in India clearly shows that adapting to old age is dependent on several socio-economic, cultural and psychological factors. Most of the previous research projects were data based but it is also essential to conduct a research on the elderly by treating them as human beings as full of emotions and feelings. The requirements of the elderly are changing according to the changing lifestyle; research also demands to shift our focus from the traditional topics. Further, these research projects generally treat all the elderly equally while there are differences in the conditions of the elderly; none is living in the same conditions and everyone has different requirements. There are elderly, who are living better lives and there are also such elderly who are living in the worst conditions.

Table-1: socio-Demographic Profile of the Respondents

AGE	60-65	26	100	**MOTHER TONGUE**	TELUGU	69	100
	65-70	46			URDU	23	
	70-75	28			OTHERS	8	
RELIGION	HINDU	36	100	**MARITAL STATUS**	MARRIED	32	100
	MUSLIM	23			UNMARRIED	3	
	CHRISTIAN	29			WIDOWER	54	
	OTHERS	12			DIVORCEE	11	
EDUCATIONAL STATUS	Illiterate	46	100	**AREA OF LIVING**	URBAN	47	100
	Primary	20			RURAL	53	
	Secondary	17					
	Intermediate	9					
	Graduate	8					
	Post-Graduate	---					

	House wives	Govt. employee	Private employee	Self Employed	Wage Earners
OCCUPATION (Before)	38	4	16	18	24
OCCUPATION (Present)	66			15	19

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The socio Demographic profile of the respondents of the present study shows that the data is collected from elderly women whose age ranges vary from 60 years old to 75 years old. Table 1 describes that majority of the respondents are (46%) belong to 65-70 age group. Among the respondent's 36 percent belong to Hindu religion followed by Christians 29 percent, Muslims 23 percent and 12 percent are other religions. It is observed that most of the respondent's mother tongue (69%) is Telugu followed by 23 percent Urdu and 8 percent other languages like Marathi, Tamil and Kannada.

According to Table 1, Out of 100 respondents 97 were married and only 3 were unmarried. Among the married, 54 percent are leading their life as widowers and 32 percent are in marital bonding and 11 percent are separated from their life partners. Regarding the area of living, 53 percent belong to rural and 47 percent are urban inhabitants.

Table 1 also explains that around 46 percent respondents are illiterates, followed by 20 percent completed their primary education, 17 percent secondary education, 9 percent intermediate and 8 percent completed their graduates. There are no post graduates in the sample.

Regarding their past and present employment status, Table 1 explains that Majority of the respondents (38%) were house wives, around 4 percent were government employees, 16 percent were private employees and 18 percent were self-employed and 24 percent earned their livelihood as wage earners. However, at present only 15 percent are continuing their self-employment and 19 percent are still working as wage earners whereas 61 percent are without any specific occupation yet they are sharing household responsibilities with a difference of duties.

Table-2: Percentage Distribution of the Elderly women regarding the emotional support they are receiving

Selected Aspect	Persons who are giving Emotional support		
	Son	Daughter	Others
Showing concern towards Health Issues	63%	22%	15%
Listening to problem	23%	48%	29%
Console at crisis	29%	36%	35%

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Sharing the family issues	19%	48%	33%
Meeting the physical needs	56%	38%	6%

Table – 2 explains the source of emotional support for the elderly women in times of crisis in their daily lives. Around 63 percent of women expressed that their sons will take care of their health issues while their daughters and others sharing less percentage. At the same time, 48 percent women felt that their daughters will listen to their problems rather than their sons. Also when they are in difficult circumstances, around 36 percent felt that their daughters will console them. Similarly, the equal percent (35%) have opinion that neighbors and relative's will also console them. Only 48 percent felt that daughters will share the family issues with them and 33 percent of others will share their family issues with the elderly women. Only 19 percent of women opined that their sons will share the family issues with them. Yet regarding their physical needs, 56 percent are of the opinioned that their sons will take care by their son while 38 percent of daughters are also responsible.

Table-3: Percentage distribution of the psychological problem of elderly women as they perceived

PSYCHOLOGICAL PROBLEM	PERCENTAGE
Feeling lonely	89%
Financial Insecurity	76%
Depression & Anxiety	47%
Negligence by in-laws	59%
Decreases importance in Family Decision-making	78%

Table-3 describes about elderly women's psychological problems, facing in their family. It reveals that majority of the respondents (89%) are feeling lonely and 59 percent of the respondents expresses that they have been neglected by their daughter in–laws or son in-laws.

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while 76 percent of the respondents are having financial insecurity, and 47 percent are suffering with depression & anxiety. Around 78 percent expressed that their role in family decision – making has been decreased.

TABLE-4: Percentage distribution of the Health problem of elderly women

HEALTH PROBLEM EXPERIENCING	PERCENTAGE
High Blood Pressure	78%
Diabetics	64%
Leg& Knee problem	68%
Gastric problem	54%
Cardiac Problem	58%
Using medication for any other problem	93%
Vision/Hearing problem	76%
Suffering from more than two	85%

Table – 4 explains about elderly women's health issues, which reveals that majority of the respondents (93%) are using medication for any other problem. From the analysis, 85 percent of the respondents are suffering with more than two health problems, while 78 percent of the respondents are having high blood pressure. Around 76 percent of the respondents are having vision / hearing problem, 68 percent of the respondents are suffering with leg\ knee problem, 64 percent of the respondents are having Diabetes, while 58 percent of the respondents are having Cardiac problems and 54 percent of the respondents are having gastric problems.

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Table 5: Overall wellbeing

	SATISFIED	MODERATE	NOT SATISFIED
Satisfaction with present lifestyle	40	35	25
Happy with present living arrangement	38	26	36
Ability of perform daily activity	65	19	16
Getting enough care & support from family members	26	32	42
Social contacts with others	28	34	38
Facilities at home for recreation / leisure time activity	23	31	46

Table 5 shows the overall well-being of the respondents. It indicates that 40 percent of the respondents are satisfied with their present life style, while 30 percent are moderately satisfied and 25 percent are not satisfied with their present life style.

This table also indicates that 38 percent of the respondents are happy with present living arrangement, while 36 percent are not satisfied and 26 percent are moderately satisfied.

Regarding their ability to perform daily activities, It shows that 65 percentage of the respondents are satisfied with their ability to perform daily activities, while 19 percentage are moderately satisfied and 16percentage are not satisfied.

Regarding the care & support, It indicates that 42 percent of the respondents are not satisfied with care & support from family members, while 32 percent of the respondents are moderately satisfied and only 26 percent of the respondents are satisfied.

When it comes to social contacts and interaction, this table shows that 38 percent of the respondents are not satisfied in having social contact with others, while 34 percent are moderately satisfied and only 28 percent are satisfied in having social contact with others.

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Finally, The table also shows that majority of the respondents 46 percent are not satisfied with the facilities at home for recreation / leisure time activity, 31 percent are moderately satisfied and 23 percent of the respondents are satisfied with the facilities at home for recreation / leisure time activity.

Some of the ways in which wellbeing can be enhanced among the elderly include:

- Maintaining a healthy lifestyle: Including physical activity, especially in later life is central to improving physical and mental health, because regular exercise positively effects general health, mobility and independence, and is associated with a reduced risk of depression and anxiety. Exercise also enhances mood and improves self-esteem. Any form of physical activity is good to begin with, e.g., walking, gardening, dancing, walking the dog, or participating in organized or competitive sport. At an older age, incorporating good nutrition can help not only curb chronic diseases but also helps in aiding in recovery from illnesses.
- Staying meaningfully active by working, either in a paid or voluntary capacity, is good for the health of the elderly as it helps them feel a sense of goodwill that comes from contributing to society. This is also seen to have an impact on older people's economic circumstances and on their ability to participate in the society (Marmot et al. 2003).
- Strengthening social networks helps connect older people across different age groups and enable more care within and for the community. E.g., a lot of residential societies have book clubs that organize weekly story-reading sessions for the elderly by younger volunteers.
- Maintaining social interaction: Since social isolation and loneliness negatively affect both physical and mental health. Particularly among older adults, it becomes all the more important to encourage social support to foster wellbeing through building relationships. Some steps towards this could include connecting regularly with friends and family, making an effort to make new friends and finding a support group in times of change (especially if you are undergoing health or bereavement-related issues, connecting with others who could be experiencing something similar to what you are experiencing may help ease the pain).

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Even though old age is often associated with life changes that may be difficult to cope with and may generate feelings of isolation, loneliness and despair, proactive handholding by others in the community can help the elderly manage negative feelings or low moods more easily.

It is to be noted that the psychological needs of the aged are largely excluded and the conditions of the aged becoming increasingly vulnerable, not because of physical disabilities, but due to socioeconomic, psychological and health related issues. The media takes note of the problems and issues of younger persons/ youth, etc., but they neglect the concerns of the aged.

Conclusion:

Older women are facing both age and gender related problems and discriminations. Women's low status and vulnerability starts from childhood and increases as they go through the ageing process. Due to the remarkable increase in life expectancy across countries, sustainable prevention strategies are needed to help individuals preserve psychophysical well-being in old age. In particular, the regular practice of a moderately intense physical activity is recommended by the World Health Organization to enhance balance, prevent falls, strengthen muscles, and promote psychophysical well-being. Daily physical exercise represents a beneficial and low-cost strategy, easily accessible to the general population. Studies of older people indicate that evaluations of quality of life are affected by many factors other than health. These include material conditions, social and family relationships, social roles and activities etc. There is a growing research literature suggesting that psychological wellbeing may even be a protective factor in health, reducing the risk of chronic physical illness and promoting longevity. To face the challenges of elderly, we need to concentrate on interventions to be focused like mobilizing resources for service delivery, community participation in activities that benefit older persons, advocating for the rights and dignity of older person, reorienting health workers on older person's issues.

In the context of the demographic changes and the changing family context, it can no longer be assumed that our elderly live comfortably at home receiving care from family members, who are willing to spare time and perform services for them. The major implications of this trend have their impact on the family, as it would result in more stress on the emotional and physical

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resources of the family. Further, as people live longer and into much advanced age (say 75 years and over), they need more intensive and long term care, which in turn may increase financial stress in the family (Siva Raju, 2010). In India, it has been the duty of son to support aged parents. Care giving, help and support for the elderly can be viewed from different perspectives: the economic support, social support, the daily care (physical), and the care and nursing during illness. The informal support can also be distinguished into three types. The emotional support which involves the provision of moral and psychological support through sympathetic and caring relationships belongs to the first type. The second type indicates helping the elderly with the problem-solving and decision-making processes and finally, the instrumental support which takes the form of help with the practical tasks of everyday life (Prakash. 2000).

The primary needs of the rural elderly were food, clothing, Medicare, social and emotional security, attention, and due recognition. Amongst all the support, it is the support from the family that keeps a person satisfied and contented in his or her life. Many studies have pointed out that the care-giving is primarily a feminine task and in families where both sons and sons wives go out for work, elder care in the family setting becomes problematic (Prakash, 2000).

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A REVIEW ON DEFLUORIDATION IN INDIA

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Abstract: - Fluoride is regularly depicted as a twofold edged sword as insufficient ingestion is related with dental caries, while over the top admission prompts dental, skeletal and delicate tissue fluorosis which has no fix. Fluoride in water gets essentially from the disintegration of characteristic minerals in the stones and soils with which water collaborates. The issue of over the top fluoride in drinking water has overwhelmed numerous pieces of the world, and a great many individuals depend on groundwater with fixations over the World Health Organization (WHO) rule estimation of 1.5 mg/L. In India, endemic fluorosis is thought to influence 65 million individuals. Rajiv Gandhi National Drinking Water Mission was set up to control fluorosis with an arrangement to beat the issue. Nalgonda procedure, Prasanti innovation utilizing enacted alumina, UNICEF in India utilizing family unit based defluoridation, KRASS defluoridation process, Defluoridation dependent on particle trade components, Fluoride expulsion by IISc technique at Kolar, Karnataka are instances of defluoridation strategies utilized in different field programs in India. The principle strategies of defluoridation that have been explored with differing degrees of progress incorporate adsorption, precipitation/coagulation, particle trade and layer forms. Numerous compounds, indigenous and home-grown materials are utilized alongside this. Precipitation is the settled strategy and most generally utilized technique, especially at network level. Adsorption should be possible with locally accessible adsorbent materials with high productivity and cost adequacy. Particle Exchange expels fluoride up to 90-95% and holds the taste and shade of water unblemished.

Keywords: Fluorosis, defluoridation, India, field programs

Introduction

Fluoride is frequently depicted as a twofold edged sword as lacking ingestion is related with dental caries, though unnecessary admission prompts dental, skeletal and delicate tissue fluorosis which has no fix. While fluoride is available in air, water, and nourishment, the most widely recognized way it enters the natural way of life is by means of drinking water. Fluorides in drinking water might be useful or impeding relying upon their fixation and aggregate sum ingested. Fluoride is helpful particularly to little youngsters for calcification of dental polish beneath eight years old when present inside allowable breaking points. An overabundance of fluoride in drinking water causes dental fluorosis and skeletal fluorosis. The World Health Organization has prescribed a rule estimation of 1.5 mg/L as the focus above which dental fluorosis is likely. This diagram illuminates' damages of unreasonable fluoride in water, defluoridation-history and procedures utilized and defluoridation in India [1].

Fluoride in Water

Despite the fact that groundwater contributes just 0.6% of the absolute water assets on earth, it is the major and favored wellspring of drinking water. Fluoride in water gets primarily from the disintegration of normal minerals in the stones and soils with which water collaborates. High fluoride fixations are likewise a component of bone-dry climatic conditions. Here, groundwater stream is moderate and response times among water and shakes are along these lines upgraded. Fluoride development is less articulated in the moist tropics on account of high precipitation inputs and their weakening impact on groundwater compound creation. Other than regular sources, fluoride particles can likewise be found in effluents from the semiconductor, metal handling, composts, and glass producing ventures. Be that as it may, it is additionally imperative to consider climatic conditions and amount of water admission and dietary fluoride content. Water utilization in hot muggy locales is commonly higher than in calm districts and subsequently the fluoride focus limit for likely fluorosis ought to be lower [2].

Fluoride and diseases

At fixations above 1.5 mg/L (79 µmole/L) nonetheless, fluoride is risky to human wellbeing, prompting dental and skeletal fluorosis, an illness that can cause mottling of the teeth, calcification of tendons, devastating bone distortions, and numerous other physiological issue that can, at last, lead to death [1]. over 10mg/l) to create, skeletal fluorosis is more extreme than its dental partner, portrayed by misshapening of the bone structure can be recognized right off the bat radiologically. It is presently entrenched that fluoride in drinking water can cause 'non-ulcer dyspeptic' grumblings in human subjects. The principle objections are queasiness, loss of hunger, torment in the stomach, gas arrangement and

enlarged inclination, obstruction followed by discontinuous looseness of the bowels and cerebral pain [3]. Fluoride has additionally been connected to cancer4, diminished subjective capacity, lower Intelligence Quotient (IQ), and formative issues in youngsters [5].
Fluorosis has critical monetary effects in the creating scene. Notwithstanding fluorosis expelling individuals from the workforce, water supply programs have discarded critical funds while giving exorbitant boreholes that become pointless upon the disclosure of the dangerous degrees of fluoride that they contain [6].

Global scenario
The issue of inordinate fluoride in drinking water has inundated numerous pieces of the world, and today a large number of individuals depend on groundwater with focuses over the World Health Organization (WHO) rule esteem. There are in excess of 20 created and creating countries in which fluorosis is endemic [7].

Indian scenario
In India fluorosis was first recognized in quite a while of steers at Nellore region of Andhra Pradesh in 1937. From that point forward, significant work has been done in various pieces of India to investigate the fluoride-loaded water sources and their effects. Fluorosis is an endemic illness pervasive in 20 conditions of Indian Republic. The issue of extreme fluoride is progressively serious, especially in bone-dry pieces of the nation.

- 70-100% areas are influenced in Andhra Pradesh, Gujarat and Rajasthan.
- 40-70% areas are influenced in Bihar, National Capital Territory of Delhi, Haryana, Jharkhand, Karnataka, Maharashtra, Madhya Pradesh, Odisha, Tamil Nadu and Uttar Pradesh
- 10-40% areas are influenced in Assam, Jammu and Kashmir, Kerala, Chattisgarh and West Bengal [30].
- In India, endemic fluorosis is thought to influence 65 million individuals [8].

Remedies
Around the world, a significant test is to create viable and reasonable strategies for the remediation of fluoride in groundwater. Most significant kinds of control estimates utilized are:

1. Arrangement of another or elective wellspring of water containing lower levels of fluoride

2. Mixing the current water supply with another containing lower levels of fluoride

3. Arrangement of filtered water

4. Treating the water at the "purpose of-utilization, for example, in a little treatment gadget connected to family unit drinking water outlet

5. Treatment of water at its source [9].

History of Defluoridation
In spite of the fact that an old issue [10], fluorosis was not distinguished until late history and there were little endeavors to defluoridate water before the twentieth century. The same number of parts of the reality where fluorosis is basic are generally detached, numerous societies in fluorotic areas never thought to be dental fluorosis to be a variation from the norm until expanded correspondence and travel brought about changes in recognition. Furthermore, skeletal fluorosis can regularly set aside an all-encompassing effort to create noticeable side effects, so it isn't really clear for individuals to interface fluorosis to an issue in water quality [11]. The soonest determinations of dental fluorosis originate from 1888 in Mexico and 1891 in Italy. All things considered, the connection between drinking water and fluorosis wasn't built up until the 1920s in Colorado, by Dr. Fedrick S. McKay [12].

It was during the 1930s that few countries initially started to all the more genuinely examine the negative impacts of fluoride and how to expel it from drinking water supplies. An aluminum and sand channel that expels fluorine from water has been conceived by Dr. S. P. Kramer in 1933. In the year 1945 M. Kenneth got a French patent in water defluoridation strategy. An effectively working actuated alumina network defluoridation plant was authorized in Bartlet, Texas, the USA in the year 1952 [12].

By mid-1980's, it was obvious that overabundance fluoride was available in groundwater in numerous pieces of the nation. In 1987, Rajiv Gandhi National Drinking Water Mission evaluated that 25 million individuals in 8700 towns were drinking water with overabundance fluoride. A Sub-Mission to control fluorosis was set up with an arrangement to beat the issue. Testing of the entirety of the water hotspots for fluoride and innovation intercessions were started in numerous states. The innovation choice considered was chiefly "Nalgonda" strategy [13].

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Defluoridation techniques

While different defluoridation procedures have been investigated, every ha restrictions. Existing strategies are regularly too exorbitant to even consider implementing effectively (on the grounds that the geographic territories inclined to fluorosis are among probably the least fortunate areas on the planet), insufficient, or even hazardous (So far as a portion of the remediation procedure itself has added different contaminants to the water). Numerous defluoridation strategies have been inspected since the 1930s when the threat of overabundance fluoride in drinking water was first recognized [14]. Over a long time since the issue was perceived, in any case, the endeavors to build up a technique for defluoridation that can be continued under varying social, money related, ecological and specialized limitations have not been effective. The primary methods that have been, and keep on being, examined with shifting degrees of achievement incorporate the accompanying [15]:

1. Adsorption
2. Precipitation/coagulation
3. Particle trade
4. Layer forms

Adsorption

This procedure capacities on the adsorption of fluoride particles onto the outside of a functioning operator. In the adsorption technique, crude water is gone through a bed containing defluoridating material. The material holds fluoride either by physical, substance or particle trade systems. The adsorbent gets soaked after a time of activity and requires recovery [16]

A. Activated Alumina

Actuated alumina (Al2O3), which has been being used for defluoridation since 1934, is set up by low-temperature lack of hydration (300-600 °C) of aluminum hydroxides. The ligand trade response at the outside of actuated alumina is liable for fluoride expulsion. Alumina (aluminum oxide, Al2O2) is basically insoluble in water. The solvency relies on past warmth treatment. There are various evaluations of actuated alumina, indigenously accessible at an ostensible expense. The reasonableness of the evaluation for defluoridation relies on the porosity and surface territory of the alumina [17]

B. Bone char

The fluoride-searching capability of bone was first distinguished and revealed by Smith and Smith in 1937. It was accounted for that degreased, harsh and corrosive treated bone material could viably diminish fluoride fixation from 3.5 to under 0.2 mg/L. The proposed evacuation system was of particle trade in which the carbonate radical of the apatite ($Ca_9(PO_4)_6 \cdot CaCO_3$) involving bone was supplanted by fluoride to frame an insoluble fluorapatite [18],as:

$Ca_9(PO_4)_6 \cdot CaCO_3 + 2F^- \rightarrow Ca_9(PO_4)_6 \cdot CaF_2 + CO$ [19]

Be that as it may, the significant expense of bone turned into a hindering component for its more extensive use. Notwithstanding, soon it was perceived that bone scorch, delivered via carbonizing bone at temperatures of 1100–1600 0C, had better searching potential than the natural bone. From there on, bone roast supplanted bone as a defluoridating operator [18]

C. Calcined Clay and mud pots

Different analysts have surveyed the fluoride restricting impact of basic stoneware. It has been accounted for that fluoride restricting limit in clayware of 80 mg-F/kg and studies have inferred that fluoride take-up in clayware is moderate and of constrained limit [20] The significant focal points of mud pots are they are monetary and promptly satisfactory for the rustic networks [18].

D. Natural Adsorbents

A generally less known methodology of potential utility, especially in third world country networks, that has pulled in the consideration of specialists lately is plant-based (common) defluoridation systems. The plants can be developed locally varying and the expenses for creation and transportation can be moderately low. The utilization of plants for defluoridation may likewise accomplish across the board acknowledgment and application by nearby networks all the more no problem at all. Analysts at M. S. Swaminathan Research Foundation (MSSRF) had demonstrated drumstick seeds to have exceptional defluoridation proficiency, which was higher than that of enacted alumina. Numerous regular adsorbents from different trees and creature sources like coconut shell, tamarind seeds, bone charcoal, tulsi leaves have been attempted as defluoridation operators [21].

Ion Exchange

Particle trade is a trade of particles between two electrolytes or between an electrolyte arrangement and a complex. By and large, the term is utilized to indicate the procedures of cleansing, detachment, and disinfecting of watery and other particle containing arrangements with strong polymeric or mineral 'particle exchangers'.

Regular particle exchangers are particle trade saps (functionalized permeable or gel polymer), zeolites, montmorillonite, and earth and soil humus. Particle exchangers are either cation exchangers that trade decidedly charged particles (cations) or anion exchangers that trade contrarily charged particles (anions). There are additionally amphoteric exchangers that can trade the two cations and anions at

the same time. In any case, the concurrent trade of cations and anions can be all the more proficiently acted in blended beds that contain a blend of anion and cation trade tars or passing the treated arrangement through a few diverse particle trade materials. The diverse particle trade materials considered incorporate bone, bone burn, anion, and cation trade saps, for example, carbon, defluoron-1, defluoron-2 and so on [22]

Precipitation

Right now, added to crude water cause precipitation of the fluoride salt as insoluble fluorapatite, which is isolated from the water. Generally utilized materials in precipitation procedure are Aluminum salts (for example Alum), lime, Poly Aluminum Chloride, Poly Aluminum Hydroxy sulfate and Brushite [22].

Membrane process

It is a water sanitization innovation that utilizes a semi-penetrable layer to evacuate particles, atoms, and bigger particles from drinking water. In turn around assimilation, an applied weight is utilized to defeat osmotic weight. The outcome is that the solute is held on the pressurized side of the layer and the unadulterated dissolvable is permitted to go to the opposite side. To be "particular", this layer ought not permit huge atoms or particles through the pores (gaps) yet ought to permit littler segments of the arrangement, (for example, dissolvable atoms) to pass openly. Turn around assimilation can evacuate numerous kinds of disintegrated and suspended species from water including microscopic organisms, and is utilized in both modern procedures and the creation of consumable water.

The fluoride evacuation by invert assimilation strategy has not been generally detailed. Writing distributed by the different turn around assimilation producer's show that a wide fluoride expulsion scope of 40 to 90%. Albeit turn around assimilation isn't regularly utilized on low all out broke up strong water and has not been exceptionally utilized for fluoride expulsion, the procedure should be a compelling technique. Notwithstanding its high working costs, this procedure might be pragmatic for treating little network water supplies and ought to be considered as a decent option [23].

Methods implemented in India

Nalgonda Technique

The principal network defluoridation plant for expulsion of fluoride from drinking water was developed in the locale of Nalgonda in Andhra Pradesh, in the town of Kadri. The innovation was created by National Environmental Engineering Research Institute (NEERI), Nagpur in 1961. Nalgonda Technique includes the expansion of Aluminum salts, lime, and dying powder followed by fast blending, flocculation, sedimentation, filtration, and sanitization. Aluminum salt might be included as aluminum sulfate (alum) or aluminum chloride or mix of these two. It is liable for expulsion of fluoride from water [24].

Prasanti Technology using Activated Alumina

The Prasanti innovation for fluoride evacuation utilizing initiated alumina directly being utilized for water defluoridation in Indian towns, started because of innovative work exercises did at the Bioscience Department at Satya Sai University for Higher Learning at Prasanti Nilayam at Puttaparthi (Anantapur District) in Andhra Pradesh [25].

UNICEF in India using Household based defluoridation

UNICEF bolstered the exploration for the improvement of innovation alongside water, condition. Sanitation area (WESS) by the Department of Chemistry, IIT Kanpur. Pilot ventures were taken up in Andhra Pradesh and Rajasthan in 1996-2002. Handpump joined Defluoridation Units and Domestic Defluoridation Units have been created in India by utilizing indigenously produced actuated alumina. The upsides of this methodology residential defluoridation units are: a lower cost for treatment as just a constrained volume of water is required (for cooking and drinking) to be dealt with and the lower prerequisite of treated water correspondingly brings down the need of synthetic substances and produces lower volume of slime [24].

KRASS Defluoridation Process

Fluoride debased water is gone through a bed of uniquely structured channel media to get defluoridated water. The procedure has been confirmed by Council of Scientific and Industrial Research (CSIR) and Public Health Engineering Department (PHED) of Rajasthan [26].

Delfuoridation based on ion exchange Mechanisms

Defluoridation units utilizing carbion and defluoron-1 in 8:1 extent was introduced at Gangapur (Rajasthan). Channel alum of 2, 3, 5, 6 and 10% were utilized to recover the blended medium. The fluoride substance of crude water was 4.8 mg/liter. The vast majority of defluoron-1 were cleaned out in the initial barely any cycles. Cost of treatment: Rs.0.3/m3 of water with 4.3 mg/liter fluoride [24].

Fluoride Removal by IISc method at Kolar, Karnataka.

The gadget has two units, every one of 20 liters limit. The upper unit has a blending cum sedimentation unit.

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It is outfitted with physically worked, designed mechanical blending gadget for blending of Magnesium oxide and water. The lower unit gathers treated water. Fifteen liters of water is filled the upper unit. Ca(OH)2 + MgO are included and physically blended for five minutes. The suspension is permitted to represent 16 hours. Fluoride bearing slop settles at the base. The unmistakable water is tapped into lower assortment unit through adaptable associating pipe fitted with a fine channel to trap any getting away from ooze. Water solvent sodium bisulfate is disintegrated in the lower chamber and the water is prepared for use. Muck is put away in a solid lined pit until further use. The expense of treating 1 liter of fluoride water with 2-5 ppm by IISc technique is 7 paise/liter and the expense of Domestic Defluoridation Unit is around Rs.2000/unit [24].

Conclusion

Precipitation is the settled strategy and most broadly utilized technique, especially at network level. Be that as it may, the system has just moderate productivity and the high synthetic portion is required. Over the top utilization of aluminum salts produces ooze and unfriendly wellbeing impacts through aluminum solvency.

Adsorption should be possible with locally accessible adsorbent materials with high productivity and cost-adequacy. Home grown and indigenous items which are practical and locally accessible are promising materials utilized right now. These materials are reasonable for Indian conditions. Be that as it may, the procedure is reliant on pH and nearness of sulfate, phosphate, and bicarbonate brings about ionic challenge. Removal of fluoride-loaded muck is a drawback.

Particle Exchange evacuates fluoride up to 90-95% and holds the taste and shade of water flawless. Sulfates, phosphates, and bicarbonates make ionic challenge right now. Generally greater expense is a burden and treated water now and then has a low pH and significant levels of chloride.

Layer forms is a profoundly powerful strategy and no synthetic substances are required. It works at wide pH range and obstruction by different particles is immaterial. In any case, it requires relative greater expense and talented work. This procedure isn't reasonable for water with high saltiness.

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ELDERLY DEPRESSION IN WOMEN – AN EMERGING PUBLIC HEALTH CHALLENGE

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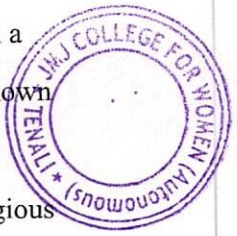
Abstract

Any assessment of the status of women has to start from the social framework, social structures, cultural norms and value systems that influence social expectations regarding the behavior of both men and women and determine women's roles and their position in society. A society is composed of many institutions and most important of them are the system of decent, family and kinship, marriage and religious traditions. They provide the ideology and moral basis for women about their rights and duties and their status and role. Women form about half of the population of the country. Now a days women are prone to emotional challenges rather to socio-economic ones. Depression is one among the most. Especially the elderly women are hardly aware that they have been suffering with the depression and even if they knew they don't dare to talk about it as the word depression is considered as the failing.

Key words: *depression in women – Women in Indian society – exploitation - symptoms of depression - Social impact*

Women in Indian society

The historical background of Indian society reveals that in Vedic times a woman was given a high status. It is an old saying, "Where women are honored, gods reside there." She was known as Ardhangini' – one half of husband's body. At the time of marriage, she as a bride was Entitled to procure certain solemn vows from the bridegroom before the ritual fire. No religious



ceremony by the husband could bear fruit without her participation. As a mother, wife and sister she occupied an honored place. She is the epitome of courage and boldness, love and affection, sacrifice and suffering. However during the course of history women lost their honored place due to social, economic and political factors. Evil customs like sati, Purdah, child marriage, enforced widowhood, dowry system, crept in the society and this led to decline in women's status inside and outside the home. During the last few years, sexual harassment at work place, eve teasing, abduction and female feticide has given an inclination of the horrible behavior patterns prevailing in the society. Majority of women live a life of dependency that does not possess any self-identity. Struggle for equality, justice and parity between women and men continues with more and more literature appearing on the subject on empowerment of women.

A woman in Indian society has been victim of humiliation, torture and exploitation. 'Matro Devo Bhava' (Mother of Goddess) is an old sentiment shared by the Indians. From time immemorial, women have been considered as goddesses like Durga, Parvati, Kali, Shakti,Vaishnomata, Bhairavi so on and so forth. Indians put them on the pedestal and offer prayers and sacrifices. In contrast, more 'goddesses' are being killed in womb, burnt alive for dowry, harassed in workplaces and streets, raped, abducted, exploited and discriminated. Indian citizens venerate and salute this country as 'Janani' or mother. On one hand, they worship this mother and on the other hand, they disregard their mothers who gave birth to them.

Depression in women

As women, we have many life roles. Mother, wife, employee, friend, healer, caregiver, and the list goes on. The complexity of all of these roles can cause ups and downs throughout life. Some of these mood changes may be due to life events (e.g., getting in an argument with a friend) or may be due to hormones (e.g., pregnancy, menstrual cycle). In general, after a few days, your emotions tend to level out and you don't feel down in the dumps anymore. But, if you are

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suffering from depression, your "downs" don't go away after a few days and may interfere with your daily life activities and relationships.

Some of the distinguishing factors in how depression differs between women vs. men include:

- Women feel anxious and scared; men feel guarded
- Women blame themselves for the depression; men blame others
- Women commonly feel sad, worthless, and apathetic when depressed; men tend to feel irritable and angry
- Women are more likely to avoid conflicts when depressed; men are more likely to create conflicts
- Women turn to food and friends to self-medicate; men turn to alcohol, TV, sex, or sports to self-medicate
- Women feel lethargic and nervous; men feel agitated and restless
- Women easily talk about their feelings of self-doubt and despair; men hide feelings of self-doubt and despair-considering it a sign of weakness

Today, depression is an important public health challenge in developing countries. This problemis not new, in 1990, the World Health Organization (WHO) described depression as a major, worldwide cause of disability. Mental and behavioural disorders are estimated to account for 12% of the global burden of disease which affects approximately 450 million people.[1] However, most countries allocate less than 1% of their total health expenditures to mental health budgets. Depression, along with other mental health disorders, has long been segregated and neglected. The elderly age group comprise a particularly vulnerable group as they often have multiple co-existing medical and psychological problems.

Women are undergoing continuous demographic and epidemiological transition across the world. In addition, a population explosion in the developing countries is contributing to the population growth. A transition towards an older society that took over a century in Europe is taking place now in less than 25 years in countries like Brazil, China and Thailand. These factors together lead to an increase in the number of elderly individuals which will ultimately lead to a rise in the absolute number of elderly women with depression in developing countries. In the past century, there has been a dramatic increase in life expectancy. The world's geriatric population

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will soon be greater than children. From 2000 to 2050, the proportion of the world's elderly population is predicted to double from ~11 to 22% and the absolute population increase is expected to be from 605 million to 2000 million. Of this, 80% people will be living in low- and middle-income countries.

In India, life expectancy has increased from 45 years in 1970 to 65 years in 2010.On account of better education, health facilities and increase in life expectancy, the percentage of the geriatric population has gone up from 5.3% in 1971 to 7.5% in 2010. Although the proportion of people 60 years and above is smaller than that in the developed world, by 2020, the absolute number of older adults is likely to be higher in India. An increasing geriatric population is associated with rising prevalence of chronic non-communicable diseases; therefore, the magnitude of depression is also expected to grow.

Societal modernization has brought in its wake a breakdown in family values and the framework of family support. With ongoing economic development, children are moving to urban areas, sometimes leaving their parents alone at home. If the parents move with their children, they are sometimes unable to adjust to the new environment. The change in the family structure along with economic insecurity results in the elderly losing their relevance and significance in their own house and increasing feelings of loneliness. This has a detrimental influence on the psychological health of the elderly women.

In modern society, enforced retirement may act to marginalize older people. The elderly women are viewed as less energetic and less valuable by potential employers. This attitude serves as a social divide between the young and old and can prevent older women from fully participating in social, political, economic, cultural, spiritual, civic and other activities.

All these factors make the elderly women more prone to psychological problems. Even though depression is the commonest psychiatric disorder in the elderly, it is often misdiagnosed and under-treated. Perhaps due to the misconception that depression is part of ageing, rather than a treatable condition. In the absence of treatment, there will be significant clinical and social implications in the lives of the elderly, as depression has a tendency to be chronic or recurrent.

Signs and symptoms of depression in women.

Signs and symptoms of depression vary from woman to woman. Some of the most common signs and symptoms are listed below:

- Feelings of emptiness, hopelessness, despair, and sadness
- Irritability, anxiousness, and guilt
- Feelings of exhaustion, severe tiredness
- Loss of interest in previously pleasurable activities
- Inability to concentrate or remember details
- Suicidal thoughts or attempts of suicide
- Sleep disturbances; sleeping too much or too little, insomnia
- Changes in appetite – eating too much or too little
- Physical symptoms – aches and pains, cramps, headaches, digestive issues, breast tenderness, bloating
- Lack of energy
- Feeling out of control
- Mood swings and feelings of tearfulness
- Panic attacks
- Feelings of tension
- Disinterest in daily activities and relationships

Social impact of Depression

Depression decreases an individual's quality of life and increases dependence on others. People with depression suffer from impairment of all major areas of functioning, for instance, personal care, family responsibilities, and socialoccupational capabilities. Elderly people tend to be less healthy physically, and are more socially withdrawn. They are less satisfied with the manner in which they handle their problems and social life. People with depression suffer overly from various medical disorders and die prematurely. Geriatric populations with depression are at a higher risk for chronic diseases like coronary heart disease (CHD), cancer, diabetes mellitus and hypertension.-These people use medical services more often, thus raising the cost of medical

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services to the community at largeThere is an increasing number of older people with limited mobility and need of long-term care.

These factors increase the elderly person's dependency and make them vulnerable to maltreatment in various forms like deprivation of dignity and insufficient care etc.Elderly patients often need long-term institutional care but such services are scant in India. Therefore, the demand of mental health care services including that for institutional care is increasing in developing countries along with the health services required for care of the elderly population.

Government and Geriatric health

The government of India launched the "National Mental Health Programme (NMHP)" in 1982, emphasizing the needs of the elderly, affected by Alzheimer's and other dementias, Parkinson's disease, depression and psycho geriatric disorders. The NMHP failed to achieve any of its targets over the subsequent decades because it was started using the Bellary Model. The Bellary Model was validated in a backward district of Karnataka, but seemed to work under resource-intensive experimental conditions over a limited time-frame. However, it failed to deliver in real-life field conditions because policy makers' priority was to cope with issues, such as high maternal and child mortality, under-nutrition, unsafe drinking water and a primordial healthcare system. Thus, mental health took a back seat and did not even merit mention in the national five-year plans till 1996-97, when a token provision of 270 million (US$ 5.1million) was made in the Ninth Five-Year Plan (1997-2002) for piloting the District Mental Health Programme (DMHP) in 25 of 593 districts. Even this meager amount remained unspent due to bureaucratic apathy and tardy implementation.

The district mental health programme (DMHP) was designed to decentralize mental health care in the community by using the public health infrastructure and other resources. But, the approach did not take into account the poor functioning of the primary health centers in general, shortage of professional manpower, poor morale of the health workers, lack of enthusiasm in the professionals, and lack of an administrative structure to monitor the progress of the programme in a decentralized manner. Till the end of the 11th 5 Five Year Plan (2007-12) the programme has been implemented in only 20% of districts (123) of the country. After the years, Government of

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India decided to increase the budget on mental health threefold in 12th Five Year Plan (2012-17). It is anticipated to cover all 640 districts by the end of the plan period.

The importance of health care of the elderly was officially emphasized in the policies of Government of India in 1999 by adopting the national commitments under the UN Convention on the Rights of Persons with Disabilities (UNCRPD), National Policy on Older Persons (NPOP). The Maintenance and Welfare of Parents and Senior Citizens Act, 2007 also deals with provisions for medical care of senior citizens along with other facilities. The National Programme for the Health Care for the Elderly (NPHCE) launched in 2011, which is an articulated version of earlier act of 2007, UNCRPD and NPOP (*vide supra*). Through this programme the government aims to provide basic health care to the elderly and improve their quality of life by collaborating with health care services, social welfare schemes and rural health development-oriented schemes. Thus this programme makes easy access to preventive, curative and rehabilitative services through a community-based primary health care approach.28 recognising the importance of mental health, India announced it as an important NCD at the First Global Ministerial Conference on Healthy Lifestyles and Non- Communicable Disease Control held in Moscow in April 2012.

How To Fight Depression In The Later Years Of The Life

The goals in treating depression in elderly women include resolution of symptoms, prevention of relapse and recurrence, and improvement of functional capacity. Because elderly women with depression often overuse health services before their illness is recognized; early recognition and timely treatment becomes a necessary element of the management of depression. Treatment depends on severity and duration of symptoms, chances of relapse, and associated co-morbidities. For sub-threshold symptoms and mild to moderate depression, psychological interventions including cognitive behavior therapy, interpersonal therapy should be preferred. Antidepressant drugs need to be considered if symptoms are moderate to severe and/or high intensity psychological interventions are not effective. women are more prone to side effects of antidepressant drugs even at lower doses; a careful monitoring and motivation is often needed while treating these patients with antidepressants. Antidepressant drugs include four groups of drugs: Tricyclic Antidepressants (TCA), Selective Serotonin Reuptake Inhibitors (SSRI),

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Serotonin and Norepinephrine Reuptake Inhibitors and Dopamine Norepinephrine Reuptake Inhibitors. SSRIs are the most commonly used drugs nowadays with lesser side effect profile. Though SSRIs have been relatively expensive compared to the older tricyclic antidepressants, cheaper generic alternatives are now becoming available. Electroconvulsive therapy is particularly useful where depression is life threatening or in response to multiple drug therapy and psychological interventions is inadequate. In addition, regular counseling, guided self-help, physical exercise programs, management of sleep patterns, relaxation techniques and vitamin B based supplements should be considered throughout the course of disease.

Considering the 77% average national deficit of psychiatrists ranging from approximately 25% in Kerala to more than 90% in nine states, our long-term goal should be to train the MBBS students in the fundamentals of psychiatry. Training of non-psychiatrist physicians and general practitioners is required to identify depressive symptoms in general patients as a short-term measure.

Governments in developing countries such as India should attempt to change the negative perception the community holds towards mental disorders by giving priority to public education as many aspects of mental health care require active collaboration with the community. It is time to start the process of destigmatisation of mental health disorders.

In addition, supply of effective and affordable drugs in primary health facilities, recognizing and addressing the inequities in health, maximizing scarce public resources, regular training programmes for primary care providers, research on preventive and promotional aspects of mental health, and sufficient fund allocation should be the priority areas for tackling depression in the elderly. Aggressive education and awareness campaigns to fight depression at individual, community and the national level and support to patients should be an essential component of future strategies. The burden of depression among the geriatric population of developing countries needs to be addressed as a priority, before it becomes a public health menace.

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Conclusion

In addition to medications and therapy, the self-help techniques below can help improve your mood if you are suffering from depression. Don't keep your feelings bottled up – find a support

group with people you trust. Stay engaged in social activities and social functions. Exercise regularly. Get enough sleep – 8 hours per night is ideal. Meditate, try yoga, or practice other relaxation techniques. If you or a loved one is suffering from depression, you are not alone. Seek help for your depressed mood to elevate your quality of life. If you are unsure who to contact, try the following resources: Family doctors, Employee assistance programs, mental health centers, Social agencies, mental health specialists (psychiatrists, social workers, mental health counselors), Private clinics, State hospital outpatient clinics, Health maintenance organizations. Dear woman, a lot many times you survived what you thought would kill you. Now straighten your crown and move forward like the queen you are. Experience is the teacher of all things. So speak about your own experience on fighting against all the odds and be an inspiration to the coming generations, because women are the deep root for the strong generation.

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Reading is the most difficult of all the Language Skills to acquire. It becomes very important at a higher level of language instruction. Though it has been given significant importance in Engineering curriculum in the recent years, it has not yet received proper attention in teaching programmes. As reading is a recognized objective among most language teachers for the assessment of comprehension ability of learners, it should be emphasized in the classroom. Reading requires the learners to assimilate the ideas of the writer in a sequential form. It also necessitates the leaner's ability to use decoding skills with accurate structure and appropriate vocabulary. Reading comprehension measures the learner's ability to understand different perspectives of writers on various issues, command of the language and knowledge of the use of different structures of sentences. Therefore it is considered to be the most complex of all.

It is found that the reading comprehension skill of 1st year Engineering students in the colleges affiliated to Jawaharlal Nehru Technological University Kakinada (JNTUK) is poor and need improvement. Therefore, the study has been taken up to critically evaluate the component of reading during second year course of the Engineering study. As a teacher of English, the researcher realized that there is a need for the improvement of teaching and learning process of reading skill in Engineering students. Though the teachers and the students are well aware of the practical value and importance of the reading skill to acquire knowledge, proper approach is not followed. In real time, the majority of the English teachers are using traditional reading approach (bottom-up) in the class rooms to teach reading texts. Since the reading comprehension ability of the students to learn with this approach is poor, this approach is not producing desirable results in classrooms.

Therefore, with a view to introducing a suitable method for improving learners' reading comprehension, and having studied previous studies on various reading methods, the researcher felt that schema theory would help the learners to improve their reading comprehension. Hence schema theory (top-down) is applied in the present study and the results are compared with traditional reading approach (bottom-up).

OBJECTIVES

1. To know the opinions of teachers about English proficiency level of I-B.Tech students and importance of English language to them.
2. To find out the proficiency level of students reading comprehension.
3. To find out the effect of schema theory (top-down) in comparison with traditional reading approach (bottom-up).
4. To find out whether there is any relationship between pre-reading scores and post-reading scores of experimental group that followed schema theory.
5. To verify how far the schema theory is appropriate for I-B.Tech students affiliated to JNTUK in comparison with traditional reading approach (bottom-up).

REVIEW OF LITERATURE

After making a considerable review of literature on various studies in teaching reading comprehension to second language learners, it is understood that substantial research has been carried out in different types of reading methods across the world. In particular, the previous studies reveal that traditional reading approach (bottom-up) makes the reader passive, interactive model allows the reader to be interactive, and schema theory (top-down) continuously connects background knowledge of the reader to the content of the reading text. The important aspect of schema theory is how knowledge is acquired, processed, and retrieved. Schema is the technical term used by cognitive scientists to describe how people process, organize, and store information in their heads.Research on the schema theory had great impact on understanding reading comprehension in the second language. Theresearch in this area seems to agree that when learners are familiar with the topic of the text they are reading (i.e., possess content schema), they are in a better position to comprehend their assigned reading text successfully. A few research studies are available to the best of the researcher's knowledge in comparing the effectiveness of schema theory (top-down) with traditional reading approach (bottom-up). Since, no study seems to have been conducted comparing the

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results of schema theory (top-down) with traditional reading approach (bottom-up), the study is conducted on this reading method while comparing its results with traditional reading approach.

METHODOLOGY

The study proceeded through administration of tools like questionnaires, comprehension tests and pre-reading and post-reading tests to a sample of teachers and students at Engineering level in the colleges affiliated to Jawaharlal Nehru Technological University, Kakinada. In the Stage-I of the study, a sample of sixty teachers working at Engineering colleges affiliated to the university and students studying at Engineering colleges affiliated to the university are taken to draw the opinion of teachers and students on the prescribed English text books. In the Stage-II, a sample of sixty students studying in various engineering colleges affiliated to JNTUK is taken to find out the present level of engineering students' reading comprehension. In the main study, a sample of one hundred and twenty students is taken from Sri Sarathi Institute of Engineering and Technology, Nuzvid.

PROCEEDURE

The research study is carried out in three stages.

The Stage-I : It has two parts namely Part-1 and Part-2. Part-1 gathers information from English teachers who are working at different Engineering colleges affiliated JNTUK, Kakinada. It explores English proficiency level of 1st year Engineering students' and finds out teachers' views on prescribed English text books. In a similar way, Part-2 also collects information from 1st year Engineering students who are studying at different engineering colleges affiliated to JNTUK, Kakinada on the importance of English language in their professional career and their views on English text books. Questionnaires are prepared on the Likert Five point scale with 20 statements to elicit the views of English teachers and students.

Stage-II: It is conducted to estimate the reading comprehension level of 1st year Engineering students. Hence a reading text is taken from semester-1 English Text. The comprehension test with 20 questions is administered. The result of the test has revealed that the reading comprehension level of seco students is poor and needs improvement.

Stage III: Since it is an experimental study before the main research plan i.e Stage-IV, a sample of two lessons from the prescribed text book for Semester-1 are taken for Stage-III and administered on eight students of two sections. Section-1 students are taught with the help of pre reading activities (schema theory) and Section-2 students are taught with the traditional reading approach. The pre-reading test scores of Section-1 students are compared with their post-reading tests so as to find the relationship between pre-reading and post-reading tests. After teaching reading text to Section-2 students with tradition reading approach (bottom-up), a post-reading test is given to them with the same questions given for Section-1. Finally, the answer scripts for the post-reading tests of both sections are evaluated and compared the results of each other so as to find out which reading method is effective to understand the given reading texts. Based on the result, Stage-IV is conducted.

Stage-IV (Main study): Based on the positive results found in the Stage-III for Schema Theory, Stage-IV (Main study) is carried out. It is comprised of ten reading comprehension proficiency tests. Out of the ten, five tests are conducted in Semester-1 and other five tests are in Semester-2. The total 120 strength of Electronics and Communication Engineering (ECE) branch students are divided into experimental group and control group with sixty students for each group. To examine the variation in the results of tests, as in the Stage-III, Schema theory (Top-down) is applied on the experimental group participants and Traditional reading approach (bottom-up) is applied on control group participants. The pre-reading test scores of experimental group are compared with their post-reading tests so as to find the relationship between pre-reading and post-reading tests and to determine the effectiveness of the method for improving reading comprehension skill.

RESEARCH TOOLS USED FOR THE STUDY

1. Conventional Tools : Likert Five Point Scale Questionnaire, Reading comprehension test and Proficiency tests.

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2. Tatistical Tools: *t*- Distribution, Z- Distribution and Correlation Coefficient

FINDINGS AND CONCLUSION

- From the findings in Stage-I, it can be concluded that English proficiency level of 1st year students needs improvement. Students have remained weak in English language usage due to frequent use of their mother tongue, insufficient opportunities to practice English in the college and inadequate knowledge of English grammar and vocabulary.
- It can be concluded that there is a positive correlation between pre-reading scores and post-reading scores of experimental group that followed schema theory in reading.
- It can be seen that if the previous knowledge of the learners on the reading content is recalled with effective pre-reading activities, they are able to understand the reading text effectively and are able to write post-reading tests successfully.
- Finally the study confirms that there is a significant difference between the reading methods - Schema theory (top-down) and traditional reading approach (bottom-up) - while teaching reading comprehension text books to the 2nd year engineering students affiliated to JNTU Kakinada.

Therefore it is concluded from this study that Schema theory (Top-down) plays a significant role in improving learners' reading comprehension. It can be concluded that the teachers who conduct pre-reading tests prior to the explanation of the reading material will be able to improve the comprehension skills of learners effectively. Lectures with Traditional Reading Approach (bottom-up) are not improving the reading comprehension skills of learners. Selection of appropriate reading method affects learners' attention in the classroom and also helps them to improve their reading ability. Finally, this study concludes that there is a significant difference between Schema theory (top-down) and Traditional Reading Approach (bottom-up) while teaching reading comprehension skill to the II-B.Tech students affiliated to JNTUK, Andhra Pradesh.

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DEMENTIA, A CHALLENGING HEALTH PROBLEM OF ELDERLY WOMEN IN INDIA-A REVIEW

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Abstract

Background: This article aims to highlight the causes, symptoms and treatment of Dementia with which 3.7 million elderly people in India are suffering and strategies for bringing about an improvement in their quality of life.

Methodology: A web and manual based literature survey was conducted to assess the amount of information available on Dementia disease in India. The databases searched include Google Scholar, Pub Med, Scopus, and Web of Science, the search terms were "Dementia" , "Geriatrics", "Indian Health care system", "Health Issues of Elderly women " without narrowing or limiting search elements. Publications only with abstracts/full articles and books were reviewed in the search.

Interpretation and Conclusion: The literature reviewed adequately answers the "what" and the "why" of aging and poor geriatric care in India, but more research is needed to understand "how" to instigate improvements. Global as well as Indian data on prevalence of dementia confirms a greater vulnerability of the women patients than their male counterparts. The global health community has recognized the need for action and to place dementia and its care and support services on the public health agenda. Dementia imposes significant physical, mental, and financial stress on caregivers who, again, often are women.

Keywords: Dementia, Prevalence, Geriatrics; Elderly; Health.

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Introduction:

Dementia is usually a disease of the older people. Women make up a larger proportion of the older population. In 2014, women accounted for 62 per cent of people aged over 80. Certain changes in activities or societal roles make the people to be considered as old, the boundary of old age cannot be defined because it does not have the same meaning in all societies. In January, 1999, Government of India adopted 'National Policy on Older Persons', which defines 'senior citizen' or 'elderly' as a person who is of age 60 years or above [1]. In Africa, Latin America, the Caribbean, and Asia, population ageing is particularly rapid. The prevalence of dementia is increasing worldwide. By 2050 over 71 per cent of people with dementia will live in low and middle income countries. The impact on women will be greater than for men [2].

Dementia is characterized by progressive loss of memory and other mental faculties such as language, judgment, and planning, impairment of daily activities, and deficiency in social interaction. Dementia impacts personal, family, and societal life. It reduces life span, induces caregiver's strain at family level, and utilizes health care facility, inflicting strain on national income. It is expected that the burden of dementia will be increasing in developing countries due to increase in longevity and increasing prevalence of risk factors such as hypertension and stroke and lifestyle changes.

The world is Ageing:

It is well documented that the world's population is ageing; the proportion of the global population aged 60 years or over has increased from 8.6 per cent in 1980 to 12 per cent in 2014, and is expected to rise further by 2050 to 21 percent [3]. The number of people aged 80 or above is projected to increase by 19 per cent. According to the UN [3] ,the number of older persons worldwide is projected to be 2 billion by 2050, with particularly rapid growth in Africa, Latin America and the Caribbean, and Asia. Given the global differences in life expectancy between women and men, in 2014women made up 54 per cent of those aged over 60, and 62 percent of those aged over 80. The changing demographics of the population, along with changes associated with socioeconomic development, will have implications for the provision of health and social care for both developed and developing countries [4], to ensure there is an infrastructure to provide appropriate long term care available. According to the World Health Organisation (2011), many countries have been slow to make use of the available evidence to develop effective health care policies to respond to aging populations,

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particularly in low and middle income countries, with a lack of a strategic insight concerning their specific needs [5].

Demography of the elderly in India:

The elderly population (aged 60 years or above) in India accounted for 7.4% of the total population in 2001, 8.6% (104 million; 53 million females and 51 million males) in 2011 and has been projected to increase to 19% by the year 2050 [1,6-7]. Globally, demographers predict that it will take only another 25-30 years for the 65 years and older age group to reach double the number of children under 5 years of age. This means that future populations might require more geriatricians than pediatricians. Preparations therefore need to begin decades in advance [8]. Projections indicate that in 2050 the 'oldest old' - those aged 80 years and on whom the burden of morbidity and dependency is highest, growing faster than ever, will number 434 million, having more than tripled in number since 2015 [6].

According to statistics related to elderly people in India, in the year 2011, it was observed that as many as 71% of elderly persons were living in rural areas. In rural areas, 66% of elderly men and 28% of elderly women were working, while in urban areas only 46% of elderly men and about 11% of elderly women were working. Although the literacy rates among the elderly have shown an uptrend, the old-age dependency ratio has climbed from 10.9% in 1961 to 14.2% in 2011 for India as a whole. State-wise data on economic independence tells us that in rural areas, the proportion of elderly males who are fully dependent on others is highest in Kerala (43%) and is lowest in Jammu & Kashmir (21%) [1].

Prevalence of dementia in India

Prevalence rates (PRs) from different regions of India differ widely. [9-17]. The prevalence of dementia of rural population in South India and that in North India showed a widely varying rate from 3.39 to 0.84%, respectively. [9],[12] There are few urban studies from several regions of India showing similar varying rates: From 2.44 to 4.1% in West India, [14],[15] 1.83% in North India, [13] 0.8-1.28% in East India, [16],[17] and 3.6% in South India [11].

The situation in India with regards to dementia prevalence has not been researched thoroughly though there have been indications of prevalence according to the 10/66 Dementia study which was conducted in seven low and middle income countries in eleven sites which

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included both rural and urban India [18] .This study was conducted on the background of previous literature that low socioeconomic countries harbour less of dementia compared to higher economic countries (Table 1). In assessing and diagnosing dementia there are a number of issues when countries like India are considered. The educational background, social status, urban / rural living, understanding of assessment process and validation of the assessment tools used are to be taken into account when diagnosing somebody with a condition which means little to people but harnesses itself in the most overwhelming fashion. Though the percentage figures from these studies look small in numbers one could imagine the prevalence of Schizophrenia, which is considered to be 1% and still presents with significant psychiatric morbidity costing the Government a fortune.

Table 1: The prevalence of dementia in India as in 10/66 Dementia study

India	65-69 years%	70-74 years%	75-79 years%	80 years %	Crude Prevalence% (CI 95%)	Standardized Prevalence (CI 95%)
URBAN						
Men	2.9	5.5	4.5	25	7.5	8.2
Women	5.5	7.4	8	21.2		
RURAL						
Men	4.3	5.8	5.7	11	10.6	8.7
Women	7.8	14.8	15.7	29.4		

Table 2: Projected dementia population in the State of Andhra Pradesh by year 2026 [19]

Projected numbers (in 000s) with dementia by age group					% change in dementia compared to 2006	
Year/age	65 - 69	70 - 74	75 - 79	80+	Total	
2006	35.6	43.5	50.3	54.0	183.4	
2011	38.7	50.6	57.6	99.0	245.9	34
2016	46.3	55.9	68.9	136.8	307.9	68
2021	56.7	67.9	77.5	176.4	378.5	106
2026	68.3	84.0	95.3	213.5	461.1	151

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Dementia has been found to be one among the most important chronic debilitating illnesses with largest contribution to disability when compared to other chronic diseases from the developing world [20]. A two fold increase in people with dementia by 2021 and a threefold increase by 2026 are thus estimated. Interestingly in the state of Andhra Pradesh by year 2026, percentage change in dementia compared to 2006 is estimated to be 151 (Table 2).

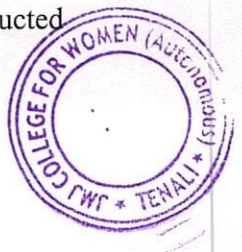
Impact of increasing prevalence

This is a cause of concern for many - a greater proportion of women (58 per cent) than men (43 per cent) in the United States were frightened about the prospect of being diagnosed with dementia, with the main reasons for this concern being forgetting loved ones, becoming a burden to their family and not being able to take care of themselves [21]. The current costs of dementia across the world are estimated to exceed US$600 billion, including medical costs, social care workforce costs, and the significant contribution from informal caregivers [22]. For lower and middle income countries, informal family care accounts for the majority of the cost.

Therefore, the care burden associated with dementia disproportionately falls on family carers in much of the world. Improved education, along with healthier environments and lifestyles is needed across the world to lessen the burden of dementia [23]. However, if dementia is not made a public health priority by governments and health care authorities in low and middle income countries, it is difficult to secure funding to improve care and support for people with dementia and their families [5].

The need for this review

A roundtable discussion of experts in the field of Alzheimer's disease (AD), identified the need to understand more about the gender and sex differences in the mechanisms in the disease, and also the effects differences of sex and gender on those with the disease and on men and women caregivers[24]. The predominance of women affected by dementia, both as experiencing dementia and as carers, makes dementia a gendered and feminist issue[25-26]. This review of the literature goes some way to exploring the research that has been conducted looking at the impact of these issues on women.



Aim of this review

The key aim of this review was to understand the main issues affecting women in relation to dementia.

More specifically the study had the following objectives:

- To explore research that has been conducted relating specifically to women and the causes, symptoms and treatment of Dementia.
- To examine the effect of gender on women living with dementia;
- To understand the issues affecting women in relation to dementia in lower and middle income countries.

Methodology:

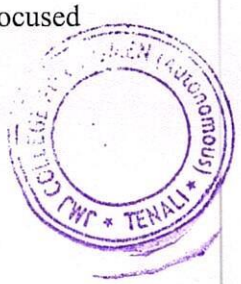
A systematic search process was undertaken to identify relevant policy, research and other documents relating to dementia, with a focus on women and gender. The search strategy aimed to identify as wide a range of published papers and reports as possible in the time available. The databases searched included Academic Search Complete, Medline, Web of Science, PubMed and Google Scholar along with a search of relevant government department and third sector organisations websites and a general internet search.

Search terms included

- Dementia, Alzheimer's,Geriatric
- Women, gender, female, feminist
- caregiving, care work, professional
- family carer, partner, spouse, daughter, mother, caregiver
- family, structure, kinship, culture

The papers were focused on people with dementia, informal family carers or the formal care workforce. Three quarters of the papers focused on informal dementia caregivers. There were similar numbers of papers focusing mainly on the person with dementia, and on the formal care workforce, which both received far less attention in the literature through this search strategy.

Of the 15 papers published from the low and middle income countries, nine focused on caregivers, four looked at prevalence and two focused on the workforce.



Interpretation:

Causes of dementia:

Dementia is mainly caused by damage to the brain cells and death of the brain cells. What is not clear, however, is whether dementia causes the death of brain cells, or the death of the brain cells cause dementia.

There are a number of factors which can cause dementia such as:

- a head injury
- a stroke

Existing medical conditions such as:

- coronary artery disease
- HIV infection
- Prion diseases (rare progressive neurodegenerative disorders)
- depression
- vitamin deficiencies
- a brain tumour
- thyroid abnormalities

Different regions of the brain are responsible for different functions. For instance, the part of the brain called the hippocampus is responsible for learning and memory. If this part gets affected memory loss can occur. Thus, the damage of particular types of brain cells in particular regions of the brain can cause different types of dementia.

Dementia- sub-types:

Dementias are broadly classified into reversible and irreversible dementias; irreversible dementias are often called as progressive dementias. Progressive dementias include Alzheimer's disease (AD), Vascular Dementia (VaD), Dementia with Lewy Bodies (DLB) and Fronto-temporal Dementias (FTD) [27].

- **Alzheimer's Disease**: This accounts for 60-80% of dementia cases. It is known as neurodegenerative disease, meaning there is progressive brain cell death that occurs over a course of time. The total brain size shrinks with Alzheimer's meaning the brain has fewer nerve cells and connections. Some causes of Alzheimer's include leading a sedentary lifestyle, family history, obesity, high blood pressure, Down syndrome, type 2 diabetes, and unhealthy diet.

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- **Vascular Dementia**: This condition occurs when vessels that supply blood to the brain become blocked or narrowed as a result of which strokes take place since the supply of blood carrying oxygen to the brain is suddenly cut off. Long-term damage on the brain blood vessels due to the wear and tear associated with ageing, high blood pressure, hardening of the arteries, diabetes, lupus erythematosus, brain haemorrhage, and temporal arteritis can also lead to vascular dementia.
- **Dementia with Lewy bodies (DLB)**: This is the second most common type of progressive dementia after Alzheimer's disease. This condition occurs due to the abnormal build-up of protein deposits, called Lewy bodies, in the nerve cells in the brain regions involved with thinking, memory and movement (motor control). People suffering from DLB may experience visual hallucinations and changes in alertness and attention. Other effects can include symptoms similar to Parkinson's disease such as rigid muscles, slow movement and tremors.
- **Frontotemporal dementia**: When the frontal and temporal lobes of the brain (the front, right side of the brain) are affected, Frontotemporal dementia occurs, which is an umbrella term for a diverse group of uncommon disorders. The frontal and temporal lobes of the brain are the areas associated with personality, behaviour, and language. Thus this disease affects our judgment, personality, and ability to manage complex tasks. The disease also affects the way in which an individual is able to use and understand language.
- **Mixed dementia** is a condition where changes representing more than one type of dementia occur simultaneously in the brain. Signs of Alzheimer's disease can co-exist with DLB.

Reversible dementias – Metabolic / Endocrine / Nutritional:

The reported frequency of Dementia due to reversible causes varies from 0 to 23 per cent [19]. Commonest amongst these are namely Alcohol and medication related Dementia, Depression induced cognitive impairment, Normal pressure Hydrocephalus, Tumor and Chronic Subdural Hematomas, Endocrine disorders and Nutritional problems (Vitamin B12 deficiency) and CNS infections like Neuro-syphilis and HIV.

- **Parkinson's disease**: is primarily caused by low and falling dopamine levels. The cells in the area of the brain called the substantia nigra produces the chemical called

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dopamine. Dopamine has a very important function in the body. It acts like a messenger that tells another area of the brain when you want to move a particular part of your body.Thus the cells producing dopamine are damaged or begin to die, Parkinson's disease occurs. The cause of the death of the cells is not known.

- **Huntington's disease (HD):** It is an inherited brain disorder in which cells in parts of the brain (specifically the caudate, the putamen) die. The cerebral cortex of the brain is also affected. As the brain cells die, a person's emotions and cognitive abilities are affected. The person suffers from depression, apathy, irritability, anxiety, obsessive behaviour, inability to focus, plan, recall or make decisions; impaired insight.
- **Wernicke-Korsakoff Syndrome:** It is a chronic memory disorder caused by severe deficiency of thiamine (vitamin B-1). Thiamine helps brain cells produce energy from sugar. When thiamine levels fall too low, brain cells cannot generate enough energy to function properly. The most common cause is alcohol misuse.
- **Creutzfeldt-Jakob disease:** It is a rare, degenerative, and an invariably fatal form of dementia. It affects about one person in every one million people per year worldwide. In this condition, the brain cells get destroyed, and tiny holes form in the brain. People suffering from this disease experience difficulty in controlling body movements have an abnormal gait and slurred speech.

Symptoms of Dementia:

The symptoms of dementia include:

- Short term memory changes
- Struggling to communicate thoughts and finding the right words
- Difficulty following narrations and storylines
- Failing sense of direction
- Saying or doing the same thing repeatedly
- Depression
- Listlessness or apathy
- Impairments in language, communication, focus, reasoning
- Confusion such as not able to remember people's faces
- Difficulty in adapting to change

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- Struggling to complete routine tasks

Diagnosis:

Dementia can be diagnosed by an experienced general practitioner, who might also refer the patient to a psychiatrist. The doctor will ask the patient about his/her symptoms, when the symptoms started, whether they are affecting daily life, and whether the patient has any existing conditions, such as heart disease, diabetes, depression or stroke. The doctor will check if the existing medical conditions are being properly managed, review any medicines the patient may be currently taking, and perform a physical examination.

The accompanying family members can provide their input about the daily routine, cognitive abilities, and any recent behavioural changes of the patient that they may have noticed. The doctor will also ask the patient and the attendants questions about the patient's everyday activities, such as personal care (bathing and dressing), cooking and shopping, paying bills.

The patient may be asked to undergo a memory or cognitive test to measure any problems with memory or ability to think clearly. To rule out other causes of memory problems, the doctor may ask the patient to undergo a blood test.

The doctor may also suggest that the patient undergoes an MRI and a CT scan to check for signs of stroke or a brain tumour which could be responsible for the symptoms.

Treatment for dementia:

Medical Treatment for Dementia:

Treating dementia does not involve only medicines. Medicines may be prescribed for advanced cases but care for the patient is more important for him/her to live well. Group activities and exercises designed to improve memory and problem-solving skills will be suggested, which is cognitive stimulation therapy. Cognitive rehabilitation which involves working with a trained professional may also be suggested to be able to perform everyday tasks efficiently.

Most importantly getting time and care from family members is the biggest medicine for patients suffering from dementia. If the patient suffers from symptoms such as delusions, anxiety, hallucinations, and aggression, the doctor will prescribe medicines to control these

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symptoms. The doctor may also prescribe medicines to treat some conditions, such as heart problems, which can affect symptoms of dementia, particularly vascular dementia.

These conditions include:

- stroke
- heart problems
- diabetes
- high blood pressure
- high cholesterol
- chronic kidney disease
- depression

Exercise

Consider physical activities that are mentally or socially engaging, such as walking with a friend, taking a dance class, joining an exercise group or golfing, if you think you are suffering from symptoms of dementia. Let them be activities that you enjoy so that you will continue to engage in it. Bike riding, gardening or walking the dog are pleasurable activities which can also provide the much-needed exercise.

If it's safe for you to engage in cardiovascular exercises, this will increase the blood flow to the brain and body, providing nourishment while reducing potential dementia risk factors such as high blood pressure, diabetes and high cholesterol. It is advisable to consult your doctor before deciding on any exercise regimen.

Prevention and delaying onset of Dementia in Women:

Some studies suggest that a number of factors, focused on women, that can delay onset of Alzheimer's disease [28]. Diet and physical activity, as well as body weight, seems to have a positive impact on the risk of future dementia and cognitive decline; however these factors do not appear to slow or reverse dementia once women reach their 70s[28-29]. Mental activity (such as reading, playing games), attaining higher education, socialisation and an active lifestyle have the greatest potential for avoiding or reducing risk of developing Alzheimer's disease or other forms of dementia. Education can have a preventive effect on developing dementia; any form of primary education was protective against dementia. They also noted that females were less likely to have had any education than males [30].

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Maintaining identity:

The identity of the person with dementia therefore needs to be considered as part of a whole family system, to understand their wider role prior to the onset of dementia, and looking at how the dynamics of the family interactions change when caring for a person with dementia [31]. Studies in UK found that handbags were linked to connections to memories and identities, and also offered a means of containing personal items and keeping them safe. Women living at home kept collections of handbags that were no longer used, again linked to their identity as being part of a wider social world. Keeping the bags symbolised resistance to loss of identity [32].

Maintaining the identity of the person with dementia was important not only for that individual, but also for the carer, whose own identity was related to that of the care recipient. In some countries, maintaining identity is not possible where those in communities in which the person with dementia belongs do not understand dementia or what is happening to them, resulting in extreme stigmatization [33]. In some countries, elderly women displaying signs of memory loss, forgetfulness, or disorientation are excluded from their communities and sent to 'witch camps', with their symptoms being mistaken for witchcraft.

Maintaining independence:

There are difficulties in adapting to changing needs as the dementia progresses, and relinquishing the traditional gender roles and positions held by individuals within the family[34]. Mothers with dementia described their gratitude for daughters taking care of them, but at the same time felt they were a burden to them – the concept of "grateful guilt" has been used to describe this situation [35]. Alternative provision of social care, which meets the needs of people with dementia and their families without prior assumptions about the gender roles within the family, would remove the need for these feelings of guilt.

Awareness of dementia in India

The awareness of dementia in general population in India is lacking to the extent of not being able to identify the common symptoms and signs as culturally this symptomatology was considered as 'normal ageing' or 'madness in elderly'. In a number of studies done it was suggested that people were able to identify the typical features of dementia but named them differently like "Chinnan" (literally childishness) in Malayalam language in Kerala,

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"nerva frakese" (tired brain) in Konkani language in Goa where they also believed that it is caused by "family neglect, abuse, tension and lack of love",[37] and "weak brain" in Hindi in Banaras [38] .Though people realized the signs and symptoms of dementia, the suggestion that dementia is an organic brain syndrome and is part of a medical condition was not acknowledged [39]. A multitude of factors responsible for the lack of awareness of dementia among masses and professionals in India; lack of structured training in recognition and management of dementia among professionals; lack of support for patients and their care givers, and the lack of government healthcare organizations and media in promoting awareness in communities[39]. There are other dynamics such as lack of pressure on the government and policy makers to provide a more responsive dementia care service, and complete lack of support to the family and informal caregivers by any organization or institution [39].

Conclusions:

In many parts of the world, the structure of societies predefines the role of women as "caring for the families and the sick". Women are emotional by nature and more family oriented than men. To achieve this goal, the girls are denied of meaningful education and are disciplined in traditional ways of older women. Later, as adults, the lack of education contributes to societal discrimination making them more vulnerable to disease and poverty. Despite the issues women face today, the evidence shows that in the 21st century women live longer than men, but not necessarily healthier. It is estimated that there will be a bigger population of women who will be afflicted by dementia and therefore more daughters, daughter in-laws have to cope with the burden of care. Nowadays, more women are working to support their families but should they need to care for a family member, then it is expected that they quit their jobs resulting in their marginalization. It seems that either way, whether a woman has dementia or she cares for a loved one, she is trapped in the cycle which has been constructed by the society. Dementia is an issue that engages a woman's entire life.

This report provides an overview of the international research evidence that highlights the extent to which women are disproportionately affected by dementia. More women develop dementia, and a large proportion of carers are women, in both informal and formal capacities. Despite the review of the research evidence confirming the impact of dementia on women, public health and social care policy developments, particularly in Lower and Middle

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Income Countries (LMICs), still need to be developed and implemented to address the issues that women are facing.

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Role of government, family and society in implementation of Welfare Schemes for the blissful life of senior citizens

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Abstract

Senior citizen in India is a person attained the age of sixty years or above usually is an experienced but physically weak seeking for the help of others to continue his life needs moral and financial help like a child but differs in weight can't be carried from place to place is being neglected by their children and grand children because of single families, split families, busy life, deterioration of moral values, adapting to luxurious life, selfishness, giving lot of importance to the mechanized knowledge rather than grasping wisdom from elders ,trying to enjoy and to be happy with spending time on net ,face books, whatsApp etc. ;laziness to serve others and for themselves, false prestige, feeling hard to meet the minimum needs because of urbanization and technical revolutions. Hence the weaker sector, the aged people are neglected. So Government of India and Andhra Pradesh introduced certain schemes and introduced certain acts for their welfare. The total Senior citizen population is 104 million among them females 53 million and males, 51 million According to Population Census 2011. Maintenance and Welfare of Parents and Senior Citizens Act, 2007; National Policy on Senior Citizens 2011; Indira Gandhi National Old Age Pension Scheme; Establishment of A National Council for Senior Citizens; Scheme of National Award for Senior Citizens (Vayoshreshtha Sammans, 2005) are some of the schemes.

Ministry of social justice and empowerment, finance, road transport highways, health and family welfare, Telecommunications, railways, civil aviation, consumer affairs, food and public distribution are implementing the schemes and Celebrating international Day of Older persons. But providing life certificate, Thumb impression with Aadhar number is a difficult task as the impression gradually disappears and difference in the iris print.

Non-Governmental Voluntary Organizations and missionaries are establishing old age homes to take care of the senior citizens. Besides the schemes and Acts it is important to conduct

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programmes regarding the basic needs of Older Persons particularly food, shelter and health care to the destitute elderly; building and strengthening intergenerational relationships particularly between children / youth and Older Persons; encouraging Active and Productive Ageing; proving Institutional as well as Non Institutional Care to Older Persons; Research, Advocacy and Awareness building programmes in the field of Ageing especially caring senior citizens with love and care in the family and imparting humanity in children and youth keeping in mind that even we have to pass through the same stage in future, respecting parents gives blessed and long life is important .

Key Words: Senior citizen, welfare, Schemes acts programmes love and care

Introduction

To help or to avail different Government schemes for senior citizens knowledge about schemes, senior citizen Acts and policies is important. Some of the Government schemes for senior citizens are Integrated Programme for **Older** Persons (IPOP) ,Rashtriya Vayoshri Yojana (RVY) ,Indira Gandhi National Old Age Pension **Scheme** (IGNOAPS),Varishtha Pension Bima Yojana (VPBY),The Pradhan Mantri Vaya Vandana Yojana, and National Programme for the Health Care of **Elderly** (NPHCE).Among these---

Integrated Programme for Older Persons (IPOP)

The Ministry of Social Justice and Empowerment, with objective to improve the quality of life of older persons by providing basic amenities like shelter, food, medical care and entertainment opportunities, etc. issues grants for running and maintenance of old age homes, day care centers, mobile Medicare units, multi-facility care centre for older widows, etc. Panchayati raj institutions/local bodies, non-governmental voluntary organizations, etc. are the eligible Implementing agencies for assistance to which Funds under the scheme of IPOP are released directly. In the year 2016-17, Rs 36.99 crore was granted to 396 old age homes. 40,200 were benefited.

Rashtriya Vayoshri Yojana (RVY)

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Ministry of Social Justice and Empowerment runs another central sector scheme funded from the Senior Citizens' Welfare Fund notified in the year 2016. All unclaimed amounts from small savings accounts, PPF and EPF are to be transferred to this fund. Aids and assistive living devices like walking sticks, elbow crutches, walkers/crutches, tripods/quadpods, hearing aids, wheelchairs, artificial dentures and spectacles are provided to senior citizens belonging to BPL category who suffer from age-related disabilities such as low vision, hearing impairment, loss of teeth and loco-motor disabilities. Artificial Limbs Manufacturing Corporation of India (ALIMCO), which is a public sector undertaking under the Ministry of Social Justice and Empowerment implements this Scheme with Rs 483.6 crore up to 2019-20, in 260 districts and benefit 5,20,000 beneficiaries up to 2019-20. The list of selected districts and other features of the scheme are available on the PIB website. The beneficiary identification will be done by a committee at the district level headed by the district Collector and kits will be distributed in camps. Till date, the scheme has benefitted over 38,000.

Indira Gandhi National Old Age Pension Scheme (IGNOAPS)

The Ministry of Rural Development runs the National Social Assistance Programme (NSAP) that extends social assistance for poor households- for the aged, widows, disabled, and in cases of death where the breadwinner has passed away. This is in addition to the benefits that the state governments extend to these people. Under this scheme, financial assistance of Rs 200 is provided to person of 60 years and Rs 500 per month to persons of 80 years and above belonging to family living below poverty line as per the criteria prescribed by Government of India, based on the reports submitted by States/UTs. A total of Rs 5901 crore was released under the scheme in 2016-17. For Income security in old age is a major intervention as more than two third of the elderly live below the poverty line.Rs.1000 per month per person and revised at intervals to prevent its deflation due to higher cost of purchasing.

Varishtha Pension Bima Yojana (VPBY)

The Ministry of Finance runs The Varishtha Pension Bima Yojana (VPBY), social security schemes for senior citizens, implemented through Life Insurance Corporation (LIC) of India launched in 2003 and then re-launched in 2014 intended to give an assured minimum pension on a guaranteed minimum return on the subscription amount. The difference between the actual

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yield earned by the LIC on the funds invested under the scheme and the assured return of 9 percent committed by the government. Both the schemes, VPBY 2003 and VPBY 2014, are closed for future subscriptions. However, policies sold during the currency of policy are being serviced as per the commitment of guaranteed 9 percent return announced by the government under the schemes. As on 31 March 2017, a total of 2,74,885 beneficiaries and 3,11,981 beneficiaries are being benefited under VPBY 2003 and VPBY 2014 respectively. (Rakesh Dubbudu, 2018).

The Pradhan Mantri Vaya Vandana Yojana

PNVVY was launched in May 2017 to provide social security during old age is a simplified version of the VPBY and will be implemented by the Life Insurance Corporation (LIC) of India. Under the scheme, on payment of an initial lump sum amount ranging from Rs 1,50,000 for a minimum pension of Rs 1000 per month to a maximum of Rs 7,50,000/- for a maximum pension of Rs 5,000 per month, subscribers will get an assured pension based on a guaranteed rate of return of 8% per annum payable monthly/quarterly/half-yearly/annually. The duration of the scheme will be for a period of ten years and the scheme is opened for subscription for a period of one year i.e. from 4th May, 2017 to 3rd May, 2018. As on 30th November 2017, a total of number of 1,83,842 persons are being benefited under PMVVY(Rakesh Dubbudu10.01.18).

National Programme for the Health Care of Elderly (NPHCE)

NPHCE launched by The Ministry of Health & Family Welfare during 2010-11 to address various health related problems of elderly people with objectives under district level activities to provide dedicated health facilities in district hospitals, community health centers (CHC), primary health centers (PHC) and sub-centers (SC) levels through State Health Society either free or highly subsidized.

The facilities being provided under the programme are Geriatric OPD and 10-bedded geriatric ward at district hospitals; Bi-weekly geriatric clinic at community health centers (CHC); Weekly geriatric clinic at primary health centers (PHC); Provision of aids and appliances at sub-centers; The Centre will bear 75 percent of the total budget and the state government will contribute 25 percent of the budget, for activities up to district level in 520 districts of 35 states/UTs.

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Maintenance and Welfare of Parents and Senior Citizens Act, 2007

A senior citizen including parent who is unable to maintain himself from his own earning or property owned by him, shall be entitled to make an application under section 5 in case of - Parent or grand-parent, against one or more of his children not being a minor.

National Policy on Senior Citizens 2011

promotes the demographic explosion among the elderly, the changing economy and social milieu, advancement in medical research, science and technology and high levels of destitution among the elderly rural poor. In principle the policy values an age integrated society. It will endeavour to strengthen integration between generations, facilitate interaction between the old and the young as well as strengthen bonds between different age groups. It believes in the development of a formal and informal social support system, so that the capacity of the family to take care of senior citizens is strengthened and they continue to live in the family. The policy seeks to reach out in particular to the bulk of senior citizens living in rural areas who are dependent on family bonds and intergenerational understanding and support.

Employment in income generating activities after superannuation will be encouraged. Support and assist organizations that provide counseling, career guidance and training services. States will be advised to implement the Maintenance and Welfare of Parents and Senior Citizens Act, 2007 and set up Tribunals so that elderly parents unable to maintain themselves are not abandoned and neglected. States will set up homes with assisted living facilities for abandoned senior citizens in every district of the country and there will be adequate budgetary support.

Universal application of health insurance – RSBY (Rashtriya Swasthya Bima Yojana) promoted in all districts to senior citizens.

Department of Telecommunications gives priority to Senior citizens to register telephone connection under N-OYT Special Category.

The Senior Citizens Health Insurance Scheme (SCHIS) as top up over existing Rashtriya Swasthya Bima Yojana (RSBY) scheme is being implemented for senior citizens aged 60 years and above. SCHIS provides enhanced coverage of Rs. 30,000 per senior citizen in the family

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eligible for coverage under RSBY). RSBY is a centrally sponsored health insurance scheme being implemented by this Ministry which covers BPL families (a unit of five) and and 11 other defined categories. Enrolled beneficiaries are entitled for health insurance coverage of Rs.30,000/- cashless per annum per family.

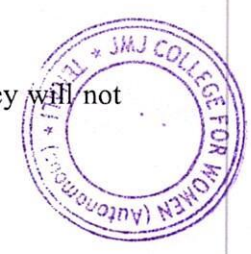
National Programme for Control of Blindness (NPCB); The current National Programme for Health Care of the Elderly (NPHCE); Indira Awas Yojana and other schemes of the government; Age friendly, barrier - free access in buses and bus stations, railways and railway stations, airports and bus transportation within the airports, banks, hospitals, parks, places of worship, cinema halls, shopping malls and other public places that senior citizens and the disabled frequent. Establishement of A National Council for Senior Citizens Implementation responsibility is of The Ministries of Home Affairs, Health & Family Welfare, Rural Development, Urban Development, Youth Affairs & Sports, Railways, Science & Technology, Statistics & Programme Implementation, Labour, Panchayat Raj and Departments of Elementary Education & Literacy, Secondary & Higher Education, Road Transport & Highways, Public Enterprises, Revenue, Women & Child Development, Information Technology and Personnel & Training will setup necessary mechanism for implementation of the policy.

YSR Pension Kanuka in Andhra Pradesh was launched in May 2019 with aim to provide assistance to senior citizens of the state both socially and financially will get a pension amount on a monthly basis Rupees 2250. Its Previous name NTR Bharosa Scheme launched by Andhra Pradesh state government for the benefit of Senior citizens belonging to BPL, widow and disabled pensioners.

Conclusion

Though government introduced many schemes senior citizens are with stretched hands like kids longing for love and support as they are week physically eagerly waiting to spend their time. Youngsters must realize the importance of their elders. Experiences of senior citizens guides them in the right path can be used as short cuts.

Parents, Start children off on the way they should go, and even when they are old they will not turn from it. (proverbs22:6).



I request all the youngsters ``Listen to your father, who gave you life, and do not despise your mother when she is old. Buy the truth and do not sell it— wisdom, instruction and insight as well. The father of a righteous child has great joy; a man who fathers a wise son rejoices in him. May your father and mother rejoice; may she who gave you birth be joyful! (proverbs23:22-25). Remember "The eye that mocks a father, that scorns an aged mother, will be pecked out by the ravens of the valley, will be eaten by the vultures (proverbs 30:17). If someone curses their father or mother, their lamp will be snuffed out in pitch darkness (proverbs20:20)''. A wise son brings joy to his father, but a foolish man despises his mother.
[21] Folly brings joy to one who has no sense, but whoever has understanding keeps a straight course. (proverbs15:20, 21). "Honor your father and your mother, so that you may live long in the land the LORD your God is giving you'' (Exodus 20:12).

Gray hair is a crown of splendor; it is attained in the way of righteousness (proverbs16:31). "'Stand up in the presence of the aged, show respect for the elderly and revere your God. I am the LORD (Leviticus19:32)".Children's children are a crown to the aged, and parents are the pride of their children (proverbs 17:6).Hatred stirs up conflict, but love covers over all wrongs. (proverbs10:12). Ganesh (Vinayaka) respected his parents and stood victorious over Kumaraswami just by rotating around his parents Siva-Parvathulu. Pandurangadu who neglected his parents when he is young finally found his way to heaven by serving his older parents. All of our religions are leading us to respect adults and to look-after them when they become old. When the Senior citizens life is blissful the generations will be blessed by them and by God Almighty. All the people live in peace and harmony.

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ALIENATION AND LIFE SATISFACTION OF AGED WOMEN.

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Abstract:

Alienation in old age particularly among women is the fiery concern in current scenario as the population of older women is higher than the male counterpart. Woman has been depending on her father in her childhood, on her husband in her adulthood and on her son in her old age sacrificing herself identity all through her life. Alienation is a universal existential difficulty which is vital and inescapable fact of all human reality. The factors of alienation have to be identified and dealt well with proper evaluation in order to realize life satisfaction and the life satisfaction is comparatively high in old age particularly among women.

This article seeks to analyze the much neglected aspects of female alienation and suggests few ways to cope with alienation and seek life satisfaction for a better life of women in their old age.

Key words: Alienation, Life Satisfaction.

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Introduction:

One of the most prominent Greek philosophers Aristotle said, "Man is by nature a social animal". As a social being every human being regardless age or sex grows in the society with a mixture of emotions both positive and negative. Alienation is a universal existential difficulty which is vital and inescapable fact of all human reality.

Alienation is 'every human being's disease' in the twenty first century. It is not merely common but also agonizing after sixties increasingly for women. A woman devotes her life for the welfare of her family, catering to her husband's needs, bringing up her children and draining all her energy in accomplishing her responsibilities as a wife, as a daughter-in-law as a mother and later as a mother-in-law respectively. This is expected of every woman to perform all household chores especially in Indian context therefore cannot be identified as something unusual or extraordinary. Every woman who marries, shoulders responsibility of her household, husband, in-laws and children. She ignores her wishes, crushes her ambitions, and sacrifices her likes and pursues to adjust in all unpleasant circumstances thus unites with the family losing her own identity. Yet, though we speak of 'feminism' or 'equality of sexes' women are generally considered as 'second sex' or the 'second class citizens' in our society. A concept such as the 'female alienation' is hardly ever discussed or focused.

According to Oxford dictionary t is defined as,

"The state or experience of being alienated".

According to Collin's Dictionary Alienation is defined as,

"The state of being an outsider or the feeling of being isolated as from society"

Philip Carr-Gomm, a psychologist says,

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"Modern humanity's sense of alienation lies in the fact that we have cut ourselves adrift from both the natural world and from the roots of our past".

Martin Luther King Jr. said,

"Alienation is a form of living death. It is the acid of despair that dissolves society".

The twentieth century science and technology has paved way for the increase in life span of humanity at least since our country's Independence. The problems like difficulty in maintaining the standard of living as a result of increase in the cost of living, expensive medical treatment, lack of economic freedom, difficulty in the freedom of movement due to physical weakness, lack of privacy for oneself during old age, lack of proper residence arrangements, lack of emotional support, ill-treatment by the children after the loss of spouse, increased feelings of loneliness and isolation due to the loss of spouse or because their children stay away from them, loneliness due to loss of friends and relatives as age advances, stressful burden of responsibility of looking after the households and grandchildren. An idle, monotonous and boring life when in no responsibility after settling their children's life or after their own retirement, lack of availability of new opportunities of passing time affect women in their old age.

"India Ageing Report 2017" by the United Nations Population Fund ***(UNFPA)*** says the share of population over the age of 60 could increase from 8 per cent in 2015 to 19 per cent in 2050. India is moving faster to become the most populous country in the next 7 years. It's a matter of critical concern about ageing population. According to some studies, India is ageing much faster than previously thought and may have nearly 20 per cent population of 60 years and above by 2050. The twenty first century computer or digital world has made the words of nineteenth century poet and philosopher, Henry David Thoreau,

"He (man) has no time to be anything but a machine."

Youngsters whose life is accustomed to the mechanical and machine world have become themselves 'machines' diminishing in emotions and familial touch towards their aged family members and have no time to care for their parents or grandparents even more when it comes to aged women who are more in population percentage, they are still underestimated than aged men. Old age is the second childhood where aged people though sometimes have a strong will

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power and positive attitude towards life can't escape the advancing weak physique, blurry mental stamina which will undoubtedly create gradually a broken spirit in them. The most common form of abuses they experience accordingly is disrespect, verbal abuse, and neglect mainly by their sons or daughter-in-laws. Above 80% of those elders who are abused do not report the matter either because of their parental sentiments or to maintain confidentiality of the family matter or because they are forced not to share or perhaps they did not know how to deal with problem. More than 60% of aged would definitely agree that their adult children or grandchildren do not give a quality time for this aged group as much as they give to their phones or computers.

Anita Desai in her novel ***'Fire on the Mountain'*** speaks about the loneliness of an old woman, ***Nanda Kaul,*** the way fantasy becomes her life's driving force. She does her best to escape from the hunting ghosts of the memories of the past but all her efforts are in vain, as from memory there is no escape. She retreats to the mountains to adapt a compelling seclusion. Although having a busy life in the past, being the wife of a Vice-Chancellor, she wished for privacy. Though she performed all her deeds and obligations as a responsible ideal wife, mother and mistress of the house it is taken for granted as a mere formality she feels worn out as she advances in her age. At the end of the novel she realizes life cannot be lived alone. Nevertheless she prefers loneliness or a life of solitude after fulfilling her familial responsibilities, she feels utterly impossible to live an alienated life as she realizes her emotional progressiveness towards her grandchild. Nanda Kaul experiences all the agony that an elderly woman in common experiences.

The main character ***Hagar Shipley*** in the novel ***' The Stone Angel'*** of ***Margaret Laurence*** speaks how she feels the loss of her spirit and free will at the age of ninety when her weak physic resulting to broken spirit does not cooperate with her attitude of 'pride', 'self-love' and 'over confidence'. In her old age she actually had her affectionate son, concerned daughter-in-law and a dedicated nurse near her bed. Yet she strongly believed,

"... if a person doesn't look after herself in this world, no one else is likely to".

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She at last convincingly believes that she can have satisfaction of life only when she starts accepting the harsh reality of her deteriorating age and stamina. Both these women represent in general every 'aged women'.

In India 85% of the elderly are living with family, 8% are living with spouse only, 6% are living alone and 2% are living with relatives. In Manusmriti, it is said that a woman should always be protected. It is duty of father, husband and son to protect her. India, knowingly or unknowingly is still patriarchal in nature. It is woman in common who compromises with her life especially after marriage. Today woman are no less in any field when compared to her male counterpart yet it is she who has to sacrifice not only her stay with her beloved parents and siblings but also her studies, profession and job after her marriage. She bottles within her all her core likes and dislikes and tries to present herself as a faithful wife, sacrificial mother and a trust worthy daughter in law. Her presentation of 'good self' gradually becomes her real self as long as she is physically and mentally strong but her 'real self' starts to project in her attitude, actions and living as she moves towards her 'old age'. Alienation is a state where one feels isolated, rejected, unwanted by their dear ones. Women in their old age also feel powerless. They are looked down as nothing less than 'noisy gong' when they pour out their agony in want of love, care and concern. Popularity of nuclear family system has virtually crushed strong traditional bond between grand-children & grandmothers. There are few major concerns of older women's experience of alienation, such as:

Social alienation:

Older women, in urban or semi urban areas feel socially alienated when compared to those in villages. Due to lack of social protection, older women are forced to lead a life full of distress. Ignored by their own kith and kin they experience a great loss of self-respect, they don't expect any kind of social security from others. Sometimes they themselves choose to stay alone than to be ignored or depreciated by their own.

Financial alienation:

Financial needs with an increased life span of older women in their old age are emerging as a burning issue currently. Earlier the age difference between husband and wife was at least 10

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to 12 years. These women were not encouraged to go out to earn therefore they depended on their husbands' investments and savings. Even if they are left with property or money they possibly would not be able to use the money or take any financial decisions on their own. They are the real owners of everything yet they still are puppets in the hands of their children. In urban areas today nearly 45%of women are from well to do families. Their children either work in abroad or they prefer to live separately from parents. Elderly women in such circumstances are left with no choice but to either choose some 'old age home' or have a nurse who can take care of their daily needs. In such a scenario the older women not only feel alienated by their dear ones but are also not taken sufficient care by the appointed nurses who only focus on the salary that they get.

Medical Alienation:

Women in general, they neglect and sacrifice their health due to family responsibility, or they lack awareness of severity of ailments and they ignore the symptoms, their physical suffering are ignored or unnoticed by their own family, sometimes they are too shy to speak out openly about their certain health issues they also lack financial support due to which they often have to face grave health issues. Older women who live alone cannot share their pain, since there is no one to lend her patient hearing. Indian women are religious minded and believe more in divine healing power than medical science. As age advances their medical expenses also increases due to lack of economic stability their health is openly ignored.

Emotional Alienation:

Uncomfortable relations with son & daughter-in-law or with daughter and son-in-law there are only limited interaction with children or grand-children in the midst of chaotic and unending daily fights. Their interference in family matters is completely disliked by their daughters-in-law, invariable mood swings of retired husband and children who are busy with their own jobs make women in their old age feel emotionally alienated. Most old women are self-conscious. Since childhood they have been emotionally attached to their near and dear ones, in old age when they lose them or are not with them they feel isolated. What one need in old age is the emotional support and that's the most they miss in actuality. They sometimes feel that they

are dehumanized specially when their feelings and words are not taken into consideration or given a deaf ear they feel themselves merely a 'thing of no value'.

Physical Alienation: This is the basic form of alienation that every women in old age experience. Their bodies no more cooperate with their will power as in their younger days. They also face loss of memory due to Dementia or they lack clear thinking capacity due to the advancement in their age. This also makes them feel alienated from the society.

Prolonged loneliness can worsen the persons' health, mental stability and will power to challenge everyday life situation. If the elderly women tackle their core alienated problems well in a proper balanced way they will start to find Life Satisfaction in everything. For this there life style should change. To an extent like the two women in the above mentioned novels they should accept the harsh reality of their age, strengths and weaknesses of their old age and accept the newness of the new generation instead of rigidly sticking to their age old mentality, compromise with the things that they cannot change and leave to the time which will give proper experiences to their children. As much as possible they should try to develop a positive outlook towards everything.

Life satisfaction is entirely based on one's subjective reflection, so it is whatever the individual chooses to focus on. Each person must determine what elements they hold dear and what value they are assigned. Life satisfaction is the evaluation of one's life as a whole, not simply one's current level of happiness.

There are a few different working definitions of life satisfaction, including well-being and life satisfaction researcher Ed Diener's:

> *"[A]n overall assessment of feelings and attitudes about one's life at a particular point in time ranging from negative to positive" (Buetell, 2006).*

Another popular definition of life satisfaction comes from another highly regarded life satisfaction scholar, Ruut Beenhoven:

> *"Life satisfaction is the degree to which a person positively evaluates the overall quality of his/her life as a whole. In other words, how much the person likes the life he/she leads" (1996).*

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In the words of Erik Erickson, *"Life doesn't make any sense without interdependence. We need each other; the sooner we learn that the better for all of us".*

"Satisfaction lies in the effort, not in the attainment. Full effort is full victory", said Mahatma Gandhi

Kahalil Gibran said, "*To be able to look back upon one's life in satisfaction is to live twice"* .

Life satisfaction remains comparatively high in old age even though the normal complaints, aches and pains, sleeping problems can take away from one's enjoyment of life; the factors associated with these complaints often lose importance to older adults. In general, woman develops life satisfaction in every stage of life, there may not be much changes in old age but circumstances may puzzle her mind if she has been right although her life in looking at life with adjustments and finding satisfaction in that but after some point she becomes balanced.

Women in their old age do not give importance to their status, wealth or material goods as younger generation but they give importance to family relationships and a long-term fulfillment from one's life. If they live a satisfied life they tend to live physically healthy when compared to and be even more healthy mentally. Their life satisfaction comes from reflection of one's own behavior in the society in which they exist. Life experiences make them wise in their outlook and in their behavior too. They grow in kindness and empathy and shun the egoism. Since they are aware that they are closer to death they prepare themselves in religious terms such as penance, charity, helping others, encouraging others in their need. They try to practice more moral values die peacefully without harming others much in their life time which they feel would become a ladder for them to attain 'moksha'

Conclusion:

Old age is the process of life in human aging system and alienation is an inescapable reality in every stage of life for all living creatures created by God. Human beings are said to be created in the image and likeness of God but surely we are not God but God's creation which means we are less powerful and imperfect mortal beings. As in the words of Aristotle 'a social being' our call is to live in the society, with the society and for the society. When our ideas, life style and behavior differ from others we feel alienated and sometimes deliberately try to alienate

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ourselves from others. Such experiences increase in old age especially in elderly women whose life span is more than their spouse and who feel lonely without their life companion. Still women are able to adjust and compromise with life better than their spouse. They live a convincing life of satisfaction Women in old age make all efforts to draw strength from within them as they wisely live the life of interdependence by relating to others gently, treating others affectionately and accepting others and self as they are. This she attains life satisfaction on a large scale and cope up with the problem of alienation. Thus she lives her life twice.

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REVIEW OF RESEARCH

WAGE, INCOME AND EXPENDITURE PATTERN OF (MARGINALIZED) CONSTRUCTION WOMEN WORKERS IN ANDHRA PRADESH – A CASE STUDY IN GUNTUR CITY

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ABSTRACT:

India's construction industry is large and visible, engaging 3.2 crore workers nationwide. For most of these workers, the construction industry is their "principal" source of employment. .Thus the construction workers come under the unorganized sector. The term unorganized sector has been defined as those areas which has no proper means and ways of doing works in a systematic way or in organized way. The unorganized sector workers suffer from the cycle of excessive seasonal employment; there is no formal employer and employee relationship; because there is also lack of social security and protection. Chaotic industry specialists in India incorporate:- little and minimal ranchers, landless farming workers, tenant farmers, anglers, and those occupied with creature cultivation, beedi rolling, naming pressing, building and development laborers, calfskin laborer, weavers, laborers in blocks furnaces and stone quarries, specialists in observed factories and oil plants and so forth, etc. Development is the area which has enrolled an enormous expanded in work in the post change decade. In development, an expected 10.7 million development specialists, representing 83 percent of all development laborers in India in that year, were utilized through temporary workers and did not get least business insurance and advantages at all. The target of the paper is to investigate the Wage, Income and Expenditure example of Construction ladies specialists in urban casual area.

KEYWORDS: *Construction Workers, Women, Unorganized Sector,*

INTRODUCTION:

The chaotic segment is portrayed by the nearness of components viz. extended periods of time of work, wage segregation of people, absence of professional stability, no base wages, absence of least offices at work spot, abuse, overwhelming physical work and sexual misuse and so forth. The working ladies by and large work in chaotic area. They are outside the span of Protective Labor Laws and Trade Union Organizations. They are not offered reasonable wages and conventional terms of work. There are not really any chances to improve their salary in light of the fact that in this part, females work by and large as workers in untalented occupations, do customary work as local hirelings. The procedure of globalization, send out situated industrialization and movement of enterprises from the created to creating nations likewise lead to increment in ladies specialists in sloppy part.

The idea of ladies' work ranges from pay business or independent work, family work and piece appraised work. The pervasiveness of ladies specialists in urban chaotic part is huge in number. They are occupied with exercises like local work, development work, little exchanges like block making, coir and bin weaving, family enterprises and so forth. In provincial sloppy part ladies are occupied with rural exercises, creature cultivation, dairy, fisheries and so on. In the

present paper the status of ladies residential specialists, development specialists and horticult workers was contemplated through an observational investigation.

The majority of the residential laborers and development specialists are basically ladies v have moved from provincial territories for monetary increase. The inundation of ladies specialists the urban communities for non-ranch work has soaked the current areas and is one of the fundamer explanations behind her extraordinary abuse. Hardships of city life, nonappearance of fundamer comforts and misuse of these ladies by businesses have added to their wretchedness.

WOMEN CONSTRUCTION WORKERS:

Women occupy an extremely disadvantaged position in the society. They are the victims multiple forms of oppression. This is because they are women and they are occupied in mos exploited areas in the society. Despite the existence of various constitutional and legal provisic guarding women is employment particularly in the unorganized sector, suffer from varic disadvantages relating to their working lives as well as in their home. Illiterate women engaged only some fields like agriculture, tailoring, biscuit company and construction work form our study ar Among these fields, in the construction field which is one of the oldest activities of mankind, the char of getting exploited and dominated is more compared to that in other fields. This is because of t dependence of female workers on male workers. Under this work women are exploited very serious There is wage discrimination, harassment, ill-treatment, etc., particularly faced by women. The ma work done by the women construction workers are: - breaking stone, digging stone, mortar mixing a carrying load (Mukta, 2001).

After the state bifurcation, the Guntur city has playing very important role, Geographically was located mid of the state and the Government of Andhra Pradesh announced the new capital Andhra Pradesh was Amaravathi, it was very near to the Guntur city, and the large number constructions are taking place, the large number of women workers are engaged in this sector only.

Some of the characteristics of construction industry are:

1) High economic vulnerability due to the double combination or irregular and unstable employme and consequent high mobility on the one hand and their utilization only in the lowest grade of jc on the other,
2) High proportion of female labour and frequent employment of whole family or couples;
3) Ignorance, poverty illiteracy and poor health;
4) Lack of unionization due to mobility;
5) Lack of opportunity for training, skills upgrading and literacy for employed people and of bas education for the children.

Legislations to Protect Unorganized Workers:

In India, the government has adopted various policies of welfare about workers throug enactment of legislations and creation of welfare funds and boards. Some of the important legislation are as follow.

- Workmen's Compensation Act, 1923
- The Trade Union Act,1926
- Minimum Wages Act ,1948
- The Maternity Benefit Act, 1961

- The Equal Remuneration Act, 1976
- Bonded labor System (Abolition)) Act, 1976
- Contract labor (Regulation and Abolition) Act,1970
- Inter State Migrant Workmen Act, 1979
- Building and Construction workers Act, 1996
- Beedi and cigar workers welfare fund Act, 1976
- The Child Labor (Prohibition and Regulation Act, 1986
- The Payment of Gratuity Act,1972
- The Payment of Wages Act ,1936
- The Employers' Provident Fund and Miscellaneous Provisions Act,1952
- The Employees State Insurance Act, 1948
- The Payment of Bonus Act ,1965 Child labor (Abolition and Rehabilitation) Bill, 2006,

Besides, the first National Commission on labour Report 1969 recommended various suggestions on the working conditions in unorganized sector workers. The Second National Commission on labor was set up in 1999.The implementation of labor policy however, is the responsibility of the state governments. A large number of workers in the unorganized sector have almost no social security. (Suriyan, 2009).

REVIEW OF LITERATURE:

Anand, (1998) analyzed the characteristics of the construction workers, predominantly migrant workers and the intervention strategies adopted to facilitate the reach out services to these women workers along with awareness of their rights and utilization. He suggested that NGOs and other organizations can play a vital role through campaigning and active participation by creating awareness amongst these women workers and unionism and cooperatives would yield results as far as struggle for better wages and working conditions are concerned.

Rajasekhar, D., Suchitra, J.Y., (2006) conducted a study on Employment Security for The Un-organised Sector Workers in Karnataka. This study covered agriculture, construction and domestic workers of 4 districts of Karnataka. The objective of this study was to examine the requirement of employment security in unorganized sector and the problem faced by workers without employment security. It was found that inter and intra-sectoral heterogeneity among these occupational groups was the main factor for the policies aiming at ensuring their employment security. Results indicated that the same policy for all occupational groups of unorganized sector would not work as different groups have different problems

Subramani, et.al (2015) conducted a study to find how ongoing migration in different parts of India and how it is crucial towards the improving livelihood. The construction industry is important for Indians migrate rural to urban area. Setting a unique example of Public Private Partnership, the Department of Community Medicine collaborated with a construction company in Vidyavihar (West), Mumbai, employing a large number of migrant workers, to provide comprehensive health services during the working hours of the hospital over 90% of urban construction workers are rural migrants, and majority of them work in construction. The author's review of the literature regards the work related risks, also analyses the risks embedded in their work and social status. In depth interviews of 20 persons with construction workers, carried out to demonstrate the risks. The results suggest that rural construction workers in cities were exposed to problems such as not being paid for their work in time, their miserable living conditions, to pay their own healthcare by them and no savings in the old age.

This paper also highlights the problems of policy implementation that failed to recognize th complexity faced by these workers.

Sarika Patel and Rameshwari Pandya (2017) Study has shown that the economic and soci condition of women is dismal. These women workers suffered from recurrent periodic spells unemployment, contributing to high degree vulnerability, further impending the prospects of econom and social mobility. The work available to these women is almost always poorly paid, mentally an physically unhealthy, demeaning and insecure. Women workers lives and works under man constrains. They faces a crushing work burden of work for income, work for subsistence and work fc the household and care and work for children and the aged.

Pandi Devi, I (2018) Shows her survey are women workers have to perform duel role of bot outside employment with or without violent working conditions and also manage their homes. Lack education and low income of the family is the compelling factor for the women folk to opt for seekin jobs in unorganised sectors to augment the family earning to sustain lively hood. Most women worker do not have any social security or access to health care benefits.

NEED FOR THE STUDY:

Expanding productive employment is central to sustained poverty reduction as labor is th main asset for majority of the poor. In Andhra Pradesh considerable number of workers are in th organized sector. In other words, organized workers form only around 5.5 per cent while unorganize workers constitute 94.5 per cent of the total in Andhra Pradesh. The vast majority of workforc including agricultural labor, construction labor and labor in traditional leather tanning, handloom fishing, forestry, salt making, household industry etc., as also village artisans, urban informal worker coming under the general categories of unorganized sector are wholly out of any reckoning into variou statutory laws in the state. These workers are unprotected by legislation and most of them tend to b poor. This city Geographically located in the mid of the state, here large number of construction work are going on and many women workers also engaged in this sector and particularly in Guntur city Hence it is urgency to study the socio-economic conditions and their problems in the selected area.

OBJECTIVE:

The objective of the study is to analyze the socio-economic, Wage, income, expenditure, savings debt and also understand attitudes and health of Construction women workers in urban informa sector.

METHODOLOGY:

The Office of Assistant Commissioner of Labour and other sources are consulted for data. There are five labour circles namely Chuttagunta, Arundelpet, R.T.C.Colony, Lakshmipuram and Housing Board Colony in Guntur City. These areas are purposively selected for the present study.

The data for the present study have been collected from both primary and secondary sources. The secondary data have been collected from both published and unpublished sources of various Government Offices viz office of the Labour Commssioner, Guntur, Offices of Assistant Labour Commissioner of different areas in the city. Office of Census of India; Directorate of Economics and statistics, Guntur office of Municipality and Town Planning.

The Primary data have been collected from 100 samples of construction women workers working in Guntur City through a specially well designed schedules to know their socio-economic,

wage, income, Expenditure, Saving, debts and Attitudes of women towards work and Health of the Construction women workers in the study area using the convenience sampling technique.

RESULTS & DISCUSSION

Table – 1

Socio-Economic & Demographic Characteristics

Age	**No of Respondents**	**Percentage**
Below 25	27	27.0
25-30	43	43.0
30-35	14	14.0
35-40	7	7.0
Above 40	9	9.0
Total	**100**	**100.0**
Marital Status	**No of Respondents**	**Percentage**
Married	80	80.0
Widower/Widow	11	11.0
Divorced	3	3.0
Separate	6	6.0
Total	**100**	**100.0**
Education	**No of Respondents**	**Percentage**
LIterate	24	24.0
Primary	4	4.0
Middle/Higher	2	2.0
10 pass/ Inter	1	1.0
illaterate	71	71.0
Total	**100**	**100.0**
Type of family	**No of Respondents**	**Percentage**
Joint	11	11.0
Nuclear	89	89.0
Total	**100**	**100.0**
Type of Residency	**No of Respondents**	**Percentage**
Owen	43	43.0
Rent	57	57.0
Total	**100**	**100.0**
Type of House	**No of Respondents**	**Percentage**
RCC	47	47.0
Kutcha	53	53..
Total	**100**	**100.0**

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Caste Category	No of Respondents	Percentage
B.C	32	32.0
S.C	48	48.0
S.T	20	20.0
Total	**100**	**100.0**

Socio-Economic & Demographic Characteristics of the sample respondents (Table - 1) reveals that majority (43.0 per cent) of the respondents were in between 25-30 years of age, followed by 27.0 percent of the respondents were in below 25 years of age, only few (9.0 percent) of the respondents were above 40 years of age. Majority (80.0 percent) of the respondents were married, 11 per cent of the respondents were Widows and only 6.0 percent of the respondents were separate and only 3.0 per cent of respondents were divorced. Nearly one third (71.0 per cent) of the respondents were illiterate and the rest of the respondents were literate. Majority (89.0 per cent) of the respondents are in nuclear families and the rest (11.0 percent) of the respondents are joint families. More than half of the respondents (57.0 per cent) are living in rented houses and the remaining (43.0 per cent) of the respondents have Owen houses. Regarding the type of house, more than half of the respondents (53.0 percent) are in Kutcha house, followed by 47 per cent of the respondents are in RCC house. Nearly half (48.0 percent) of the responds were S.C's, followed by 32 per cent of the respondents were B.C's and only 20 per cent of the respondents were S.T's.

Table – 2

Wages, Income, Expenditure, Savings and Debts of the Responds

Average wage per day	No of Respondents	Percentage
Below 300	7	7.0
300 - 350	11	11.0
350 - 400	53	53.0
400 - 450	17	17.0
Above 450	12	12.0
Total	**100**	**100.0**
Family monthly income	**No of Respondents**	**Percentage**
Below 10000	8	8.0
10000 - 15000	22	22.0
15000 - 20000	49	49.0
20000 - 25000	15	15.0
Above 25000	6	6.0
Total	**100**	**100.0**
Family monthly Expenditure	**No of Respondents**	**Percentage**
Below 10000	15	15.0
10000 - 15000	57	57.0

15000 - 20000	26	26.0
Above 20000	2	2.0
Total	**100**	**100.0**
Family monthly Savings	**No of Respondents**	**Percentage**
.00	24	24.0
Below 5000	68	68.0
10000 - 15000	4	4.0
Above 15000	4	4.0
Total	100	100.0
Debts	**No of Respondents**	**Percentage**
Below 10000	11	11.0
10000 - 20000	20	20.0
20000 - 30000	7	7.0
30000 - 40000	26	26.0
40000 - 50000	12	12.0
Above 50000	24	24.0
Total	**100**	**100.0**

Source: Primary data

More than half (53.0 percent) of the respondents are receiving wages between Rs. 350-400 per day and very few (12 percent) of the respondents are receiving wages above 450 per day.

Regarding earnings, nearly half (49.0 percent) of the respondents are earning between Rs. 15,000 – 20,000 per month and followed by 22 percent of the respondents are earning between Rs. 10,000 – 15,000 per month and only very few (6.0 percent) of the respondents are earning above Rs. 25, 000 per month.

Regarding expenditure, more than half (57.0 percent) of the respondents were expenditure between Rs. 10,000 – 15,000 per month, followed by 26 percent of the respondents were expenditure between Rs. 15,000 – 20,000 per month and only 15 percent of the respondents were expenditure below Rs. 10,000 per month. Majority (68.0 percent) of the respondents were savings below Rs. 5,000 per annum and nearly one fourth (24.0 per cent) of the respondents were not saving. More than one fourth (26.0 percent) of the respondents were have debts between Rs. 30,000 – 40,000 per annum followed by 24 percent of the respondents were have debts above Rs.50,000 per annum and 20 percent of the respondents were have debts between Rs. 10,000 – 20,000 per annum and only few (11.0 percent) of the respondents were have debt below Rs. 10,000 per annum.

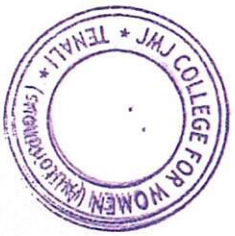

Table- 3

Attitudes of Women towards Work

Sl.No	ATTITUDES	No of Respondents	
		Yes	No
1	Do you work because of Force	0 (0.0%)	100 (100.0 %)
2	Is it your duty	100 (100.0 %)	0
3	Is it Obligation	0 (0.0%)	100 (100.0 %)
4	Poverty	100 (100.0 %)	0 (0.0%)
5	Are you Comfortable	59 (59.0 %)	41 (41.0%)
6	Is Education Necessary for Women	100 (100.0 %)	0 (0.0%)
7	Is women's Education useful for family's Good Relationships	100 (100.0 %)	0 (0.0%)
8	Do you feel you are treated well	100 (100.0 %)	0 (0.0%)
9	Do you feel you are abused	0	100 (100.0 %)
10	Does your own money make you proud	100 (100.0 %)	0 (0.0%)
11	Can you work independently	74 (74.0%)	26 (26.0%)
12	Harassment at their work place (or) elsewhere	63 (63.0%)	37 (37.0%)
13	Do you go to another place for work	16 (16.0%)	84 (84.0%)

Source: Primary data

All the (100.0 percent) respondents were not working because of force. All the (100.0 percent) were said that about attitude of work, they feel like it is their duty. All the (100.0 percent) respondents were not working because of obligation. All the (100.0 percent) were working because of poverty. More than half (59.0 percent) of the respondents were not comfortable at their work and followed by rest (41.0 percent) of the respondents were comfortable at their work. All the (100.0 percent) respondents were said that education is necessary for every woman. All the (100.0 percent) respondents were stated that women's education is useful for making good relationships in families. All the (100.0 percent) respondents were felt that, they treated well in their family. All the (100.0 percent) respondents were felt that, they are not abused in their family. All the (100.0 percent) respondents stated that their own money make them proud. Majority (74.0 percent) of the respondents said that, they can work independently and the rest (26.0 percent) of the respondents were not work independently. Majority (63.0 percent) of the respondents stated that, they are facing harassment at their work place and the rest (37.0 percent) of the respondents are not facing any harassment at their work place. Majority (84.0 percent) of the respondents stated that, they did not go to another place for work and the rest (16.0 percent) of the respondents said that, they go for work to another place.

Table – 4

Health of Women Workers

1	**Are you Healthy**	**No of Respondents**	**Percentage**
	Yes	37	37.0
	No	63	63.0
	Total	**100**	**100.0**
2	**Do you feel Tired after work**	**No of Respondents**	**Percentage**
	Yes	78	78.0
	No	22	22.0
	Total	**100**	**100.0**
3	**Did you receive any extra facility as a female labour**	**No of Respondents**	**Percentage**
	Yes	17	17.0
	No	83	83.0
	Total	**100**	**100.0**

Source: Primary data

Majority (63.0 percent) of the respondents were not healthy and the rest (37.0 percent) of the respondents were healthy. More than three fourth (78.0 percent) of the respondents were said that they feel tired after work and the rest (22.0 percent) of the respondents were said that they didn't feel tired after work. Majority (83.0 percent) of the respondents were not receiving any extra facilities as a female labour and the rest (17.0 percent) of the respondents were receiving extra facility as a female labour at their work place.

SUGGESTIONS

- It is found that, majority of the respondents are not aware about the labour Laws. So, Government should be conduct awareness training programmes for construction women workers for their social security.
- It is found that, majority of the respondents stated that, their wages are very meager. It is not sufficient to run their families. So, Government should be taken necessary actions on contractors to maintain minimum Wage Act.
- The unorganized welfare association must to organized general health camp twice in a year for construction women workers.
- The superiors and male co-workers can motivate the women workers in the work place to reduce the problem faced by the women workers in the construction sector.

SUMMARY

The construction labour is mostly unskilled and rural migrants who come to the cities in search of livelihood. Women are most exploited in the construction. Organizing construction workers is an tricky task considering the scattered nature of construction sites, the migrant nature of the work, and the contract system of employment prevailing in the industry. There is an urgent need to regulate and protect the working and living conditions and welfare of the unorganized construction labour.

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SOCIO-ECONOMIC CONDITIONS OF (MARGINALIZED) CONSTRUCTION WOMEN WORKERS IN ANDHRA PRADESH: (WITH SPECIAL REFERENCE TO GUNTUR CITY)

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ABSTRACT

Construction activities are an integral part of the Indian economy and have attracted considerable amount of finances in both the public and private sectors. Investment in construction industry is very high and it is a flourishing industry that has accumulated immense wealth in the hands of the builders resulting in the formation of a powerful builders lobby in the country. It is the second largest unorganized sector of industry employing more than eight million workers. It is one of the few industries in which operations are discontinuous making the industry a mobile one. The industry uses several types of materials - steel, wood, bricks, cement, lime, asbestos, toxic chemicals etc. in large quantities. The origin of the construction industry dates from the origin of civilization. Rapid urbanization leads to acute need of housing and growth of industry which require massive infrastructure including roads, bridges, building of factories, railways etc. Due to these requirements, the construction industry stands out as one of the major economic activities. Construction activity is also consistently providing a substantial contribution to the national income. The objective of the present study is to analyze the socio-economic, living conditions and awareness about their rights of Construction women workers in Guntur City.

KEY WORDS: *Unorganized Sector, Construction Workers, Marginalized Women.*

INTRODUCTION

The increase in investment and income in urban modern sectors of developing countries has attracted labour force to these urban centers resulting in phenomenal increase in urban population and labour force. Given the disparities between income in agricultural and non-agricultural activities and between rural and urban areas; location of industries, expansion of government administration in the wake of independence and concentration of opportunities for acquiring education and skills in urban centers have played an important role in attracting the migrants. Due to lack of intensive type of industrialization, low levels of absorption capacity of the modern urban sector was assumed and contributed to mass urban unemployment, underemployment and extreme poverty in urban areas of the Third World, causes to dual markets in urban economy.

The pressure of labour supply gets manifested in the proliferation of certain unorganized, frequently sporadic occupations characterized by low skill, low productivity and meager incomes. This dualistic nature of urban economy has been used as a frame of analysis of economic structures and markets.

The term 'unorganized' is often used in the Indian context to refer to the vast numbers of women and men engaged in different forms of employment. These forms include home-based work (for example: rolling papads and beedis), self-employment (for example: selling vegetables), employment in household enterprises, small units, on land as agricultural workers, labour on construction sites, domestic work, and a myriad other forms of casual or temporary employment. They do marry, bear children, and get old but under these phases of life they live the same life. They suffer from many problems like unhygienic environment, no medical facilities, and no awareness regarding law.

Construction activities are an integral part of the Indian economy and have attracted considerable amount of finances in both the public and private sectors. Investment in construction industry is very high and it is a flourishing industry that has accumulated immense wealth in the hands of the builders resulting in the formation of a powerful builders lobby in the country. It is the second largest unorganized sector of industry employing more than eight million workers. It is one of the few industries in which operations are discontinuous making the industry a mobile one. The industry uses several types of materials - steel, wood, bricks, cement, lime, asbestos, toxic chemicals etc. in large quantities. The origin of the construction industry dates from the origin of civilization. Rapid urbanization leads to acute need of housing and growth of industry which require massive infrastructure including roads, bridges, building of factories, railways etc. Due to these requirements, the construction industry stands out as one of the major economic activities. Construction

activity is also consistently providing a substantial contribution to the national income.

In the post-liberalization period, the construction industry in the country is witnessing many structural changes which will radically transform the industry as well as construction labour market. The industry, which hitherto has been based on labour intensive technology providing ready source of employment will become technology intensive and mechanise, leading to elimination of substantial workforce.

Some of the characteristics of construction industry are:

1) High economic vulnerability due to the double combination or irregular and unstable employment and consequent high mobility on the one hand and their utilization only in the lowest grade of job on the other,
2) High proportion of female labour and frequent employment of whole family or couples;
3) Ignorance, poverty illiteracy and poor health;
4) Lack of unionization due to mobility;
5) Lack of opportunity for training, skills upgrading and literacy for employed people and of basic education for the children.

Legislations to Protect Unorganized Workers

In India, the government has adopted various policies of welfare about workers through enactment of legislations and creation of welfare funds and boards. Some of the important legislations are as follow.

- Workmen's Compensation Act, 1923
- The Trade Union Act,1926
- Minimum Wages Act ,1948
- The Maternity Benefit Act, 1961
- The Equal Remuneration Act, 1976
- Bonded labor System (Abolition)) Act, 1976
- Contract labor (Regulation and Abolition) Act,1970
- Inter State Migrant Workmen Act, 1979
- Building and Construction workers Act, 1996
- Beedi and cigar workers welfare fund Act, 1976
- The Child Labor (Prohibition and Regulation Act, 1986
- The Payment of Gratuity Act,1972
- The Payment of Wages Act ,1936
- The Employers' Provident Fund and Miscellaneous Provisions Act,1952
- The Employees State Insurance Act, 1948
- The Payment of Bonus Act ,1965 Child labor (Abolition and Rehabilitation) Bill, 2006,

Besides, the first National Commission on labour Report 1969 recommended various suggestions on the working conditions in unorganized sector workers. The Second National Commission on labor was set up in 1999.The implementation of labor policy however, is the responsibility of the stategovernments. A large number of workers in the unorganized sector have almost no social security. (Suriyan, 2009).

After the state bifurcation, the Guntur city has playing very important role, Geographically it was located mid of the state and the Government of Andhra Pradesh announced the new capital of Andhra Pradesh was Amaravathi, it was very near to the Guntur city, and the large number of construction are taking place, the large number of women workers are engaged in this sector only.

NEED FOR THE STUDY

Expanding productive employment is central to sustained poverty reduction as labor is the main asset for majority of the poor. In Andhra Pradesh considerable number of workers are in the organized sector. In other words, organized workers form only around 5.5 per cent while unorganized workers constitute 94.5 per cent of the total in Andhra Pradesh. The vast majority of workforce including agricultural labor, construction labor and labor in traditional leather tanning, handloom, fishing, forestry, salt making, household industry etc., as also village artisans, urban informal workers coming under the general categories of unorganized sector are wholly out of any reckoning into various statutory laws in the state. These workers are unprotected by legislation and most of them tend to be poor. This city Geographically located in the mid of the state, here large number of construction works are going on and many women workers also engaged in this sector and particularly in Guntur city. Hence it is urgency to study the socio-economic conditions and their problems in the selected area.

OBJECTIVE

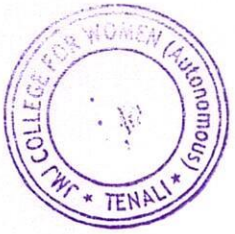
The objective of the study is to analyze the socio-economic and living conditions of Construction women workers in Guntur City.

METHODOLOGY

The Office of Assistant Commissioner of Labour and other sources are consulted for data. There are five labour circles namely Chuttagunta, Arundelpet, R.T.C.Colony, Lakshmipuram and Housing Board Colony in Guntur City. These areas are purposively selected for the present study.

The data for the present study have been collected from both primary and secondary sources. The secondary data have been collected from both published and unpublished sources of various Government Offices viz office of the Labour Commssioner, Guntur, Offices of Assistant Labour Commissioner of different areas in the city. Office of Census of India; Directorate of Economics and statistics, Guntur office of Municipality and Town Planning.

The Primary data have been collected from 100 samples of construction women workers working in Guntur City through a specially well designed schedules to know their socio economic conditions, income and employment situations of the Construction women workers in the study area using the convenience sampling technique.



RESULTS & DISCUSSION

Table – 1 Socio-Economic & Demographic Characteristics

Sl.No	Age	No of Respondents	Percentage
1	Below 25	9	9.0
	25-30	29	29.0
	30-35	31	31.0
	35-40	13	13.0
	Above 40	18	18.0
	Total	**100**	**100.0**
	Marital Status	**No of Respondents**	**Percentage**
2	Married	85	85.0
	Widower/Widow	13	13.0
	Divorced	1	1.0
	Separate	1	1.0
	Total	**100**	**100.0**
	Education	**No of Respondents**	**Percentage**
3	LIterate	11	11.0
	Primary	2	2.0
	Middle/Higher	2	2.0
	10 pass/ Inter	2	2.0
	illaterate	83	83.0
	Total	**100**	**100.0**
	Type of family	**No of Respondents**	**Percentage**
4	Joint	15	15.0
	Nuclear	85	85.0
	Total	**100**	**100.0**
	Type of Residency	**No of Respondents**	**Percentage**
5	Own	46	46.0
	Rent	54	54.0
	Total	**100**	**100.0**
	Type of House	**No of Respondents**	**Percentage**
6	RCC	32	32.0
	Kutcha	68	68.0
	Total	**100**	**100.0**
	Social Security	**No of Respondents**	**Percentage**
7	White card	84	84.0
	Without card	16	16.0
	Total	**100**	**100.0**
	Caste Category	**No of Respondents**	**Percentage**
8	B.C	45	45.0
	S.C	39	39.0
	S.T	16	16.0
	Total	**100**	**100.0**
	Religion	**No of Respondents**	**Percentage**
9	Hindu	65	65.0
	Muslim	17	17.0
	Christian	18	18.0
	Total	**100**	**100.0**

Source: Primary data

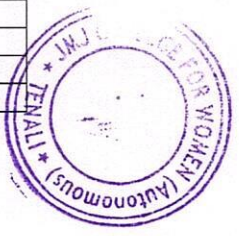


Table – 2
Work Related Information

Sl.No	Nature of Work	No of Respondents	Percentage
1	Unpaid Family work	0	0.0
	Permanent	0	0.0
	Temporary	**100**	**100.0**
	Total	**100**	**100.0**
	Employment Status	**No of Respondents**	**Percentage**
2	Seasonal	12	12.0
	Causal	88	88.0
	Total	**100**	**100.0**
	Place of Work	**No of Respondents**	**Percentage**
3	Slum	28	28.0
	Non-slum	72	72.0
	Total	**100**	**100.0**
	Reason for Opting	**No of Respondents**	**Percentage**
4	Poverty	66	66.0
	Livelihood	34	34.0
	More Income	0	0.0
	Total	**100**	**100.0**
	Are you main Worker in your family	**No of Respondents**	**Percentage**
5	Yes	15	15.0
	No	85	85.0
	Total	**100**	**100.0**
	Job Opportunity	**No of Respondents**	**Percentage**
6	Personal Approach	15	15.0
	Mastery	28	28.0
	Mediator	57	57.0
	Total	**100**	**100.0**
	No. of hours work in a day	**No of Respondents**	**Percentage**
7	7 hours	1	1.0
	8 hours	23	23.0
	9 hours	34	34.0
	10 hours	42	42.0
	Total	**100**	**100.0**
	No. of Days work in a month	**No of Respondents**	**Percentage**
8	20 days	42	42.0
	22 days	27	22.0
	24 days	19	19.0
	25 days	12	12.0
	Total	**100**	**100.0**
	No. of months work in a year	**No of Respondents**	**Percentage**
9	10 months	54	54.0
	11 months	26	26.0
	12 months	20	20.0
	Total	**100**	**100.0**
	Mode of Payment	**No of Respondents**	**Percentage**
10	Daily	26	26.0
	Weekly	74	74.0
	Total	**100**	**100.0**

11	**Timely payment**	**No of Respondents**	**Percentage**
	Satisfied	73	73.0
	Moderately	27	27.0
	Total	**100**	**100.0**
12	**Monthly Income (Individual)**	**No of Respondents**	**Percentage**
	Below 8000	24	24.0
	8000 - 10000	46	46.0
	Above 10000	30	30.0
	Total	**100**	**100.0**

Source: Primary data

Table – 3

Awareness levels of the respondents on different Acts

Sl. No	Acts	No of Respondents	
		Aware	Not aware.
1	Payment of wages Act 1936	6 (6.0%)	94 (94.0%)
2	Payment of Minimum wage Act 1948	0 (0.0%)	100 (100.0%)
3	Work man's Compensation Act 1923	0 (0.0%)	100 (100.0%)
4	Child labour Act 1986	9 (9.0%)	91 (91.0%)
5	Maternity Benefits Act 1979	0 (0.0%)	100 (100.0%)
6	Bonded labour Act 1986	0 (0.0%)	100 (100.0%)

Source: Primary data

FINDINGS OF THE STUDY

1.Demographic Profile

Table 1. Demographic profile of the sample respondents. It is found that majority (31.0 per cent) of the respondents were in between 30-35 years of age, followed by 29.0 percent of the respondents were in between 25-30 years of age. Majority (85.0 per cent) of the respondents were married, 13 per cent of the respondents were Widows and only 1.0 percent of the respondents were divorced and separate. Majority (83.0 per cent) of the respondents were illiterate and the rest of the respondents were literate. Majority (85.0 per cent) of the respondents are in nuclear families and the rest of the respondents are joint families. More than half of the respondents (54.0 per cent) are living in rented houses and the remaining (46.0 per cent) of the respondents have Owen houses. Regarding the type of house, more than half of the respondents (68.0 per cent) are in Kutcha house, followed by 32 per cent of the respondents are in RCC (Pucca) house. Majority (84.0 per cent) of the respondents have White cards and the rest of the respondents didn't have any type of Social Security. Nearly half of the responds (45.0 per cent) were B.C's, followed by 39 per cent of the respondents were S.C's and only 16 per cent of the respondents were S.T's. Majority (65.0 per cent) of the respondents were Hindus, followed by 18 percent of the respondents were Christens and 17 per cent of the respondents were Muslims.

2.Finding on Work Related Information

Work related information of the respondents (Table - 2) reveals that all the respondents (100.0 percent) are temporary. Majority (88.0 percent) of the respondents were causal workers and followed by very few (12.0 percent) of the respondents were seasonal workers. Nearly three fourth (72.0 percent) of the respondents are working in non-slum and followed by more than a quarter (28.0 percent) are working in slums. Majority (66.0 percent) of the respondents reason for opting this work poverty and followed by 34 per cent of the respondents reason for opting this work for their livelihood. Majority (85.0 percent) of the respondents are not a main workers in their families and rest (15.0 percent) of the respondents are main bread earners in their families. More than half (57.0 percent) of the respondents were getting job opportunity through mediator and followed by 28 per cent of the respondents were getting job opportunity through mastery and only 15 per cent of the respondents were getting job opportunity through personal approach. Majority (42.0 percent) of the respondents work 10 hours per day, followed by 34 per cent of the respondents work 9 hours per day and nearly one fourth (23 percent) of the respondents are working only 8 hours per day. Majority (42.0 percent) of the respondents stated that on an average they work for 20 days per month and followed by more than one fourth (27.0 percent) of the respondents they work for 22 days per month and 19 per cent of the respondents they work for 24 days per month and only few (12.0 percent) of the respondents they work for 25 days per month. More than half (54.0 percent) of the respondents work 10 months in a year, followed by more than one fourth (26.0 percent) of the respondents work 11 months in a year and 20 per cent of the respondents work 12 months in a year. Nearly one third (74.0 percent) of the respondents stated that they received their payment Weekly and the rest (26.0 percent) of the respondents said that received their payment Daily. Nearly three fourth (73.0 percent) of the respondents satisfied for timely payment, followed by more than one fourth (27.0 per cent) of the respondents said that for timely payment moderately. Regarding the earnings nearly half of the respondents (46.0 percent) are earning between 8,000 – 10,000 per month, followed by 30 per cent of the respondents are earning above 10,000 per month and nearly one fourth (24.0 percent) of the respondents are earning less than 8,000 per month

3.Finding on Awareness of Respondents on different Social Security Acts

It is found that, all most all (94.0 percent) of the respondents are not aware about Payment of Wages Act 1936 and only very few (6.0 percent) of the respondents are aware of this act, followed by 100 per cent of sample respondents were not aware bout Payment of Minimum Wage Act 1948, Regarding the statement Work Man's Compensation Act 1923. Majority (91.0 percent) of the respondents are not aware about Child Labour Act 1986 and only 9 per cent of the respondents are aware about act. All the respondents (100.0 percent) are not aware about Maternity Benefits Act

1979 and Bonded Labour Act 1986. It can be found that majority of sample respondents are not aware of different social security acts which is mentioned in the questionnaire.

SUGGESTIONS

- It is found that, majority of the respondents are not aware about the labour Laws. So, Government should be conduct awareness training programmes for construction women workers for their social security.
- It is found that, majority of the respondents stated that, their working hours is too hard. So, Government should be taken necessary actions on contractors to maintain minimum working hours at work place.
- It is found that, majority of the respondents they don't have full employment in a month, so, there is a need to increase man days of work for construction women workers for better living.
- It is found that more than half of the respondents are working 10 months in a year, the rest the months they don't have employment. So, Government should be taken necessary action to provide employment throughout the year for construction women workers for better standard of living.

CONCLUSION

Today there is an urgent need to pay attention to the welfare of the construction labour. It is the moral responsibility of the government, developmental organizations, intellectuals, social scientists and policy makers to ensure that the concrete action should be taken to uplift the quality of work life of women construction workers, also create a congenial work environment at the work place.

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Parasite resistance and tolerance in honeybees at the individual and social level

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Abstract: *Organisms dwelling in large businesses, inclusive of social insects, are particularly liable to parasite transmission. However, they have got evolved diverse defence mechanisms which are not most effective confined to the person's immune response, however additionally consist of social defenses. here, we overview instances of diversifications at the individual and social stage inside the honeybee Apis mellifera towards the ectoparasitic mite Varroa destructor and the end parasitic microsporidians Nosema ceranae and Nosema APIs. They're considered vital threats to honeybee health worldwide. We highlight how man or woman resistance may additionally result in tolerance at the colony degree and vice versa.*

1. Introduction

The host–parasite dynamics in social organisms are different compared to those of solitary ones. In particular, large colonies of social insects provide optimal conditions for parasite growth and horizontal transmission due to the incubator-like environment of the nest, which is crowded with often tens of thousands of susceptible hosts (Schmid-Hempel, 1998). The honeybee Apis mellifera provides an important model system for host–parasite relationships, primarily because of its role in agriculture and ecosystem functioning. Bees are crucial pollinators for approximately 70% of all crop species worldwide as well as for the wild flora (Klein et al., 2007; Potts et al., 2010). Thus, the alarming reports of worldwide losses of managed honeybees have sparked scientific debates and stimulated intensive research on honeybee health in the past decades.

Although the role of pathogens and parasites in recent honeybee declines is still not fully understood (Lundin et al., 2015; Moritz and Erler, 2016), pathogen epidemiology and host–parasite interactions have been studied in considerable detail (Ball and Bailey, 1991; Fries, 2010; Rosenkranz et al., 2010; Evans and Schwarz, 2011). Honeybees are vulnerable to a broad spectrum of parasites and pathogens, but two parasites clearly stand out in scientific discussions on honeybee health over the last decade (2005–2015), the ectoparasitic mite Varroa destructor and the end pathogenic Nosema ceranae with more than 800 and 400 publications, respectively, listed in the Web of Science (www.thomsonreuters.com/WebOfScience). Both parasites have been introduced into A. mellifera only a few decades ago and they are therefore suitable for revealing swift reciprocal adaptations. In this review, we will focus on the rapid adaptations in host defence against both parasites. There are two host defence strategies to be distinguished, resistance and tolerance. Resistant hosts are able to limit the parasite burden, whereas tolerant hosts are able to limit the harm caused by a given parasite burden (Råberg et al., 2009). Host tolerance is described as a reaction norm to illustrate host fitness alterations as a function of parasite burden, i.e. for more tolerant hosts, fitness decreases less with increasing parasite intensity (for detailed reviews see Råberg et al., 2009; Kutzer and Armitage, 2016). Although a trade-off between tolerance and resistance was reported in mice and in D. melanogaster, tolerance is not generally associated with a cost (Kutzer and Armitage, 2016).

Both strategies are likely leading to different host–parasite dynamics (Best et al., 2014). Whereas resistance may lead to an antagonistic host–parasite convolution through Red Queen (RQ) oscillations of host and parasite genotype frequencies (Agrawal and Lively, 2002; Salathé et al., 2008), tolerance should slow RQ dynamics down by eliminating the negative frequency dependence due to marginal fitness effects on both host and parasite within a certain range of infection intensity (Råberg et al., 2009; Best et al., 2014). When applying theoretical models to honeybees, one needs to consider the social structure of the host population and male haploid (Schmid-Hempel and Jokela, 2002; Kidner and Moritz, 2013). Interestingly, resistance may only rarely result in RQ dynamics when high susceptibility of the host population and transmission rates reach a certain threshold (Kidner and Moritz, 2013). We are not aware of any theory addressing tolerance similarly with multilevel selection and haplodiploidy. Yet, a distinction between resistance and tolerance is

essential for our understanding of host–parasite interactions. In societies of social insects it is also important to differentiate between resistance and tolerance at the individual and at the colony level. A colony composed of resistant individuals is likely to also be resistant at the colony level. However, if not all individuals of a colony are resistant, the colony may still tolerate an infection without experiencing negative fitness effects such as in the case of the Varroa-tolerant honeybee colonies from Gotland (see Section 3.2). In contrast, a colony composed of tolerant individuals might also become resistant against end parasites if the infection can be cleared at the colony level as suggested for Nosema-tolerant honeybees from Denmark (see Section 4.2). We will therefore embark on dissecting the defence mechanisms against Nosema and Varroa and assessing how these determine resistance and tolerance at both the individual and the colony level.

2. The parasites

2.1. Varroa destructor, an ectoparasitic mite

V. destructor (formerly also V. jacobsoni) (Anderson and Trueman, 2000) is an obligate ectoparasite of brood and adult honeybees, which is currently considered to have the most negative impact on apiculture (Dainat et al., 2012; Kielmanowicz et al., 2015). Varroa-infested colonies have been reported to die after 2–3 years if not systematically treated (Rosenkranz et al., 2010). V. destructor has originally coevolved with Apis cerana in Asia, but has nearly reached worldwide distribution now, with the exception of Australia and some isolated islands, after two host shift events to A. mellifera in Korea and Japan about 60–100 years ago (Oldroyd, 1999; Roberts et al., 2015a). The life cycle of this haplodiploid mite is highly adapted to the development of drone and worker brood, allowing only a narrow time window for reproductive success (reviewed by Rosenkranz et al., 2010). Briefly, after invasion of a suitable host cell just before capping, the female mite starts feeding on the 5th instar larval haemolymph and initiates cogenesis within a few hours (Garrido and Rosencrantz, 2004). Specific host signals trigger egg laying of the mite, starting with an unfertilized haploid male egg after approximately three days and followed by up to four or five fertilized diploid female eggs in 30 h intervals (Frey et al., 2013). The offspring mites hatch a few hours after ovipositor and pass through proto- and deutonymph stages until they become sexually mature following a final molt after approximately seven days. As soon as the first female reaches sexual maturity the male mates with it, triggered by female sex pheromones, until the next female is mature (Ziegelmann and Rosenkranz, 2014). Fertilized females are released when the host honeybee hatches and can be transmitted between individual honeybees within the same colony or might even be spread to a new host colony through foraging and drifting honeybees (Rosenkranz et al., 2010). V. destructor infestations have a strong negative effect on the fitness of honeybees both at the individual and the colony level. Infested honeybee pupae experience severe nutritional deficiencies during development depending on the parasitisation rate, as both adult female mite and offspring feed on their haemolymph (Garedew et al., 2004). This feeding activity at the early sensitive life stage, together with additional secondary infections, can alter the host physiology and may reduce the immunocompetence, flight and navigation performance when adult, which will ultimately resultindecreasedhoneybee survival(e.g., Duay et al., 2002; Amdam et al., 2004; Kralj and Fuchs, 2006; Annoscia et al., 2012). Alongside with direct effects of Varroa parasitisation come indirect effects, because Varroa acts as an incubator and important vector of honeybee viruses (Martin et al., 2012; Mondet et al., 2014). Best studied is the fatal interplay betweenmite and deformed wing virus (DWV) (de Miranda and Genersch, 2010; Martin et al., 2012; Nazzi et al., 2012; Francis et al., 2013; Kielmanowicz et al., 2015).

2.2. Nosema apis and N. ceranae, two intracellular microsporidians

N. apis is a long-known parasite of A. mellifera, whereas N. ceranae is presumed to have more recently undergone a host switch from A. cerana to A. mellifera (Fries, 2010). Today, N. ceranae has reached global distribution and has progressively become more prevalent over the past decade (Klee et al., 2007; Paxton et al., 2007). N. ceranae has also been found to infect other honeybee (Chaimanee et al., 2010; Traver and Fell, 2015) and bumblebee species (Plischuk et al., 2009; Li et al., 2012; Fürst et al., 2014). As N. ceranae has only recently been described and can only be reliably identified by polymerase chain reaction, a clear distinction between both Nosema species especially in older publications might be difficult (Fries, 2010). The role and magnitude of the damage of N. ceranae infections in honeybee colonies has been controversially discussed. Major implications of N. ceranae infections in colony losses have been mainly reported in Mediterranean regions (e.g., Higes et al., 2008;Bacandritsos et al., 2010; Soroker et al., 2011), but have been ruledout in countries with a temperate climate (e.g., Genersch et al. 2010; Dainat et al.,

2012; Budge et al., 2015). This suggests that cli-mate may influence its virulence (Martín-Hernández et al., 2009;Gisder et al., 2010). Irrespective of this, some studies suggested higher virulence of N. ceranae than N. apis (Paxton et al., 2007;Martín-Hernández et al., 2011; Williams et al., 2014), whereas other studies neither reported higher proliferation rates for N. ceranaenor increased host mortality (Forsgren and Fries, 2010; Milbrathet al., 2015; Natsopoulou et al., 2015). Nevertheless, the asymmetric inter specific competition between both Nosema species in sequential co-infections may provide an alternative explanation for the global invasion success of N. ceranae (Natsopoulou et al., 2015).Both Nosema species undergo analogous life cycles and are typically horizontally transmitted via the faecaloral route by ingestion of spores from the environment (Bailey, 1955; Fries, 2010;Graystock et al., 2015), but might possibly also be sexually trans-mitted (Roberts et al., 2015b). Ingested Nosema spores germinate in the midgut lumen and penetrate the membrane of epithelial cells with their polar tube to inject their protoplasm (Fries et al., 1992).The spherical protoplasm develops into a spindle-shaped meront, which replicates several times until first oval sporonts and the new generation of spores are formed after 4 days post-infection (Frieset al., 1992; Girder et al., 2011). Ultimately they are released into the lumen via cell lysis, where they may infect neighbouring cells ormay be defecated (Fries, 2010). Although Nosema species are known to have lost sexual reproduction (Ironside, 2007), recent reports of recombination in N. ceranae raise new questions about its life cycle(Sagastume et al., 2011; Gómez-Moracho et al., 2015).

Despite the controversies mentioned above, N. ceranae infections have been shown to negatively affect honeybee health atthe individual level, which may also lead to reduced colony fitness under certain conditions. Depending on the intensity of the Nosema infection, honeybees may experience nutritional and energetic stress (e.g. Mayack and Naug, 2009; Martin Hernandez et al., 2011; Kurze et al., 2016), and/or immunosuppressant (Antúnezet al., 2009; Chaimanee et al., 2012; Holt et al., 2013; Aufauvre et al., 2014), which possibly makes them also more vulnerable to other pathogens such as black queen cell virus (BQCV). Additionally, N.ceranae appears to inhibit apoptosis in its host cell, which mightbe a mechanism of self-protection, thus enhancing its reproductive success (Higes et al., 2013; Kurze et al., 2015). Recent transcriptome and proteome data also suggest modifications in epithelium renewal and apoptosis-related pathways in association with N. cer-anae infections (Dussaubat et al., 2012; Holt et al., 2013; Aufauvreet al., 2014; Vidau et al., 2014).

3. Defence against an ectoparasite

3.1. Social level

A. mellifera resistance to V. destructor is characterized by many different mechanisms ranging from colony level to individual responses. A major resistance mechanism at the colony level is swarming, as it reduces the mite intensity (lost in the swarming bees) and simultaneously having a bloodless period in the old hive hindering mite reproduction. Colony level tolerance in the new nesting site is caused by reproductive timing and types mainly worker brood is produced initially, where the mites have lower fitness (Fries et al., 2003). Another type of swarming is non-reproductive (absconding). When absconding, all adult individuals of the colony, including the queen swarm, leave the brood and most of the stores behind and establish a new nest elsewhere (Fig. 1A). In this process all parasites in the brood and pathogens in the stores are also left behind. Absconding is therefore a most efficient natural colony level defence mechanism against Varroa.

It is particularly pronounced in African honeybees where colonies readily leave the hive whenever conditions become unfavorable(Hepburn and Rudolf, 1998).The best studied behaviorally controlled resistance mechanism is the so-called Varroa sensitive hygiene (VSH, formerly called suppressed mite reproduction) and grooming behavior (Fig. 1A),collectively called social immune response (Cremer et al., 2007).VSH is a social level trait where typically only few paternal lines express the task at a specific time of their adult life due to temporal polytheism. For example, hygienic behavior consists of a sequence of different subcomponents (detection, opening and removing), which may be inherited independently and performed by different workers in the colony (Moritz and Fuchs, 1998; Oxley et al., 2010; Tsuruda et al., 2012). There is also a cost to VSH behavior, as with very low mite detection thresholds, relatively large numbers of uninfected pupa are removed as well (Vandame et al., 2002). The heritability of VSH has been estimated to be rather low at h2= 0.18in A. mellifera (Boecking et al., 2000). A. cerana, having a long coevo-lutionary history with V. destructor and V. Jacobson, removes theVarroa mites from the worker brood to such an extent that the mites will not even enter the worker brood but instead reproduce exclusively in the drone

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brood (Peng et al., 1987). The A. cerana drone cell cap is hard and has a specific form with an opening at the top, which may be an adaptation to mite infection. If more than one Varroa female enters an A. cerana drone cell, the drone will not be able to open the cell cap since workers are not helping the drones to emerge. This mechanism most effectively reduces high infection rates of Varroa and keeps the Varroa population typically below 800individuals per colony (Rath, 1999).Grooming behavior is the ability of adult honeybees to remove phonetic mites from themselves or other bees. The mite is large relative to the size of the honeybee so it is likely that the camouflage of cuticular carbohydrates plays a significant role in its phoretic lifecycle phase as well as in the brood. Indeed, V. destructor can rapidly change its cuticular hydrocarbon profile, i.e. odour, when moving from one host colony to another (Kather et al., 2015; LeConte et al., 2015). Varroa mites are also highly adapted in holding on to bees and bore between the abdominal sclerites of the host during long phoretic phases. However, in spite of the parasite adaptations honeybees, in particular A. ceranae, are able to detect and remove the Varroa mites (Le Conte et al., 2015). The traits associated with behavioral resistance are usually complex colony level traits. They are not only complex because the behavior as such is composed of different coordinated subtasks, but also because the queen is highly polyandrous resulting in a composite genotypic colony structure (Adams et al., 1977).

3.2. Individual level

The most solid case of resistance to V. destructor has independently emerged as a consequence of natural selection on the island of Gotland (Sweden) and in Avignon (France). In both cases the resistance to the parasite is based on a – slightly different – inhibition of the mite's reproduction, with V. destructor entering the brood but failing to produce offspring or exhibiting delayed egg-laying (Le Conte et al., 2007; Locke and Fries, 2011; Locke et al.,2012) (Fig. 1A). Part of this resistance may also be due to tolerance of the resistant honeybee populations to virus load (Lockeet al., 2014). However, in these populations individual résistance of drones is a main driver of tolerance on the colony level, mainly due to reduction of mite population growth rate (Locke et al., 2012).V. destructor has an eight- to ten-fold preference for drone brood, as the drones are larger in size and their post-capping development lasts 14 days instead of 12 days in worker bees. In the Cape honeybee, A. mellifera capensis, worker development even lasts

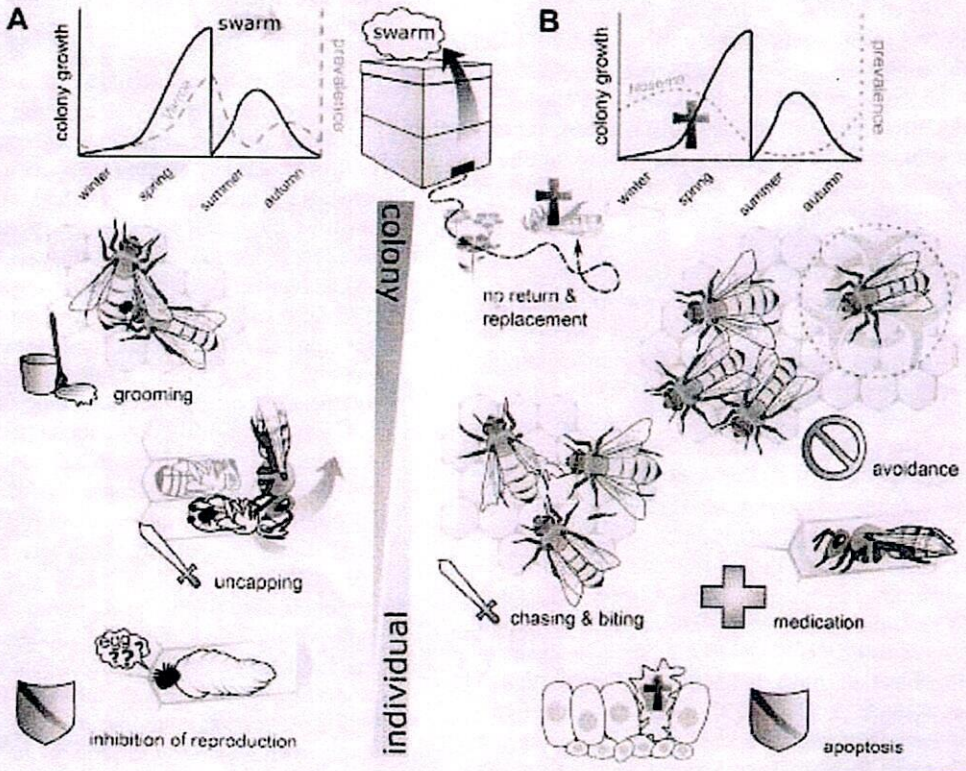

Fig. 1. Defenses against (A) Varroa and (B) Nosema, ranging from the colony level to the individual level.

(A) Swarming/absconding and leaving infested brood behind in the hive; grooming behavior to remove and kill mites from nest mates; Varroa-sensitive hygienic behavior (VSH) by detecting and uncapping infected brood cells to remove the pupae from the colony and kill all immature mites; inhibition of the mite's reproduction where V. destructor enters the brood cell but fails to produce offspring. (B)Replacement of old workers through rapid colony growth in spring/infected bees may not return to the colony as they age faster and become foragers sooner; infected bees display modified cuticular hydrocarbons and can be either attacked/killed or avoided; bees choose specific honeys for self-medication; escape from the inhibition of apoptosis by N. ceranae in midget epithelial cells.

Only 9 days on average. Hence, only a single reproductive mite off-spring can develop per worker cell, which drastically inhibits the growth of the mite population in A. m. capensis colonies (Moritzand Hänel, 1984). In addition, drones are also fed more often and longer by nurse bees that may involuntarily carry mites to the brood, thus increasing the probability of a mite infection (Cervoet al., 2014). Therefore, any traits of resistance to V. destructor that are expressed in the drone brood will have a strong influence on V.destructor population growth rate, fundamentally interfering with the host–parasite convolution. Resistance of individual drones may enable the whole colony to tolerate Varroa and survive under the infection, as even a low frequency of resistant drones directly reduces the growth rate of the mite population. The colony may become tolerant because it can be infected but the infection only rises to a certain limit depending on the mite reproduction in the worker brood. Yet, if the genes deter-mining drone resistance also result in worker resistance, colonies are expected to become fully resistant. In this case, natural selection should be particularly swift because of the haploid male genome.

Potential resistance gene(s) will spread more rapidly in the population due to fitness advantages of resistant drones (Kidner and Moritz, 2015).V. destructor has only a very narrow time window for starting reproduction after enclosure in the brood cell (Rosenkranz et al.,2010). Within 5 h after the capping of the brood cell, the mite consumes the first haemolymph meal and only a few hours lateroogenesis begins. If the female mite fails to initiate ovary activation in this narrow time window, it will remain infertile. The ovary activation has been suggested to depend on cuticular hydro car-bon stimuli (Aumeier et al., 2000; Frey et al., 2013). Hence, a lack of such stimuli might be one way to prevent mite reproduction. However, it is also possible that specific compounds in the firsthaemolymph meal can inhibit the activation of the mite's reproductive cycle. Clearly, understanding the underlying physiological processes that interfere with the crosstalk between the mite and the host larva will be fundamental to comprehend this important step in host–parasite convolution. This is the most critical phase in the reproductive cycle of the mite, where the host has the opportunity to evolve true resistance.

4. Defence against an end pathogen

4.1. Social level

The colony dynamics do not only influence the prevalence of brood parasites like Varroa, but also affect the prevalence of Nosemainfections in adult bees (Fig. 1B). Although the prevalence of N. apisand N. ceranae may differ, also depending on the climatic conditions (Fries, 2010; Girder et al., 2010), typically Nosema prevalence dynamics in temperate climates (also in the southern hemisphere) are characterized by an increase of Nosema infections during winter, reaching a high peak in spring before the old winter workers are replaced by many uninfected young workers (Borchert, 1928; Bailey, 1955; Doull and Cellier, 1961). However, these dynamicsmay disappear under climatic conditions favorable for N. ceranae (Martin Hernandez et al., 2007; Higes et al., 2008). In principle there are two options for a healthy worker to reduce chances for parasite transmission within the colony: either remove infected workers from the colony or avoid contact with infected workers (Fig. 1B). Infected workers appeared to be attacked, including biting, stinging and chasing, by their uninfected nest mates, which in some cases even resulted in lethal attacks in these experimental groups (Müller et al., 2015). Such agonistic behavior, which was associated with significantly altered expressions of cuticularhydrocarbons, was also observed in DWV-infected and generally immune-challenged honeybees (Richard et al., 2008, 2012;Baracchi et al., 2012). However, healthy workers were also observed to avoid highly infected nest mates (Müller et al., 2015). Interestingly, although N. ceranae and N. apis infections indeed resulted in changes of hydrocarbon profiles in honeybees, these specific cues may not always lead to altered social interaction between nestmates (Murray et al., 2015). Thus, the recognition of infected individuals likely reflects an adaptive social immune response towards Nosema infections. A special case of social immunity is self-medication. Honeybee products such as honey, bee bread (pollen

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stored in the combs)and porpoise contain naturally antibiotic, antifungal, and antiviral compounds of plant products, which are crucial for food and nest hygiene and may also be considered as medication (reviewed by Erler and Moritz, 2015). For example, honeybees collected more antiphrastic resin when they were infected with the fun-gal pathogen Ascosphaera apis, which causes chalk brood disease, thereby reducing the infection intensity (Simone et al., 2009;Simone-Finstrom and Spivak, 2012). Likewise, specific antiparasitichoney types were preferably chosen by N. ceranae-infected workersin comparison to healthy individuals in laboratory tests (Ghermanet al., 2014).

4.2. Individual level

Another mechanism promoting the reduction of infected workers in the colony is that N. apis-infected workers age more quickly and begin risky foraging earlier in life (Wang and Moeller, 1970;Woyciechowski and Moro´n, 2009), which may also be the case for N. ceranae-infected workers (Wolf et al., 2014). Furthermore. Ceranaeinfected foragers may often be too weak to return to the hive, showing significantly reduced homing abilities (Wolf et al.,2014). This may be due to the energetic stress imposed by Nosemaspp. (Mayack and Naug, 2009; Kurze et al., 2016). Thus, if infected workers that tolerate the infection sufficiently to allow for flight ability do not return from flights, this would limit the transmission of Nosema to newly emerged uninfected workers and may lead to a "clearance" of the infection in the hive and colony resistance. Besides external defence mechanisms, honeybees possess an innate immune system for internal defence. Their immune system, although consisting only of a reduced set of immune genes (Evan set al., 2006), displays nuanced patterns of selection between beta, which likely reflect different parasite pressures and life his-tory traits among them (Barribeau et al., 2015). Also, N. ceranae would be expected to impose a strong selection pressure on the immune system of honeybees. Although N. ceranae infections are associated with the suppression of immune genes (Antúnez et al.,2009; Chaimanee et al., 2012; Holt et al., 2013; Aufauvre et al., 2014)and the inhibition of apoptosis in sensitive honeybees (Higes et al.,2013; Kurze et al., 2015), recent transcript me and proteome analyses revealed increased expression levels of antioxidants, which might indicate an alternative immune response (Dussaubat et al.,2012; Vidau et al., 2014).Possible defence mechanisms against N. ceranae infections were studied in some detail in honeybees that were artificially selected for resistance over two decades in Denmark, resulting in a decrease from 60–80% down to 10% Nosema prevalence in these colonies(Hatjina et al., 2014). When infecting individual drones from this breeding line with N. ceranae, they showed significantly higher survival and expression levels of genes of the innate immune system, in particular of the Toll pathway, than Nosema-sensitive honeybees after one week of infection (Huang et al., 2012). Surprisingly, N. cer-anae developed similarly high infection levels in these drones as insensitive honeybees, suggesting tolerance rather than resistance at the individual level (Huang et al., 2012; Kurze et al., 2015). Another indication for tolerance is that the energy budget appears not to be negatively affected like in sensitive honeybees (Mayack and Naug, 2009; Martin Hernandez et al., 2011; Kurze et al., 2016).

If these bees are truly tolerant, how can this lead to resistance observed at the colony level? According to a quantitative trait loci(QTL) mapping study based on drones from a hybrid queen between both genotypes, major QTL (on chromosome 14) were associated with 31 genes, including the candidate gene Aubergine (Aub), which is known to be involved in post-transcriptional gene silencing viaRNA interference (Huang et al., 2014). Indeed, Aub has been shown to be associated with resistance against intestinal bacterial infections in Drosophila melanogaster (Cronin et al., 2009). As apoptosis has been suggested to play an important role in the pathogenesis of N. ceranae infections (Higes et al., 2013), this could be another target of selection. Interestingly, tolerant workers appear to escape the manipulation of apoptosis by N. ceranae in the midget epithelium, having similar rates of apoptosis as uninfected controls. In contrast, apoptosis was significantly reduced in negative association of the inhibitor of apoptosis protein (iap) gene expression insensitive honeybees (Kurze et al., 2015). If this different response would really keep the Nosema infection intensity at bay through regular defecation of infected cells outside the hive, this adaptation could possibly reduce the transmission success of this intracellular pathogen and may explain the low prevalence observed in colonies of this breeding lineage.

5. Concluding remarks

While the majority of research in ecological immunology is based on individual responses, the additional complexity of immune responses at the social level makes social insects an appealing study system for future investigations of host–parasite dynamics and convolution. This may also reveal new perspectives for studying other social organisms.

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They appear to have not only adapted at the individual level to resist or tolerate parasites, but their adaptations at the social level are also crucial to reduce or avoid parasite transmission. The case study on Varroa resistance (i.e., the mite's delayed egg-laying) in Sweden illustrates how individual resistance may lead to tolerant colonies due to the inhibition of Varroa reproduction. In contrast, colonies selected for Nosemaresistance in Denmark (i.e., low prevalence at colony level) appear to be tolerant at the individual level (i.e., they developed high infection intensities, but energy metabolism and survival was not impaired). This may suggest that tolerant individuals buffer the impact of an infection on colony fitness, leading to a potentially swifter replacement of infected individuals and reduced parasite transmission under certain conditions. A better understanding of these mechanisms in social insects may not only be interesting for questions on host–parasite evolution, but could also be important for improving honeybee health in the long term

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SOCIO-ECONOMIC ISSUES OF WOMEN IN CONTEMPORARY INDIA

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Abstract

Women in an ancient India were respected and worshiped as goddesses. Nevertheless, in the middle age, the women's status gone down to great extent. Women were considered in society only to perform duties like bringing up children, caring every family member, and other household activities. Another common problem for women is gender discrimination which they face from their birth and continues till their death. Lack of proper education, household work burden, domestic violence, rape, sexual harassment at workplace, Gender bias at home as well as at workplace etc are some other issues that women are facing in contemporary India. In the 21st century, there are a lot of positive changes has occurred in the women status as the number of educated people is increasing in the country. Now, women are breaking all the barriers of social issues and problems against them in society. They are going ahead and enjoying equality of status in almost all fields because of being a literate and financially independent.

Particularly the urban women have completely transformed from being a mere homemaker to the modern-day multitasking woman while handling responsibilities without fear. However, Women in oppressed regions and rural backgrounds have still to compete a lot in terms of their urban counterparts. It is not that the rural women are backward in any aspect, but the change and transformation that the urban woman sees is a little slower to the rural women. There are some places, where women, either in urban or rural backgrounds, still, face harassment and humiliation in domestic as well as professional circles.

Women have achieved success in various spheres of their life, yet the dark side of humanism does exist even in modern days. The status of women in society has been denied in the public on many occasions, though they are well educated and having high position in their career. Women are more financially sound and economically independent, yet they are not able to take certain important decisions on their own. Women today are empowered with self-confidence and boldness to carry on the world without fear, yet in terms of women safety, there are still lots to be achieved. This paper is an attempt to analyse the various socio-

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economic problems that women face in contemporary India and find out various measures to prevent them.

Introduction:

"*It is impossible to think about the welfare of the world unless the condition of women is improved. It is impossible for a bird to fly on only one wing.*" — **Swami Vivekananda**

Once Jawaharlal Nehru, India's first Prime Minister said, "You can tell the condition of a Nation by looking at the status of its Women". Not just Indian society, Women are important to any society. Women in an ancient India were respected and worshiped as goddesses. Nevertheless, in the middle age, the women's status gone down to the great extent. Women were considered in society only to perform duties like bringing up children, caring every family member, and other household activities ect., In India, women are legal citizens and have equal rights with men (Indian Parliament). Due to the lack of acceptance from the male-dominant society, Indian women suffer immensely. In Indian society, women are powerless also mistreated inside and outside the home. Though women are responsible for bearing children, yet they are malnourished and in poor health. Women are also overworked in the field and complete the all the domestic work, and they are unpaid or underpaid labours.

In the 21st century, Indian women's have lot of opportunities, with having a voice in everyday life, in the business world as well as in political life. However, India is still a male-dominated society, where women are often seen as subordinate and inferior to men. We may say that India is moving away from the male-dominated culture in the 21st century, yet discrimination is still highly visible in rural as well as in urban areas, throughout all strata of society.

The social framework:

There have been many great changes in the status of Indian women over the past few millennia. The status of the women had declined from the ancient time to medieval times, later changed to the promotion of equal rights by many reformers during independent movement. In independent India, women have held high offices that includes President, Prime Minister, Speaker of the Lok Sabha, Union Ministers, Chief Ministers, and Governors.

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Our ancient holy literature, such as Rigveda shows evidence that women are fully the equals of men as regard to access to and capacity for the highest knowledge, even the knowledge of the absolute Brahma. The brahmavadinis were products of an educational discipline of brahmachrya, for which women were also eligible.

The Yajurveda also states that a daughter who has completed her bramhacharya should be married to one who is similarly learned. The Atharvaveda also refers to maidens qualifying by brahmachrya, the disciplined life of studentship, fit for married life in the second ashram i.e. Grihastha ashram. The Upanishad also emphasizes that the men and women were equal participants of knowledge.

As society got much more settled and was not subjected to the pressure of continuous invasion, the position of women became subject to deterioration. The majority religion in India, Hinduism assigned a lower status to women. The ancient lawgiver Manu prescribed, "A women must never be independent". The life of an ideal Hindu wife is to be spent in the service of her husband, she ought to be a "pativrata". Hindu women were expected to be an obedient daughter, faithful wife and devoted mother. Marriage was the single important event in her life and it took place soon after puberty. The child marriage came to be a norm which implied that, young girls were not involved in the decision-making process of selecting their husbands.

The custom of Sati, the prescription of widow remarriage even when she is widowed as a child, the insistence on dowry, etc rendered Hindu women a non-person. In addition, prohibition of interreligious and inter-caste marriages compelled some women into prostitution or commit suicide.

Indian protestant religions like Jainism, Buddhism, Veershaivism, and Sikhism undertook reform movements to improve the conditions of women. However, the status of women continued to be similar to that in Hinduism. The Hindu code Bill and the Constitution consider these religious groups like Hindus, hence, the same civil code is applicable to them.

Islam religion, in theory, the accepted social equality to men and women but does not allow women to have equal participation in religious field. Islamic marriage is a contract, still, it does not give equal rights to men and women, polygamy is allowed and easy divorce is granted to the husband only. The middleclass Muslim Women are not allowed to participate in social activities and they are expected to observe pardah especially while moving in the streets.

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Social Reforms In India:

There were two main reasons for the changes of women's status in India, one was the wake of Raja Ram Mohan Roy's movement against women's subjugation to men and the second one was British influence on Indian culture and civilization. However, after Mahatma Gandhi's enlightened leadership only they re-asserted their equality with men. In response to the call of Gandhi, they discarded their evil and came out of the four walls of their houses to fight the battle of freedom shoulder to shoulder with their brothers. After Independence, the Indian Constitution has given equal status to women with men. According to the Indian Constitution, there will be no discrimination between men and women and all professions are open to both with merit as the only criterion of selection.

After gained constitutional rights, the Indian woman has distinguished themselves in various spheres of life as politicians, orators, lawyers, doctors, administrators, and diplomats. There is hardly any sphere of life in which Indian women have not taken part and shown their worth. Women exercise their political rights as well, by to vote, the contest for Parliament and Assembly, seek appointment in public office and compete in other spheres of life with men. Today, Indian women enjoy more liberty and equality than before. Women have been given equality with men in shaping their future and sharing responsibilities for themselves, their family and their country. However, there is some social and economic constraint that prevents women even today to become more independent and self-reliant.

A Woman In The Modern Day's:

In modern society, women have completely transformed, especially the urban woman are changed from being a mere homemaker to the multitasking woman. They handle responsibilities without fear. Urban women of today balance their family lives with their professions, they can able to handle their duties and chores at home, manage a career outside their homes, nurture their children simultaneously. The modern women take right decisions boldly, stands up for her rights and walks a path of success. Kalpana Chawla, Indra Nooyi, Sushma Swaraj, Aishwarya Rai and many more women achievers are in their chosen fields. Women are rising and shining almost in every fields, as a journalists, politicians, doctors, engineers, lawyers, actors and in many other professional spheres as well.

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We have women who are bus drivers, metro rail drivers, conductors, post masters, flight squadrons, pilots, scientists, etc. It is proven fact that there is literally nothing that is unconquerable by the women. They have taken over male bastions and proved successful in their own ways. Women today are law makers; we have had president and prime minister in our nation who were women. On many important occasions, Women ruled the country and proved to be the best decision makers in times of emergency. Also women proved to be a good decisions-makers and make men respect their decisions.

Famous writers Arundhati Roy, Anita Desai, Kiran Desai, Shobhaa De, Jhumpa Lahiri can put any other writer to shame. In the field of cinema, women like Rekha, Smita Patil, Shabana Aazmi and Vidya Balan and Konkona Sen are such names who don't play feminised roles, but have asserted themselves over this male-dominated realm. In the field of Politics, from Indira Gandhi to Shiela Dixit, Uma Bharti, Jayalalithaa, Vasundhra Raje and Mamata Banerjee today, women are making their presence felt.

This is just one side of the story. Women in oppressed regions and rural backgrounds have still to compete a lot in terms of their urban counterparts. The development of rural women seems a little backward in some aspect when compared to the change and transformation that the urban woman sees. In many ways Women from urban and rural backgrounds, both still face harassment and humiliation in domestic as well as professional circles. How much high they reach in their lives, women are still made to feel helpless when men mete out unhealthy treatments and behave badly in front of them.

Socio-Economic Problems Of Women In India:

Dowry Tradition:

The Main discrimination against women arises from India's dowry tradition, in which the bride's family gives money and/or gifts to the groom's family. According to law, Dowries were made illegal in India after 1961, yet the practice persists in most marriages, and the law is almost impossible to enforce. Sadly, the dowry system has continued even today in most of our communities, particularly those who traditionally have not practiced it, because it is used as a means of climbing the social ladder and to achieve economic security. In the dowry, the

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bride what she gives for her marriage can easily exceed the annual salary of a typical Indian family. It will badly affect the family economically, who have more than one or two daughters.

Access to Education:

Nobody can deny that the situation has improved since the earlier times, in terms of the status of women. However even after over seventy years of independence women are still exploited, like dowry, crimes like rape, sexual harassment at the office or public places, and molestation, eve-teasing, which are the shameful side of our country. Though women, represent 48.2% of the population, getting access to education, and employment are very less when compare to men, especially rural girl's situation. girls enrolled at the primary level From 5.4 million in 1950-51 to 61.1 million girls in 2004-05. The enrolment has increased from 0.5 million girls to 22.7 million girls at the upper primary level.

Between the year 2000 and 2005, the girls dropout rates have fallen by 16.5%. After introducing programs like 'Sarva Shiksha Abhiyan' and 'Saakshar Bharat Mission for Female Literacy' the literacy rates have increased from less than 10 percent to more than 50% today. Compare to other countries, India has the largest population of working women in the world, and has more number of doctors, surgeons, scientists, professors than the United States.

Employment Opportunities:

Throughout the Indian economy, women tend to hold lower-level positions than men even though they have sufficient skills to perform higher-level jobs. Particularly in the villages, female agricultural labourers were usually paid 40 to 60 percent of the male wage. Though women occupy similar positions and have similar educational levels, they earn just 80 percent of what men do. Compare to private sectors, the public sector hires a greater share of women yet, wages in the public sector are less egalitarian despite laws requiring equal pay for equal work.

On other side, many women are employed, yet they may not have control over the money they earn. In the recent years, there is a considerable improvement in the Status of working women in India, yet they still find themselves dependent on men. The reasons are man in patriarchal society has always wielded economic independence and power to take decision. Though the working woman became economically independent in the same

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patriarchal set-up, the basic infrastructure of society has hardly changed, though her own role within the same structure is passing through a transitional phase. It is but natural that she would remain vulnerable to exploitation even in her economically independent state.

Child Marriage and Reproductive Health & Rights

According to the Prohibition of Child Marriage Act 2006, the marriage below age 18 for girls and age 21 for boys are prohibited, yet this law failed to bring the changes in the villages where family, caste and community pressures are more effective than any legislature. According to the report submitted by UNICEF's "State of the World's Children 2009", 47% of India's women aged 20–24 were married before the legal age of 18, among them 56% are in rural areas. According to the report around 40% of the world's child marriages occur in India.

Compare to Age group between 20 and 24, girls age between 15 and 19 are twice as likely to die of pregnancy-related reasons. In many case, child wives are experiences domestic violence, marital rape, deprivation of food, and lack of access to information, healthcare, and education. Unfortunately, the vicious cycle of illiteracy, abuse and other offences are likely to be continued and passed on to their own daughters.

According to the data given by women Delivera women's advocacy group, there are 225 million women in developing countries have an unmet need for family planning, which is contributing to 74 million unplanned pregnancies and 36 million abortions every year.

Gender Equality

Equality is a recurrent issue when it comes to women and girls, whether it's unequal access to schooling or unequal pay in the workplace. In terms of political representation, around 95% of countries in the world are led by a male head of state, which shows that there should be a lot of changes, particularly, the men as a global community hase a long way to go before women are given a fair shake.

Atrocities against women

Though women have achieved success in various spheres of life, the dark sides of humanism do exist even in modern days. Today, Women are empowered with self-confidence and

boldness to carry on the world without fear, yet in terms of women safety, there are still lots to be achieved. We get to hear plenty of cases of rapes, mental and physical harassments, dowry deaths, cases of domestic violence, etc.

Crimes against women are definitely has increased in the modern society. They have a fear to go out of their houses after sunset. They fear their own safety, because of the incidents like chain snatching, molestation, eve teasing etc. These unsafe situation, bring down the courage of women and leave them wanting for help and support from the male members of the family.

Suggestions To Improve Women's Socio-Economical Condition

- Main reasons for low enrolment in secondary schools particularly in villages are, long distance schools and less number of female teachers, hence government should open more number of schools at villages level and increasing recruitment of female teachers.

- There must be Initiatives to develop the combine vocational training and life skills such as the ability to manage challenges and advocate for women's rights.

- Women should be protected and legally recognized in informal sectors as well. Female entrepreneurs should have increased access to financial services that often remain out of reach.

- Employers and governments should strive for the "recognition, reduction, and redistribution" of care work, instituting better parental leave and breastfeeding policies, as well as affordable childcare options. Importantly, these benefits should extend to informal sectors as well.

- Indian Law should affirm equal property and asset ownership rights for men and women. Government should take measures to ensure women's financial inclusion by increasing economic services and training.

- Initiatives should support women's collective action and leadership, enabling women to challenge current power structures and, government programs should be implemented through a gender-sensitive lens.

- Protections that address women's specific needs—legal protections for parental leave, unemployment benefits, childcare support, and social pension programs among others—should be implemented.

- To prevent violence against women, Government law should more vigorous.

Conclusion:

Over the years, women have made great height in many areas with notable progress in reducing some gender gaps. Yet realities such as 11,332 women and girls getting trafficked every year, and increased practice of dowry, rape and sexual harassment hit hard against all the development that has taken place. As compared to the past, women in modern times have achieved a lot yet in real they have still to travel a long way. women are on one hand climbing the ladder of success, on the other hand she is mutely suffering the violence afflicted on her by her own family members and society.

Women are taught to be bold and outgoing in these days of modernism. They need to strengthen themselves by building up their inner strength and face the world without fear. Society should encourage the women to take independent decisions regarding their careers, professions, choices in matters of life partners, etc. and they should have a say in all important matters of the family. They should be taught to be self-reliant and should not depend on anyone to meet their financial needs; they should be taught to handle their own expenses. There should be more number of Government policies towards women to improve their social & economic status. The society need not to treat a woman as a Goddess, they may treat her as a fellow human being with respect and dignity.

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