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## Dr. K. VICTOR BABU

M.A.,M.A.,M.Phil.,Ph.D.,PDF, (D.Lit)

Associate Professor, Institute of Education  
& Editor-in-Chief  
International Journal of Multidisciplinary  
Educational Research (IJMER) &  
Sucharitha: A Journal of Philosophy and  
Religion  
Mettu University, Metu, Ethiopia.



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### Editorial.....

It is heartening to note that our journal is able to sustain the enthusiasm and covering various facets of knowledge. It is our hope that IJMER would continue to live up to its fullest expectations savoring the thoughts of the intellectuals associated with its functioning .Our progress is steady and we are in a position now to receive evaluate and publish as many articles as we can. The response from the academicians and scholars is excellent and we are proud to acknowledge this stimulating aspect.

The writers with their rich research experience in the academic fields are contributing excellently and making IJMER march to progress as envisaged. The interdisciplinary topics bring in a spirit of immense participation enabling us to understand the relations in the growing competitive world. Our endeavour will be to keep IJMER as a perfect tool in making all its participants to work to unity with their thoughts and action.

The Editor thanks one and all for their input towards the growth of the **Knowledge Based Society**. All of us together are making continues efforts to make our predictions true in making IJMER, a Journal of Repute

**Dr.K.Victor Babu**  
**Editor -in-Chief**

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## A COMPREHENSIVE STUDY ON INDIAN EDUCATION SYSTEM AND MANIFESTATION OF AI IN IT

**Dr.B.Lavanya<sup>1</sup> and A.Suganya<sup>2</sup>**

Associate Professor ,University of Madras, Chennai

<sup>2</sup>Research Scholar, University of Madras , Chennai

### **Abstract**

The study is based on the Indian National Education Policy on the upcoming changes and upgradation that has to be done in School Education, Higher Education , Teacher Education , Professional Education, Vocational Education and Adult Education . It also explains in detail about the future plans and improvements that has to be brought in National Research Foundation and Promotion of Indian Languages, includes the government financial plans and Rashtriya Shiksha Aayog. It also states the merits and limitation of the new National Education Policy-2019. It clearly states the committee near future goals and targets. Since the future world will be filled with artificial intelligence environment and thus, we have proposed the manifestation of artificial intelligence in school and higher education and along with a comparative study on Indian Education system and other countries education system.

**Keyword** – Education Policy, Artificial Intelligence, Teaching, Learning

### **I. Introduction**

The National Policy on Education(NEP) is a policy formulated by the Government of India to promote education amongst India's people. The policy covers from elementary education to colleges in both rural and urban India. The first NPE was promulgated in 1968 by the Prime Minister. The current 2019 National Education Policy is framed by K.Kasturirangan [Former Chairman of ISRO] with various other University members.The upcoming National Education Policy has many new changes and up gradation in the education system of our country. It contains of plans where institution collaboration with industries to improve the skills in students, to have practical and research knowledge in students. The study also states the various artificial intelligence techniques implemented in other countries both in school and higher education and the possible use of it along with our National Education Policy.

### **II. Objective**

The main objective of this paper is a study of National Education Policy -2019 of India,along with the comparative table between our National Education Policy 2019 and other countries education system and it finally proposes the ways to implement the artificial intelligence at different education levels.



### **III. Literature Survey**

The first National Policy for Education came out in 1968, based on the recommendation of the Indian Education Commission (1964-66) also known as Kothari Commission. The second committee came in 1986 in which District Primary Education Programme was started in 1990. There were various schemes that came up like Sarva Shiksha Abhiyan( SSA)-200-2001, Rashtriya Madhyamik Shiksha Abhiyan (RMSA)-2009 and Rashtriya Uchchar Shiksha Abhiyan (RUSA)-2013.Later National Education Policy-2016 stated that it should include four basic values they are building values, awareness, knowledge and skills for creating and maintaining congenial school environment. The policy explains about right for education for minority and weaker sections. It also aims in Gross Enrollment Ratio of 100% in school education and higher studies. It also aimed at improving quality of school and college both in curriculum and infrastructure.

Though our country policy states various level of improvement measures in education some researchers shows that over 300 Indian startups use AI in their core product offering and out of that 11 % are in the education sector. While this is a great sign that there is progress being made to make education efficient using AI [5], but we need to still improve the implementation of artificial intelligence in education by various ways. AI already presents the capability to replace a large number of administrative staff and teaching assistants in higher education. It is therefore important to explore the effects of these factors on learning in higher education, especially in the context of an increasing demand for initiative, creativity, and ‘entrepreneurial spirit’ for graduates [6].Countries like China, USA, UK, Canada, Russia, Germany, Norway, Sweden and few other have already stepped into the usage of artificial intelligence in their country education system both in school and higher education level.

China has the Next Generation Artificial Intelligence Development Plan which connects AI with healthcare, transportation, education and government. They have fixed that 2030 has a deadline for AI in Chinese infrastructure [5].A study published by eSchool News indicates that by 2021, the application of AI in education and learning will be increased by 47.5% [7].

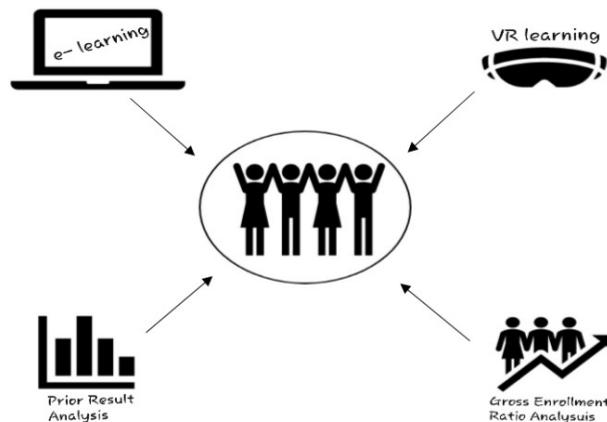
### **IV. School Education**

The National Education Policy -2019 have made a framework for school education that consists of cognitive stimulation for 0-3 years, educational guidelines for 3-8 years. It also consists of curricular, pedagogical framework for all child educators and parents. The stages of school education are framed as follows 5-3-3-4,

1. Foundation Stage: 3-8 years – Aims in Rapid Brain Development.
2. Preparatory Stage: 8-11 years- Aims in building on play and discovery.
3. Middle Stage: 11-14 years- Aims in learning concepts in subject.
4. Secondary Stage:14-18 years-Aims preparation of Higher education.

The policy also aims to achieve the foundation literacy to all students below class 5 and to provide compulsory education to children of age 3-18 years. The participation and learning of all children are ensured by attendance.Students are even allowed to have bi-

language education and they can also learn in their mother tongue till 8<sup>th</sup> standard. The policy states to provide high quality text book in local language along with we can also include NLP enabled intelligent tutor systems these systems helps in developing qualities such as self reflection, answering deep questions, resolving conflict statements, generating creative questions, and choice-making skills [15] They can also opt for collaborative learning, online asynchronous discussion groups [14]. Singular talent are identified and education to students are proposed to be topic centered. The policy ensure to maintain pupil teacher ratio, but the fact is that how much ever we try single teacher is not essential to fulfill the needs of all students so personalized learning with AI can help them to clear all doubts[5] , even it will create adaptive learning techniques with customized tools for improving the learning experiences[7] to still more improve the student comfort on learning, students can be given trial and error system of learning where intelligent computer system designed like a teacher would question the student and they can answer it without having judgment-free environment, especially when AI tutors can offer solutions for improvement[9]. This will create adaptive learning techniques with customized tools for improving the learning experiences. For students who are still weaker to learn remedial program will be made so all students can learn .



According to the policy, women will be educated to remove imbalance in gender also special attention and priority will be given to socio-economically backward regions and merit-based scholarships will be provided for underprivileged rural areas students, they are also provided with B. Ed courses and placements are made where women are given privilege. Government will also support as 2:1 rate for every rupee of the state for special education zones.

On the administration and management side, each district will have district education council and Directorate of School Education will handle each state school with State



School Regulatory Authority. The State Council of Educational Research will take in charge of Academic Standard setting. All small school are combined into a community where one school complex contains 10-20 public school. These school complex helps in sharing resource. Each school will have school complex management committee. They have also planned to monitor and maintain up to date of student information in National Repository of Educational Data and to analysis the student performance we can have a data analysis with these data to obtain student's current level in education. Sample of National Achievement Survey on student learning level are census to evaluate State Assessment Survey. This Survey can be used for the future learning and the prediction of next year analysis can be made which helps us to know approximate future and work better to make it have still higher ratio levels. The policy states to provide funds for individual students, midalay meal and for research purposes.

## **V. Higher Education**

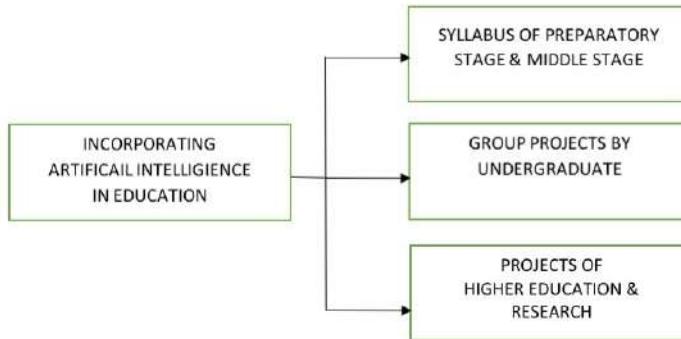
The policy mainly focuses on improving the structure of higher education system and improvising the education levels in disadvantaged geo-areas.

Thus, the policy came up with two missions namely, Mission Nalanda and Mission Takshashila where each district has higher education with 100 research institution and 500 teaching institution setups before 2030. All institution will either be framed as university or autonomous colleges but no affiliated college will be conducted. The policy also states that the allotment of staff and student ratio will be set up to 30:1 and the faculties will be given freedom to start up with new programmes and even decide student capacity based of their performance.

There are basically three forms in which higher education is going to be followed

1. World class research, high quality teaching.
2. High quality teaching with significant contribution to research.
3. High quality and undergraduate.

With these three forms in mind the Master's and Ph.D programmes are likely to be framed as, 2 years of Master in which 1 year completely for research or 4 years of undergraduate with honors 1 year of Master degree program and for Ph.D, the qualification will be Master or 4 year undergraduate. The policy also framed B.Ed course as 4 years for teacher preparation with multi-disciplinary institution as an undergraduate program and by the 4 years of course study, teachers are prepared to handle from pre-school to secondary stage and they will be eligible to take up Master's. As per the policy the teacher education has to be multidisciplinary since they have to be expertise in all core, with additional they can be thought with a basic knowledge of AI which can help them to do administrative work , grading exam, assessing homework and providing valuable response to students in a more precise manner which would help having more time with their students rather than spending long hours grading them [13]. The policy can also include that Staff of higher education can have AI oriented learning where even in time where a staff cannot clear the doubts of the students AI can be like a acting teacher and clear the doubts [7].



As its said all about regular courses the Open and distance learning will be improved by the increase in Gross Enrolment Ratio to 50% by Online digital repository and Credit based recognition of MOOC's. The Gross Enrollment Ratio can also be efficiently analyzed by using AI in admission and retention works, where AI can help in

1. **Domestic and international student admission and recruitment process can be more effective or changed**
2. The college admissions process will be easy, quick and more personalized.
3. Student confinement efforts will be more proactive than reactive.
4. The college's bottom line and overall reputational value will improve by using AI [11].

The entire framework is designed by National Higher Educational Qualification Framework. And the higher education institution will be governed by individual boards and the National Higher Education Regulatory Authority will be the only regulator for all higher education. Later it also states that the University Grants Commission will be changed to Higher Grants Council and there will be common regime for all public and private institution.

## VI. Professional Education

Professional Education will be an integral part of overall higher education. It includes the programme of agriculture, law, medical, engineering etc. Agriculture higher education is found to be less than 1% we could increase the productivity and skilled graduate in agriculture by improving the Capacity and Quality of teaching methods and job opportunities. We can overcome this reduced Gross Enrollment Ratio by the tremendous scope of AI in agriculture, applications where it will be in a position to handle frequent shifts and changes in external conditions. This would facilitate real time decision making and sequentially utilize appropriate model program for gathering contextual data efficiently [12]. Legal education it will be framed as globally competitive, adopting best practice in order to attain justice. State institution offering law education must offer bilingual education for future lawyer and judges. All



MBBS students must contain medical skills, diagnosing skills, surgical skills, emergency skills along with they can also be thought to implement AI in their specification work in higher studies. The first two years will be common period for all science graduate later they can work on their specification. Graduates for dental, nursing etc. will be allowed lateral entry into MBBS courses. Even Allopathic medical education must have basic understanding of Ayurveda, Yoga and Naturopathy to have better doctors in future. Technical Education are planning and preparing students with knowledge based and skill based which in turn makes each student to be well qualified individual and they even collaborate with industry for research and innovations. The programmes of Engineering and technology will also be revised to prepare professional in current and future emerging science and technology. The policy states that standalone university will be discontinued.

## **VII. Financing Education**

Financing in education is the best investment towards a society's future. The policy therefore envisions an increase in public investment on education to 20% over 10 year of period. Financial support includes learning resource, student safety, adequate staffing and teacher development.

The key thrust areas expansion and improvement of early childhood education, ensuring foundation literacy and numeracy, resource for school complex, food and nutrition, revamping college and university by also including AI based education.

Governing and management focus on smooth timely funds. Commercialization of education will be dealt by the policy. And regarding the Rashtriya Shiksha Aayog the National Education Commission will be constituted as an apex body chaired by the Prime Minister. The Union of Minister of Education shall be the Vice Chairman with direct responsibilities related to day-to-day matters. The Aayog will comprise Union Minister, Chief Minister, eminent professional from various fields. The Aayog will be the custodian of education, where it will facilitate effective vision and action of actors and leaders across national, State and institutional levels. The Aayog will work closely with every state to ensure coordination.

## **VIII. National Research Foundation**

The National Research Foundation will set up through an Act of Parliament as an autonomous body of the Government of India. It will receive annual grants of Rs.20000 crores and this would increase gradually as the capacity and quality of research is developed. Funding research is done on all discipline through the peer-review based process. By creating a link between researchers, government, and industry the urgent national issues are researched and implemented with best breakthroughs for public good. The outstanding research is encouraged with special prizes and seminars.

## **IX. Additional Key Focus Areas of National Education Policy 2019**

The Policy aims to see technology in all levels of education as



- Improve teaching, learning and evaluation
- Support teacher preparation and continuous teacher professional development
- Enhance educational access to disadvantaged groups
- Streamline education planning, administration and management.

The National Education Technology Forum will be autonomous body and facilitate decision making on the induction, deployment, use of technology providing the leadership of educational institution. The use of technology is assessed by digital repositories, teacher preparation to use technology and research. The National Repository of Educational Data will maintain all records related to institution, teacher and students in digital form.

Vocational education is also experimented with higher education institution where they offer by their own or with collaboration with industries. The Lok Vidya knowledge developed in India is made access for the vocational education students. The policy also states that Indian Standard will be aligned with the International Standard Classification of Occupation which is maintained by International Labour Organization where the framework will provide Recognition of Prior Learning and formal system of dropout is reintegrated by practical experience.

On the other side we have the adult education where the National Curriculum Framework for Adult Education will be developed in five areas

1. Foundation Literacy and Numeracy
2. Critical life Skills
3. Vocational Skills
4. Basic Education
5. Continuing Education

Textbooks and learning materials, criteria for assessment and certification aligned to this framework. The existing approaches and programmes will be taken away to identify the participants community volunteers. They have also decided to have large scale public awareness to be generated and special emphasis on women literacy are paid attention .

The policy states that focus on the language, literacy, scientific vocabulary in Indian language will be enabled through various literacy program and recruitment of teacher and focused research which also enables possible way of strengthening classical language and literacy are made.

Thus a table states the comparison of the Indian Education system and other countries education system in varies aspects ,

INDIAN EDUCATION SYSTEM	OTHER COUNTRIES EDUCATION SYSTEM
<p><b>School Education</b> - 3-18 years with compulsory education. Participation and learning of all children will be ensured by attendance.5-3-3-4 design, where</p> <ol style="list-style-type: none"> <li>1. Foundation Stage</li> <li>2. Preparatory Stage</li> <li>3. Middle Stage</li> <li>4. Secondary Stage</li> </ol>	<p><b>China</b>- nine years of compulsory education (six years of primary education and three years of secondary education) [16]. <b>Japan</b>- Compulsory education till 9<sup>th</sup> grade (from age 6-15) [17] <b>Finland</b>-Compulsory education from the age of 7-16[18]. <b>South Africa</b> – Compulsory education from age 7 to 15[19]. <b>United States</b> – They vary from state to state, the</p>



	starting age may be 5-8 and ending vary from 16-18 depending on the state [20].
In India the child has to complete primary school (1-5class) then to upper primary and secondary school (6-10 class) followed by junior college (11 <sup>th</sup> and 12 <sup>th</sup> or 1 <sup>st</sup> and 2 <sup>nd</sup> year) after that bachelor degree of 3 years and master degree of 2 years then Ph.D [21]	<b>US-</b> The children who cannot speak English and formally backward undergo Pre-Kindergarten, the rest of the child starts with kindergarten of 5 year, after which they attain 1 <sup>st</sup> grade to 12 <sup>th</sup> grade and then UG (4 years), MS(2years), Ph.D. [21].
<b>Higher Education</b> –Education, there are 993 Universities, 39931 Colleges and 10725 Stand Alone Institutions. Here are some more vital stats. Number of Universities: 993 Number of Colleges: 39931 Number of Stand Alone Institutions: 10725 Number of private universities: 298 There are 548 General, 142 Technical, 63 Agriculture & Allied, 58 Medical, 23 Law, 13 Sanskrit and 9 Language Universities. 60.53% Colleges are located in Rural Area. 11.04% Colleges are exclusively for women. 77.8% Colleges are privately managed; 64.3% Private-unaided and 13.5% Private-aided [22]	<b>China</b> - One of the largest higher education systems in the world. China has over 2,000 universities and Colleges [23] <b>JAPAN</b> - Universities-783 (Out of which 86 are National, 92 are Local, and 605 are Private Universities) Junior Colleges-372 (Out of which 22-are Local and 350 arePrivate Junior Colleges) [24].
Students are not allowed to switch in middle of the course to other subjects [25].	European and US based college allow students to switch subjects and they don't limit them to just one subject [25].
Literacy rate of India – 71.2% Youth literacy rates are 91.83% and 87.24% for males and females. The overall youth literacy rate is 89.65% Youth literacy rate definition covers the population between the ages of 15 to 24 years [26].	Other countries literacy percentage are North Korea -100%, Latvia-99.9% Poland – 99.8%, Russia -99.7% Italy-99.2%, South Africa-94.3% [27].
Indian education system lacks in quick adopting latest technologies in curriculum. Student fail to understand and learn concepts.	In other countries the curriculum is upgraded according to the new technology and industrial needs. Students learn by understanding concepts and by implementation.
Implementation of AI in education is less compared to other countries over 11% start-ups are of educational base which use AI. Now in 2019-2020 CBSE based school started AI as a subject to train students in multidisciplinary. [28]	Countries like China, US are investing billions in adopting AI based education. According to a report by 2025 the amount spent on AI in education may exceed the global expenditure. In US they may exceed in expenditure for AI based education by USD 85 million by 2022. [28] [29]
India spends 4.6 per cent of its total GDP on education, and ranks 62nd in total public expenditure on education per student, according to IMD. [30]	<b>US</b> - \$59.9 billion spent for Department of Education.[31] <b>Japan</b> - 5.38 trillion spent of education.[32] <b>China</b> - 29.58 lakh crore expenditure for education of the country.

### Highlights of National Education Policy 2019

- Students who study 9 & 10 overall is 79.3% But when they move to 11 & 12 it reduces to 51.3% where the policy aims in increasing the Gross



Enrollment Ratio by facilitating transportation.

- Women education is increased by appointing police for guard.
- Till 8<sup>th</sup> students can learn in their mother tongue and other language , they can have bi- language learning.
- Students are given liberal education.
- Student are planned to be educated in multi-disciplinary areas of subjects.
- Free education has been increased from 14 years to 18 years.
- Artificial Intelligence can help in carrier selection during higher education levels.
- Human and AI interaction can be brought in schools and college for disability students to clarify their doubts.
- Examination evaluation and invigilation can be done by AI technology which can save time of staffs.
- Using of AI in agriculture helps farmers to have best prediction about the climate , soils etc.

### **Criticism on National Education Policy 2019**

- 15 years above aged people are near 26 cores who are not educated, the policy claims to educate these people but they also say that the syllabus for this education will be prepared by NCERT.
- General Education Council will be the deciding authority of authorization of institution where this becomes a monopoly authority.
- NTA exam for all the 12<sup>th</sup> candidate where the NTA decides where each student has to be placed for college.
- Books are issued by NCERT but the state level education can change the syllabus as per state level students.
- **Quantity doesn't become quality.** When humans do a certain task for multiple times, they eventually become better at it. So, if a teacher has spent years teaching a class, he will get better at his job every day. Robots work by the algorithm that is not influenced by the repetition of the task. Therefore, their experience doesn't matter and doesn't make them any better.
- **Cost spent on incorporating AI in all levels of education may be at a higher side.**
- Bots and other AI learning tools will require a student to have a tablet or a laptop. However, not every student has these gadget. As soon as the government doesn't fund all the technological implementations which result in rich and poor gap.



## **Conclusion & Future Scope**

In overall the National Education Policy's plan and updation are good but implementation of AI in education can still improve the education level in standards. The few ways in implementing AI in education can be of all levels where some school students are provided with laptops in some state of our country we can further improve the education and understanding level of students by introducing VR learning , so students can have the real virtual effect of what is been thought and in higher education some students attain higher marks in bachelor education they would still lack in opting or choose which disciplinary of higher education in such a situation AI can help providing self test of their interest and analysis the data by using the previous available data and say the student with certain options. Artificial Intelligence might inform the students how their career paths look like depending on their goals thus assisting them beyond academics.

In our country we find many youngsters unemployed and few fields of education with a reduced level of GER these can be solved by educating them with AI and they can act in multidisciplinary fields and a data analyst and they can help in predicting and analysis data and fields like agriculture with less GER because since they cannot earn as a high pay as other fields but it can be changed by implementing AI has a core paper for agriculture students and to get a predicting knowledge about seasons, statistical climatic data, real time Moisture Adequacy Data (MAI) from daily rainfall statistics and soil moisture to construct forecast charts, seeds, fertilizer and pesticides than that of on field precision solutions. Since the past generation farmers didn't have knowledge of AI in agriculture they suffer with un predictable season change and other problems, so our future generation agriculture students can be thought AI so they can guide and remove the demands and needs of farmers.

In the field of medical science students can AI by learning and implementing on micro robotic operations. In future they can aim in bringing proper resources for research which implements AI irrespective to any disciplinary.

The best improvement can be done in education only when every student of the country attains same board of education. Rural area students should be facilitated with more technology resources. Student should work on real time example rather than theoretical data. Since students are the backbone of any country, the right education with proper use of technology improve the overall development of a country.

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**A STUDY ON KNOWLEDGE AND PRACTICES REGARDING  
MENSTRUATION AMONG ADOLESCENCE GIRLS IN URBAN SLUM WITH  
SPECIAL REFERENCE TO COIMBATORE CITY**

**Dr.K.S.Selvanayaki<sup>1</sup>**,  
Asst. Professor

**Dr.S.Udhayakumar<sup>2</sup>**,  
Guest Faculty

**K.Pavithra<sup>3</sup>**  
PG Student

Department of Women's Studies,  
Tamil Nadu Institute of Urban Studies, Coimbatore, Tamil Nadu, India

**Abstract:**

The present study is related to and emphasizes the menstrual hygiene and practices of the adolescent girls living in the oldest slums of Municipal Corporation of Coimbatore. Non-probability purposive sampling has been used to collect the information from 100 adolescence girls in the age group of 10-19 years as sample from the urban slum population. With the help of semi-structured interview schedule, relevant information was gathered from the slum adolescence girl respondents as primary data. A few details were also collected through personal observations. Respondent's knowledge on various aspects of menstruation, perception about and practices during menstruation and activities restricted due to socio-cultural beliefs associated with menstruation were assessed.

**Key Words:** Adolescence girls, menstruation, knowledge, perception and practice

**1 Introduction**

Urban slums are settlements, neighbourhoods, or city regions that cannot provide the basic living conditions necessary for its inhabitants or slum dwellers, to live in a safety and healthy environment. The United Nations Human Settlement Programme (UN-HABITAT) defines a slum settlement as a household that cannot provide any one of the basic living condition. Slum dwellers that do not have access to clean and affordable drinking water are at risk of waterborne diseases and malnutrition, especially amongst children and girls.

Thus the concept of slums and its definition vary from country to country depending upon the socio-economic conditions of each society. The **basic characteristics of slums** are:

- High rate of poverty
- Low level of economic status of its residents
- Inadequate infrastructural facilities
- Problem of malnutrition
- Lack of drinking water
- Low standard of living
- Unsanitary environment
- Lack of basic healthcare

According to the **Census of India 2001**, a slum is a compact area of at least 300 populations or about 60-70 households of poorly built congested tenements, in



unhygienic environment, usually with adequate infrastructure and lacking in proper sanitary and drinking water facilities.

### **Adolescence**

Adolescence has been recognized as a special period which denotes the transition from childhood to adulthood. Age group of 10-19 years [(i.e.,) early adolescence (10-13 years), mid adolescence (14-16 years) and late adolescence (17-19 years)] is considered as the period of adolescence during which sexual development happens along with psychological and cognitive changes. Attaining menarche is a very important milestone to mark this developmental process in girls. Normal menstrual cycles are typically 21-35 days long (maximum up to 45 days in early post menarchal year) and last for 3-7 days. Majority of girls are unaware about menarche and menstrual bleeding before they experience it for the first time and are unprepared mentally and emotionally. Attitude towards menstruation, either positive or negative, depends on preparedness of pre-pubescent girls and influenced by socio-cultural environment. It also depends upon awareness, age at menarche, cycle length, intensity and duration of menstrual flow. Girls mostly receive incomplete and inaccurate information regarding menstruation and their response to menarche depend on degree of physical discomfort they face during menstruation. Lot of myths and taboos regarding sex education prevails among Indian families and menstruation is considered unclean in Indian society. Various restrictions imposed on menstruating girls and secrecy surrounding it affects them psychologically, lowering their self-esteem and giving them feeling of shame and disgust. Majority of girls impose self-restrictions like going to school or play based on wrong belief that they are physically weak on those days.

### **Basic Facts about Menstruation:**

- Menstruation is the monthly shedding of the uterus lining in females of reproductive age.
- Periods occur, on average, every 28 days.
- Bleeding during periods usually lasts for 5–7 days, but can be more or less than this.
- The average blood loss during menstruation is 35 milliliters.
- Excessive blood loss of 80ml or more is known as menorrhagia.
- It is common for women to experience abdominal cramps each month.
- Severe menstrual pain is called dysmenorrhea.
- 1 in 10 women experience dysmenorrhea, especially those under the age of 30.
- Menarche is the name given to a young woman's first period and typically occurs around age 12.
- Menopause, experienced by women usually aged 45 – 55, is when menstruation ceases.

### **Significance of the Study**

Adolescence in girls has been recognized as a special period which signifies the transition from girlhood to womanhood. This transitional period is marked with the onset of Menarche, an important milestone. In the existing Indian cultural milieu, the society is interwoven into a set of traditions, myths and misconceptions especially about menstruation and related issues. Menstruation is generally considered as unclean in



Indian society. Isolation of the menstruating girls and restrictions imposed on them in the family have reinforced negative attitude towards this phenomenon in girls.

Lack of knowledge and poor personal hygienic practices during menstruation can lead to various gynecological problems in the reproductive life of girls. To manage menstruation hygienically and with dignity, it is essential that girls have access to water and sanitation. They need somewhere private to change sanitary cloths or pads; clean water and soap for washing their hands, bodies and reusable cloths; and facilities for safely disposing of used materials or a clean place to dry them if reusable. Menstruation is a natural process, but in most parts of the world it is a taboo and rarely talked about. It has also been largely neglected by the society and other sectors focusing on sexual and reproductive health, and education. As a result, the practical challenges of menstrual hygiene are made even more difficult by socio-cultural factors and millions of girls continue to be denied their rights to Water and Sanitary health, education, dignity and gender equity.

### **Scope of the Study**

Menstrual health and hygiene is intended for adolescent girls. Issues associated with menstruation are never discussed before openly and the girls are ignorant of this biological, physiological and natural function of their body. After the emergence of the menarche they received little information about physiological processes from peers (classmates); yet still do not know about hygienic practices. The last decade has seen a widening of the sanitation issue to include the crucial environmental health related areas of wastewater and solid waste management, but there exist very little subtext on menstrual health and hygiene management. Young girls often grow up with limited knowledge of menstruation because their mothers and other women shy away from discussing the issues with them.

Adult women may themselves not be aware of the biological facts or good hygienic practices, instead passing on cultural taboos and restrictions to be observed. Neglecting menstrual hygiene in water, sanitation and hygiene programme also have a negative effect on their sustainability.

Failing to provide disposal facilities for used sanitary pads or cloth results in a significant solid waste issue. Also latrines become blocked and pit filling quickly. Failure to provide appropriate menstrual hygiene facilities at home or school also prevents menstrual hygiene measures from being used by the girls all of the time.

### **REVIEW OF LITERATURE**

The literature on menstruation issues are immense, but dispersed and often concentrated on very specific problems and sometimes highly technical in nature. Here an attempt is made to review the available literature on the topic concerning urban slum adolescent girls and related menstruation issues.

Social, economic, spatial, and cultural factors together determine the healthcare behavior of women in slum areas. (Sribas Goswami, 2014)

Yasmin et. al., 2013 conducted this study to ascertain menstrual hygiene among adolescent girls. The study revealed that menstrual hygiene was far from satisfactory among a large proportion of the adolescents. Lack of appropriate and sufficient information about menstrual hygiene can be attributed to cultural and religious beliefs and taboos. Thus, the above findings reinforce the need to encourage



safe and hygienic practices among the adolescent girls and bring them out of traditional beliefs, misconceptions and restrictions regarding menstruation. General awareness about cause, organs involved in menstruation was to be improved. Use of sanitary napkins was to be enhanced by social marketing. For using old washed cloth, proper hygiene was to be maintained. Incorrect restrictions, myths and beliefs associated with menstruation can be removed by the help of teachers and parents. It was seen that hygienic practice like hand washing, daily bath had significant relationship with presence of continuous supply of water and presence of toilet exclusive to their family. According to **Kapoor A and Khari S (2016)** study the mean age of menarche was 13.28 (SD + 1.42) years. Mothers were the first informant to 56% girls. Only 11 % girls knew that menstruation is a normal biological phenomenon and 28% girls were mentally prepared before menarche. Readymade pads were being used by 46% girls. Most girls were forced to follow various restrictions during menstruation. Maternal education was significantly associated with use of readymade pads (p-value 0.031). Significant positive correlation was seen between pre- menarche preparedness to pleasantness ( $r = 0.3215$ ;  $p = 0.001$ ) while negative correlation was found between preparedness to secrecy ( $r = -0.1549$ ;  $p = 0.124$ ), annoyance ( $r = -0.1421$ ;  $p = 0.158$ ) and worrying thoughts ( $r = -0.2074$ ;  $p = 0.038$ ). Negative correlation was also seen between years of experience with menses to secrecy and worrying thought ( $r = -0.0162$ ;  $p = 0.872$  and  $r = -0.1033$ ;  $p = 0.864$  respectively).

The hygiene-related practices of girls in the adolescent period related to menstruation can have an effect on their health. The event of menarche may be associated with taboos and myths existing in our traditional society which has a negative implication for women's health, particularly their menstrual hygiene. Studies have shown that the girls lack knowledge about menstruation and due to lack of hygiene; they are likely to suffer from Reproductive Tract infections (RTI's). Attitude of parents and society in discussing the related issues are barriers to the right kind of information, especially in the rural areas. Menstruation is thus construed to be a matter of embarrassment in most cultures. It was therefore decided to conduct a study to explore the level of knowledge and practices regarding menstrual hygiene among the adolescent girls (**Kamath et.al. 2013**).

Another socio-cultural factor that has been found to influence attitudes towards menstruation is population group. It was found that ethnicity and income levels were significantly related with regard to knowledge about menstruation and level of preparedness. Culture and ethnicity are believed to have strong influences on the life events of individuals, and the experience of menarche is no exception. European Americans were found to be more knowledgeable and felt more prepared than African Americans, which may in turn lead to different attitudes towards and beliefs about the experience of menstruation (**White, 2013**).

According to **Juyal et. al., (2012)** adolescence in girls signifies the transition from girlhood to womanhood. Good menstrual hygiene is crucial for the health, education, and dignity of girls and women. This is an important sanitation issue which has long been in the closet and still there is a long standing need to openly discuss it. The onset of menstruation represents a landmark event in pubertal development of the adolescent girl. Menstruation, and the menstrual cycle are characterized by variability in volume,



pattern and regularity, which at the earlier stages of the development of the adolescent can create emotional discomfort particularly to the poorly informed girl. Studies have shown that although most girls viewed themselves as being prepared for menarche, having 'discussed this with their mothers', obvious misconceptions on the true physiological process and characteristics of menstruation.

**Sommer, (2010)** suggests that acquaintance with a country's beliefs around menstruation and providing girls with correct information about puberty are important elements in a holistic school MHM package. Ignorance about menstrual issues is prevalent not only amongst schoolgirls but also in organizations and communities. The issue of menstrual hygiene has the growing attention of women in developing countries; this applies to both individuals and self-help groups. Menstrual hygiene seems to be an insufficiently acknowledged problem especially in official programme. From research, it becomes clear that the lack of menstrual hygiene in many countries in Africa and Asia is perceived as an urgent problem and that several grass roots initiatives are trying to find a solution.

Women and girls in rural areas, who are often the poorest and cannot afford to buy sanitary napkins, catch their menstruation blood in an extra sari, or in cloths. Washing the cloth is problematic, because the women must often walk to distant spots near a river or a lake. As a result, women and girls run an increased risk of becoming victims of sexual violence and abuse e menstrual cycle is evident from these studies. Study stresses the importance of school toilets which are built to accommodate menstruating girls' specific needs for privacy, space, washing facilities and correct disposal or cleaning of menstrual pads. An environment where these hygienic needs are met can lead to improved dignity and attendance, thus improving girls' education and consequently the development of a country frequently; there is no possibility of properly drying the cloth, because nobody, especially men, may see any sign of the menstruation (shame-based culture). The consequence is that women and girls mostly have to hang it in well-hidden, often unhealthy places and use moisture and damp cloths. Incinerators are of little use if girls continue to use washable cloths, in which case, the availability of water and soap in every school toilet, together with social mobilization, are vital (**UNICEF, 2010**).

According to **Kour (2009)** research study on practices during menstruation reveals that the community depicted strong web of social and cultural practices during menstruation. It was observed that through several generations these practices were believed and followed. There were many social and religious restrictions on girls during menstruation. Girls received these instructions for do's and don'ts from mothers, elder sisters and friends. Restrictions particularly related to prohibitions in going to religious places, offering prayers and keeping fast (Roza's) were reported by all the sample girls.

Taboos/myths were also exported by all the girls by avoiding going near water as "it creates problem in the regular cycle because of a belief that reflection of water creates problems". All the girls were asked to avoid looking in the mirror by elders of the family. 98% believed that no regular bath should be taken during menstrual periods. Few (23%) showed prohibition in going to some other people's house. All the girls reported following these cultural prescriptions and prohibitions without questioning.



**Sharma et al. (2008)** concludes that stronger physical and emotional or psychological sensations may become debilitating, and include significant menstrual pain (dysmenorrhea), migraine headaches, and severe depression. Dysmenorrhea, or severe uterine pain, is particularly common for adolescents and young females. A study found that 67.2% of girls aged 13–19 suffer from it. This phenomenon is called premenstrual syndrome. More severe symptoms may be classified as premenstrual dysphonic disorder (PMDD).

Attitudes and beliefs about menstruation are found to be either positive or negative, with the majority of the literature reporting that both men and women hold mostly negative attitudes towards menstruation (**Rembeck et. al., 2006**).

### **Objectives of the Study**

The main aim of the study is to determine the menstruation knowledge and practices of adolescence girls in urban slum. The specific objectives are,

- To study the demographic details of the respondents
- To study the level of knowledge about menstruation among adolescence girls
- To understand the perception of menstruation among adolescent girls of the study area.
- To assess the practices followed during menstruation by adolescent girls of the study area.
- To analysis the activities restricted due to socio-cultural beliefs associated with menstruation

### **Profile of the Study Area**

The subject of slum welfare is immensely important, yet until recently it was largely ignored. The details of the slum problem are frequently unknown, because so often the poorest communities within an urban conglomeration are unmapped and hence are unknown to official seldom. The information of the existing menstrual practices is essential to study in order to provide need based awareness and education to urban slum girls.

The present study is related to and emphasizes the menstrual hygiene and practices of the adolescent girls living in the slum areas. The area of the study is a selected slum which is one of the oldest slums of Municipal Corporation of Coimbatore i.e., RVL Colony (Trichy road), CMC Colony and Gandhi Nagar (Upplipalayam). Rapid commercialization has been taking place in and around the city which is changing the occupational structure of the city. Poverty is more viable in many parts of the city because the economic growth of the city is not shared by the people of this area.

### **Population and Sampling procedure**

The study was conducted among the adolescence girls of urban slum in Coimbatore city. Non-probability Purposive sampling has been used to collect the information from 100 adolescence girls in the age group of 10-19 years as sample from the urban slum population.

### **Source and Tool for Data Collection**

Data on slums and poor population is obtained from the secondary sources like Census, NSSO report, etc. With the help of semi-structured interview schedule, relevant information was gathered from the slum adolescence girl respondents as primary data. A few details were also collected through personal observations. Data collection was



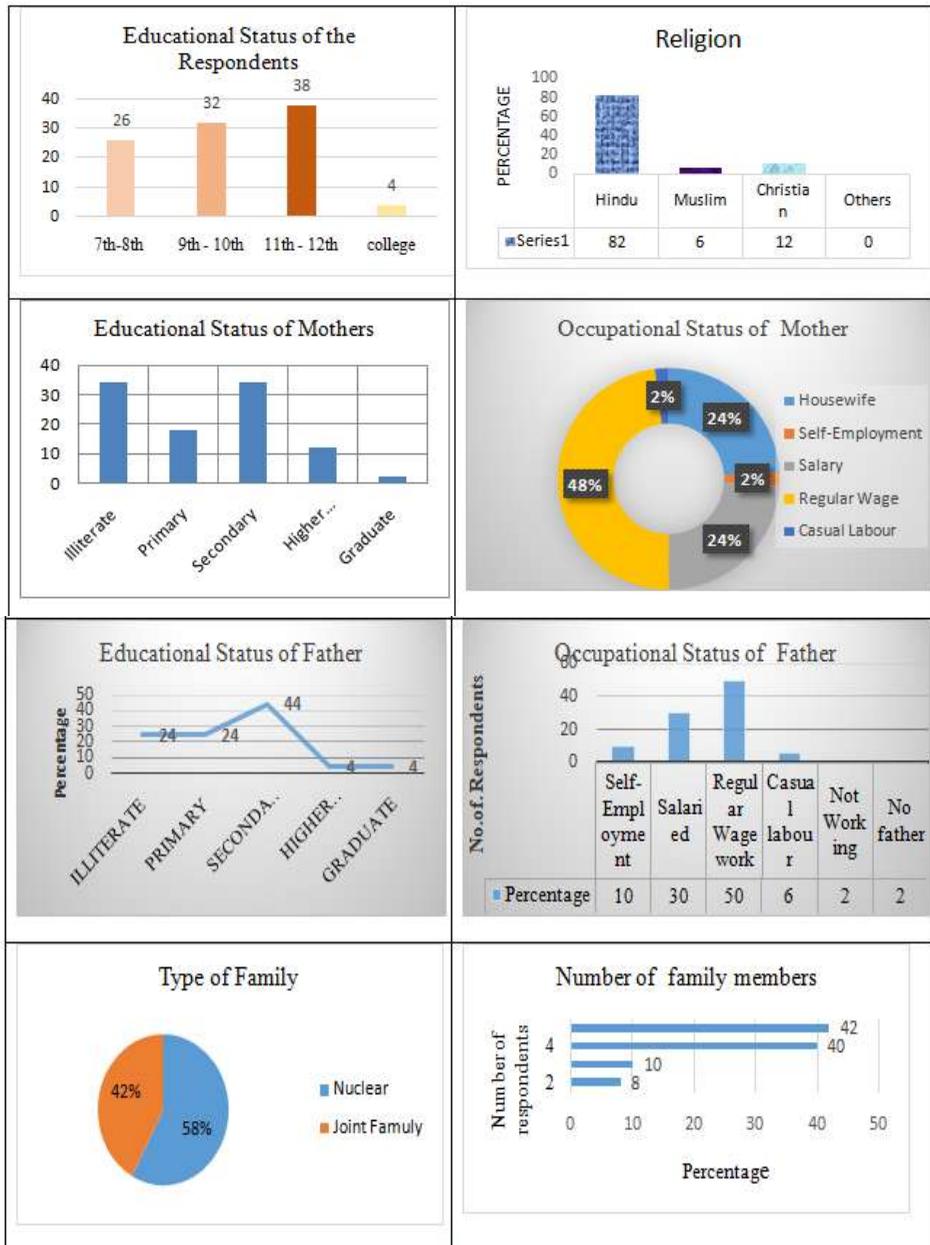
carried out during the period November-December, 2017. The study includes the living condition, knowledge, practices, perception and activities restricted during menstruation of adolescence girls in urban slum is assessed.

RESULTS AND DISCUSSION

After collecting the information from the respondents the data were analysed to answer the objectives of this study. The following table-1 gives the socio – economic characteristics of the respondents who were selected to determine the menstruation knowledge and practices of adolescence girls in urban slum.

Table – 1: Socio – Economic characteristics of the Respondents

Table with 4 columns: Socio – Economic background, Response Options, No. of respondents, Percentage. Rows include Age of the Respondents, Education of the Respondents, Religion of the Respondents, Educational Status of Mother, Occupational Status of Mother, Educational Status of Father, and Occupational Status of Father.



**Figure – 1: Socio – Economic characteristics of the Respondents**



The above table and figure shows the basic Socio-Economic characteristics of the respondents and their family. In that 34% of the respondents belongs to the age group of 15-16, 32% of the respondents are belongs to the age group of 17-18 whereas 28% of respondents belongs to the age group of 13-14 and 6% of the respondents are belong to the age group of 19-20. With regard to their educational level 38% of the respondents belongs to 11-12<sup>th</sup> standard, 32% of the respondents are belongs to 9-10<sup>th</sup> standard, 26% of the respondents are belongs to 7-8<sup>th</sup> standard and only 4% of the respondents are belongs to College. Majority of the respondents (88%) are currently studying and 12% of the respondents are not studying because of poor economic condition.

In response to the religion majority (82%) of the respondents are belongs to Hindu religion, 12% of the respondents are belongs to Christian religion, and 6% of the respondents are belongs to Muslim religion. Also half (58%) of the respondents belongs to Nuclear family and 21% of the respondents are belongs to Joint family. Nearly half (44%) of the respondents are having more than 5 members in the family and 40% of the respondents are having 4 members in their family.

Thirty four percent of the respondents mother's is illiterate and completed secondary schooling, 18% of the respondent's mother's completed primary, 12% of the respondents mothers completed higher secondary and only 2% of the respondents mothers completed graduation. Whereas 44% of the respondent's father completed secondary schooling, 42% of the respondent's father is illiterate and completed primary class and only 4% of the respondent's fathers completed higher secondary and graduation.

Nearly half of the respondent's mothers (48%) and father (50%) going to regular wage work and around one third of the respondent's mothers (24%) and father (30%) is going to salaried work.

#### **Respondent's knowledge on various aspects of Menstruation:**

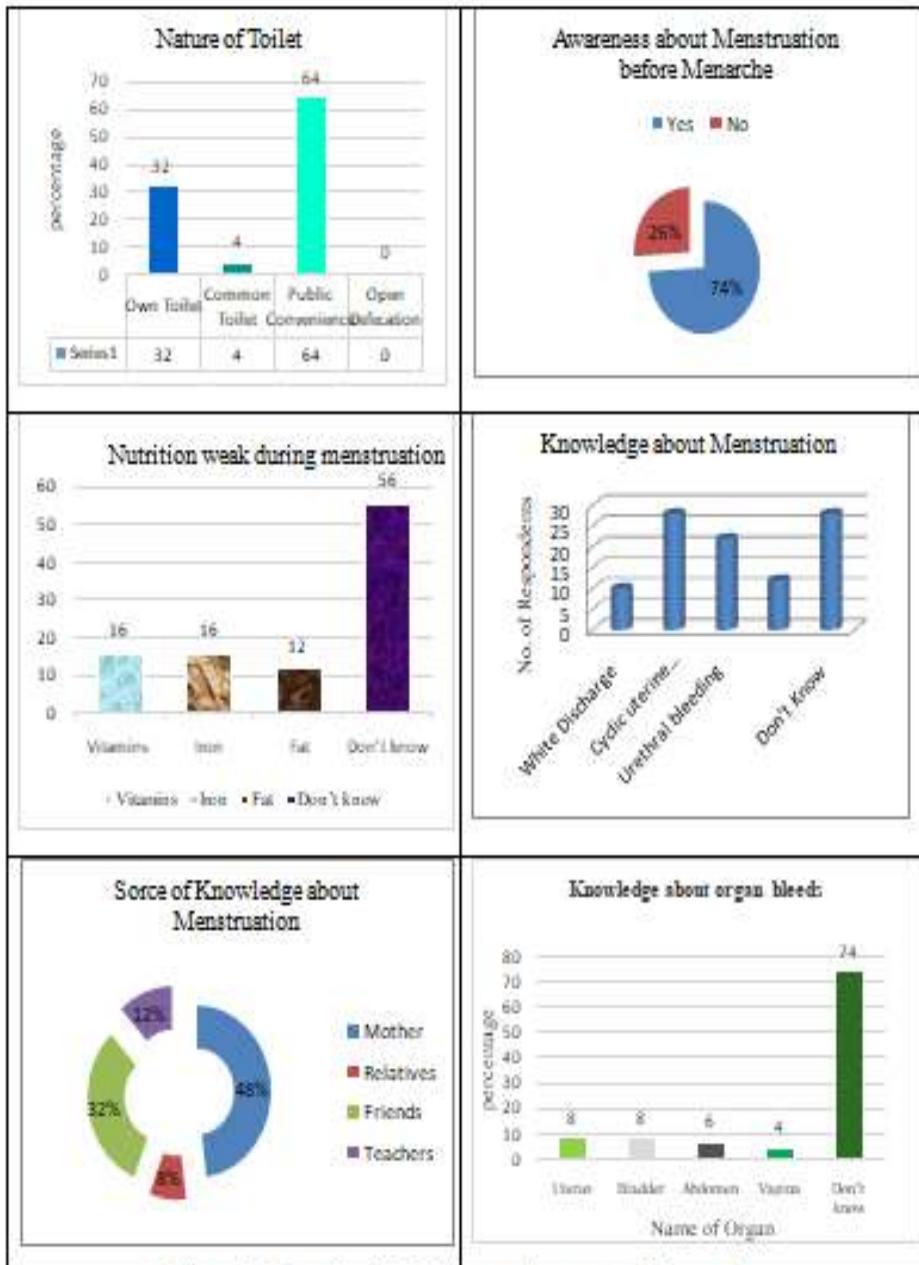


Figure – 2: Respondent Knowledge on various aspects of Menstruation

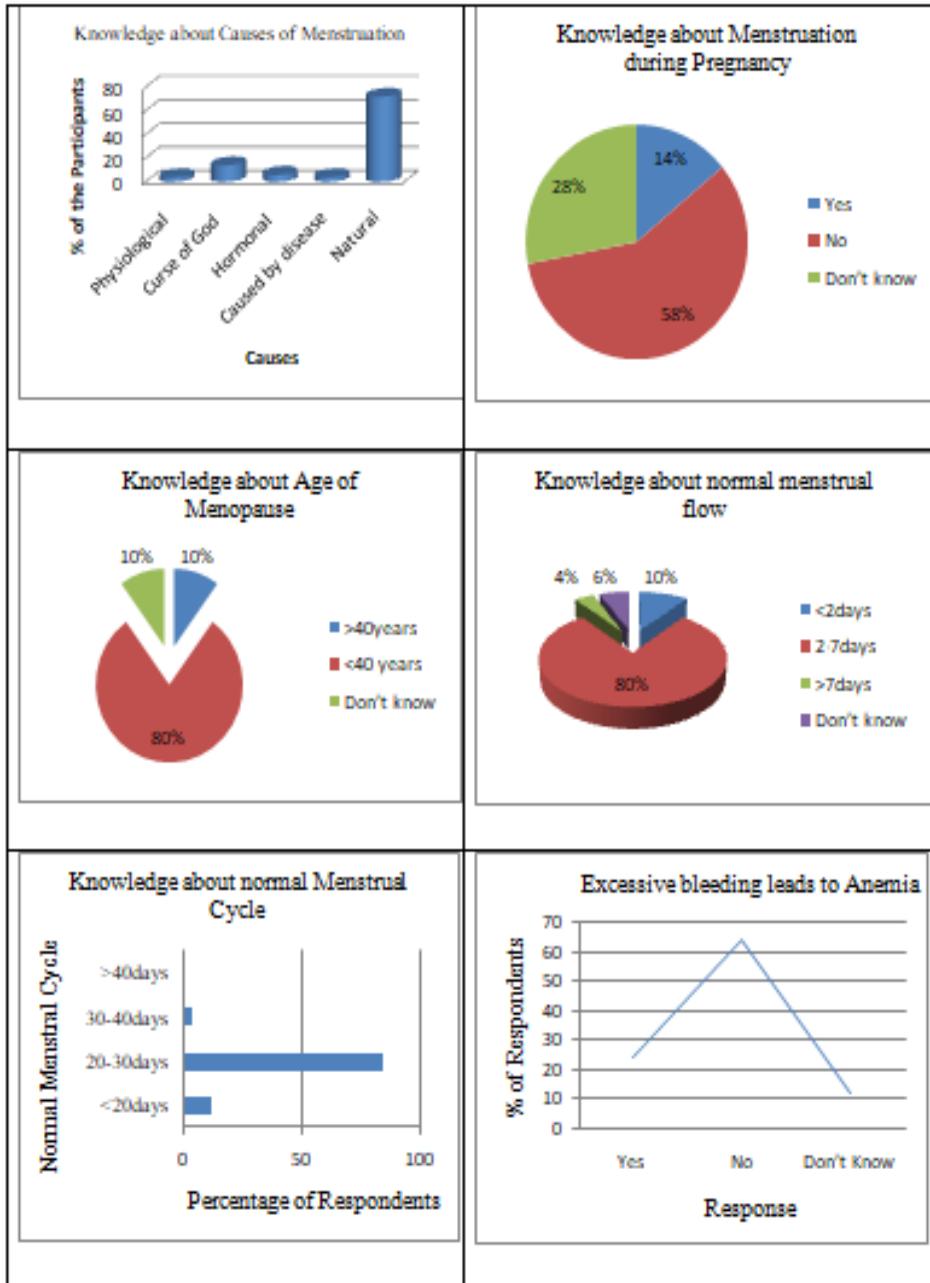


Figure - 3 Respondents' Knowledge on various aspects of Menstruation



The above figure 2 & 3 shows the respondent’s knowledge on various aspects of menstruation. Majority (64%) of the respondents are using public convenience for sanitation, 32% of the respondents are using own toilet and only 4% of the respondents are using common toilet for their sanitation. Surprisingly majority (74%) of the respondents are aware about menstruation before menarche. More than half (56%) of the respondent don’t know about the nutrient weak during menstruation. Around one fourth (28%) of the respondents are clear about that menstruation is cyclic uterine bleeding and also expressed that mother played a major role for this knowledge gain (48%), but three fourth (74%) of the respondents don’t know that which organ bleeds during menstruation. Notably majority of respondents are not knowledgeable such as menstruation during pregnancy (58%), the age of menopause (80%), the duration of normal menstrual flow (80%) and the excessive bleeding leads to anemia (65%). With regard to regular monthly menstrual cycle around 82% of the respondents are noted that it comes once in 20-30 days.

The above chart shows that 42% of the respondents attended puberty at the age of 13-14 years which is the normal puberty stage, 40% of the respondents attended puberty at the age of 12 & below 12, 14% of the respondents attended puberty at the age 14-14 and 4% of the respondents attended puberty at the age of 15 and above.

According to Bachloo (2016) 52% of girls attained menarche in 11-13 years

### Perception about Menstruation

Perception about menstruation may vary from individual to individual. The following are some of the facts and the participants perception based on their knowledge and awareness.

**Table – 2: Respondents Perception about Menstruation**

S.No.	Perceptions	Response (in percentage)	
		Yes	No
1	Taking hair bath is a good practice	80	20
2	Menstruation is a disease	8	92
3	Feels weakness of body	44	56
4	It cleans dirty blood	72	28
5	Running and Dancing is harmful	38	62

Based on the above table the participants perceived the above listed facts and responded either ‘Yes’ or ‘No’. The response shows that overall all the respondents perceived the facts about menstruation in a right way. Ninety two (92%) percent of the respondents perceived that it is not a disease rightly.

### Practices during Menstruation

Based on the knowledge and perception the regular practices of participants during menstruation such as cleanliness, kind of absorbent material used and the method of disposal were assessed. The following charts give their responses on their practices during menstruation.

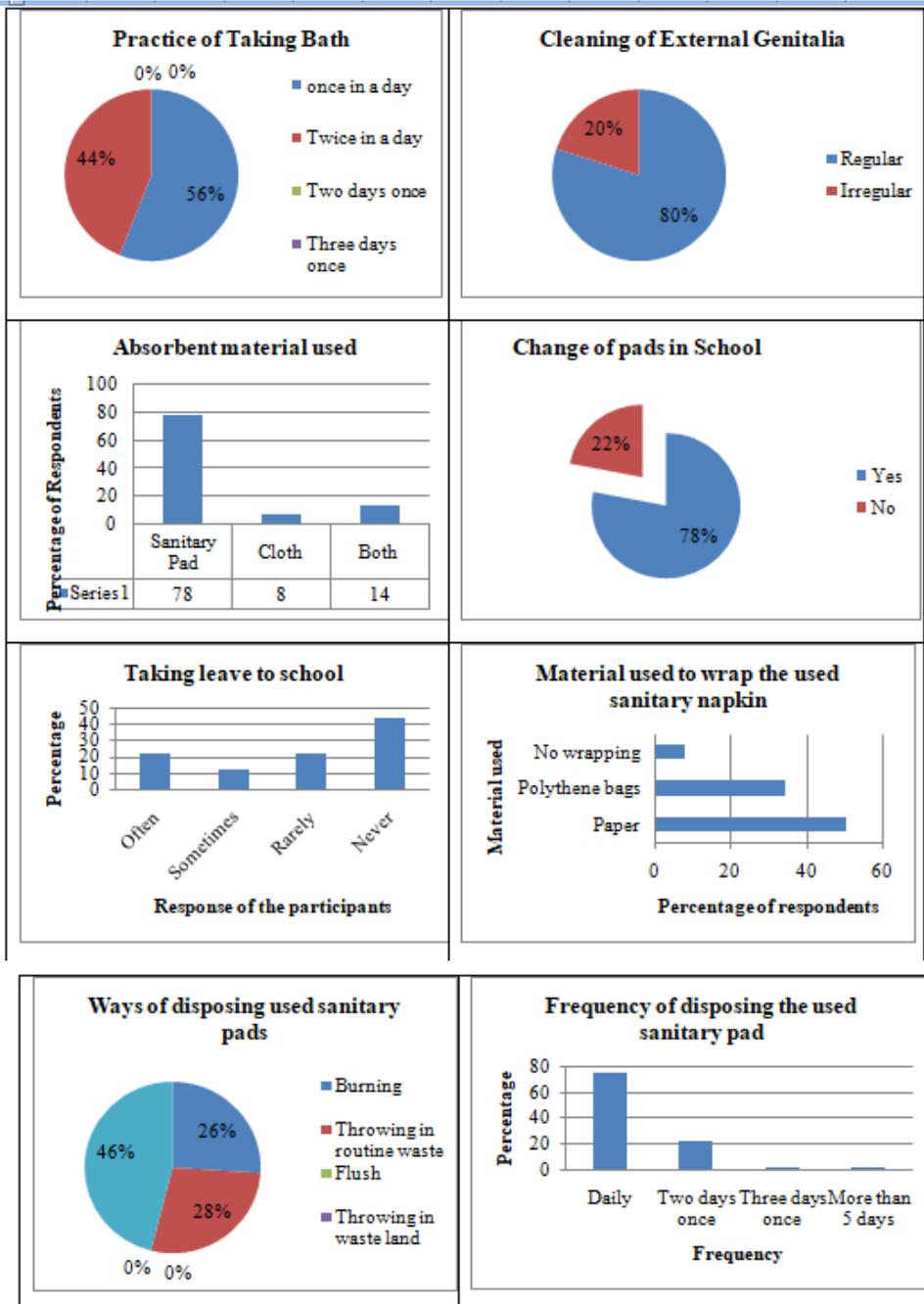
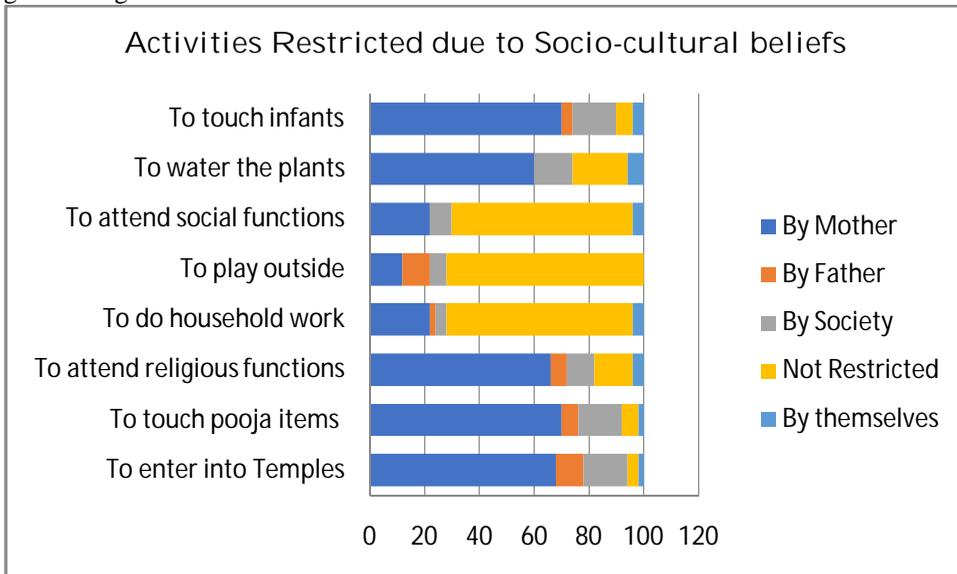


Figure – 4: Respondents Practices during their Menstruation

**Activities restricted due to socio-cultural beliefs associated with menstruation**

Many girls and women are subject to restrictions in their daily lives simply because they are menstruating. Not entering the puja room, kitchen, offering prayers, touching the holy books, etc., are the common restriction among the girls during menstruation. Culturally, in many countries menstruation is still considered to be dirty and impure. Taboos surrounding menstruation exclude women and girls from many aspects of social and cultural beliefs. Some of these are helpful, but others have potentially harmful implications. (Sunnela and Tanu, 2015).

The following chart will deals with various kinds of restrictions faced by adolescence girls during menstruation.



**Figure – 5: Respondents Practices during their Menstruation**

Among the above listed restrictions in the chart Mothers (60-70 mothers) are playing a major role in restricting the activities such as entry into temples, not to touch pooja items, religious functions, not to touch infants and for watering the plants compared to father and society. On contrary around 20 out of 100 mothers restricted their daughters to attend social functions, to play outside and to do household work. Notably society is imposed restriction only on religious activities and not to handle the infants. Particularly fathers are more concern with their daughters not allowing them to play outside.

**Discussion and conclusion:**

1. The study reflects that half of the respondents attended puberty in the age of 13yrs itself. Therefore, they should be given menstrual education at their age of 10yrs, so that the children will not be afraid and will be mentally prepared.
2. More than half (56%) of the respondent don't know about the nutrients weak during menstruation, (16%) of the respondents says that vitamins and iron weak during



menstruation and (12%) of the respondents says that fat will weak during menstruation. The adolescence girls have to give awareness about the nutrition week during their menstruation, and they have to give nutrition foods to make them healthy.

3. Most of the respondents (74%) don't know about from which reproductive organ bleeding occurs, (8%) of the respondents says that bleeding from uterus and bladder, (6%) of respondents says that bleeding occurs in bladder and (4%) of the respondents says that bleeding occur from vagina. Hence, it is very important to teach the children's about the menstruation process as their school curriculum.

4. Most of the respondents share their menstrual problem with their mother only. So it is the responsibility of mother to give proper education about menstruation and to give nutritious food to their children to make their children healthy.

Every school has to give awareness to adolescence girls about the menstruation management. It is also the duty of the mother to educate their children about menstruation and to provide nutritious food to their children for their healthy living. Hygiene practices followed by girls make them to keep healthy. It is our duty to give awareness about the menstruation cycle, management and hygiene practices which has to be followed by them which will help them to prevent from health problem related to menstruation.

The school should provide sanitary napkin vending machine and clean toilets with proper water facilities. Awareness to children to eat nutrition rich food to make them self-healthy because many children in slum are not eating food regularly and they suffer from various health problems and also the proper way of disposing their used sanitary waste to avoid throwing their waste into waste land, sewage etc.

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## VOICES OF RESISTANCE AND SUSTAINABLE DEVELOPMENT IN THE INDIGENOUS SANTHAL AND TENYIDIE LITERATURE

**Dr.Piku Chowdhury**  
Assistant Professor  
Satyapriya Roy College of Education  
Kolkata, West Bengal

### **Abstract:**

The implicit warfare or violence against nature, resulting in environmental degradation and disruption of biodiversity has affected human kind in way largely overlooked by the patriarchal hegemonic setup of traditional societies. Modern reductionist science excludes indigenous men and women as experts and violates both nature and women in terms of mechanical productivity and progress, undermining the natural productivity and evolution as economically ‘unproductive’. The price is to be paid by mankind in general and this war against nature in the garb of “development” reflects nothing but a culture of violence. This paper remains a humble attempt at exploring the profound impact of the degradation of biodiversity and policies of conversion of forest lands for economic and mechanistic developmental projects upon the men of rural India and a continual renegotiation of their identity in the fast evolving glocalised world. How poetry and folk songs of the indigenous communities of India reflect a profound realization of the crisis and how the human identity becomes a new abstract and self-referencing machine, remains an intriguing grey area to be explored. The intimate relation of the ever evolving subjectivities, human welfare, sustainable development and conservation of bio-diversity unfolds through the age-old tribal songs and poetry. An exploration of these songs and poems unearth striking perspectives on productivity and development. The voices from the soil had realized the gravity of the ecological and environmental question - the crucial need to bring the material and collective development of humanity into line with nature. These ancient songs and poetry of the Santals and the Naga tribes using Tenyidie emphasize the necessity of rethinking the representation of the human identity, its activities and its place within Nature and their vision posits a sustainable model of development. The paper intends to explore the problematic of true development and ecological questions as anticipated in the poetry of the Santal and other indigenous communities of India.

**Key words:** Identity, glocalization, sustainable development, deforestation, resistance, indigenous

Development is a highly charged and problematic term that has assumed a reductionist form through a mindless adaptation of the mechanistic model of the colonizing West. Parameters of need, productivity and growth have been steadily redefined in economic terms and categories. Utilization of natural resources for such a market driven western model of “development” eventually has been attempted in the context of industrialization and capitalism. “Progress” in this new context not only undermines the



principle of basic need satisfaction and productivity of the indigenous economies, but at the same time seems to have a homogenizing agenda, in which a mechanical and market-oriented definition of “a good life” is steadily imposed on the mass.

In the words of Vandana Shiva, “Development as capital accumulation and the commercialization of the economy for the generation of ‘surplus’ and prophets thus involved the reproduction not merely of a particular form of creation of wealth, but also of the associated creation of poverty and dispossession...development was thus reduced to a continuation of the process of colonization...it became an extension of the project of wealth creation in modern western patriarchy’s economic vision which was based on...the exploitation and degradation of nature and on the exploitation and erosion of other cultures.”<sup>1</sup> Development has thus become a systematic machinery, controlled and manipulated to pander to the needs of a highly commercialized market economy with a concomitant denial of aboriginal wisdom or scientific practices. A striking change in production parameters has rejected natural productivity and regeneration as unproductive and passive. The production parameters, essential facets of the modern definition of development and growth are restrictive in a sense because they tend to exclude regeneration from the domain of production. The profound fallacy of the political and economic definition of productivity and growth is reflected in the assumptions made by the National Accounting Systems(Shiva,2010). This system is used for calculating growth through the GNP and is based on the assumption that if producers consume what they produce then they may be said to be producing nothing at all. Economies ruled by the market or a patriarchal capitalism, thus conceives of reproduction, regeneration or self-sufficiency as an economic deficiency. Knowledge is categorized in a similar fashion. The natural creation is deemed mechanical repetition, totally discarding the subtle process of evolution and development that continues through such processes of reproduction, adaptation, alteration and regeneration. The prevalent tendency of upholding industrial production as creative and novel just because it can invent or “create” from nothing strangely overlooks the concomitant destruction of ecological cycles that generates the tremendous crisis of sustainability. What is at stake is not simply extinction of one or two species as a result of such tendencies, but the entire human civilization, which is being exposed to severe threats due to this near absolute disruption of evolutionary rhythm. Passivity has been assumed to be characteristic of nature and the female identity in this new emerging capitalist culture and thus the indigenous perception of the productive force of nature, that nurtured diversity for sustainable development, has been greatly suppressed. The resultant calamity in form of acute man-made poverty, ecological disasters, disruption of biodiversity and ecological imbalance have rendered the modern, typically western module of commercial market-driven economical development a travesty of true progress.

The time has come to reconsider and redefine development for sustainable progress. In fact human life is at stake and there is a conspicuous endeavour to glance back to the ancient wisdom of our ancestors that acknowledged the productive force and regenerative vigour of nature, equating nature with the reproducing and sustaining mother. Folklores and ancient indigenous oral literature have emerged as valuable documents that provide a striking knowledge base that may be treated as a reservoir of



resourceful ingredients for combating the contemporary crisis of the modern civilization. The present study remains a humble attempt at analyzing some indigenous folk lores and poetry to reveal how our ancestral wisdom resonates with profound understanding of true sustainable development and reverence for mother nature.

The study is however limited to the Santal<sup>2</sup> and Tenyidie<sup>3</sup> folk lores only, tribal literature of India being a vast area, with hundreds of indigenous tribes residing in the nation, and a discussion of the whole oeuvre defies the limited scope of a research paper prepared for a seminar. The text has been accessed through various libraries over the years with the help of experts in the indigenous language like Alchiki and Oraon, who helped with the translation and through other translations published by Sahitya Akademi, New Delhi. Tenyidie has been accessed from the compilation made by Shurhozelie in 1976, published by Ura Academy in Kohima. Oral poetry compilations were consulted like the one by Meguo in 2008. D Koulie's work has served as a valuable source of Tenyidie poetry. Rare personal collections were accessed through experts in the field.

The traditional Santhal literature is resonant with such ancient wisdom and a remarkable vision of an inseparable connection between nature and the human race. Various folk songs and poems reflect a profound realization of the necessity of preservation of biodiversity for sustainable development. 'Baha Sereng' is a collection of traditional Santhal songs sung during the Spring festival along with the traditional flower dance 'Baha Enech'. The songs are intimately connected with the regenerative exuberance of nature in spring time and the human acknowledgement of the bounty of nature. The Baha<sup>4</sup> festival is initiated with an inaugural song sung as homage to the ancient human spirit that achieved a close communion with Mother Nature. The song reflects the profound bonding between the magnanimous forest land and man. Barman(2014) in his research paper titled "Sacred Groves: A Cultural Symbol of Tribal Political Self-Assertion" reveals that the grove is one of the principal sacred centres of the village of tribal India where some important tribal deities and spirits are believed to reside and require periodical offerings and some sacrifices for the peace and prosperity of villages. According to Chakravarti (1991), the tribes of south-western districts of West Bengal – Bankura, Purulia and Midnapore are known to have sacred groves. The groves among the Santals are called 'Jaher'. The tutelary deities – Marang Buru and Jaher Buri or Marang Buri are believed to reside in the 'Jaher'. Barman (2014) further asserts that the principle of territorial assertion through the sacred groves has been observed amongst the Santals of Phulkusma village in Midnapore district of West Bengal. While forming a new village the Santals declared a patch of the existing forest as a sacred shrine – the Jaher Than – abode of the tutelary deity. It is reported that this is a must procedure to start any new Santal settlement. Without worshipping the Jaher no Santal can become a legitimate resident of the village. The presence of Jaher has also been observed in coolie lines of urban industrial centres like Rourkela and Jamshedpur (B.K. Roy Burman 1991; and Mitra 1994).

The three spirits Marang Buru, Jaher Buri and Jaher Era are worshiped as the primordial ancient spirits that united the deep forests and the associated diverse life forms with the humans:



*Keprothomgovir boner*

*khojkorechhilenaarkeprothomrekhechhilengramermodyesnigdhojolerdhara –  
MarangBuruiprothomkhojkorechhilengovirgohon bon arJaher Buri  
rekhechhilengramermodyesnigdhojolerdhara.SotyoiKhojkorar moto  
khojkorechhilentini sei govir boner desh...bosobasermotoigohon bon korechhilentini.*

[Who first looked for the deep green forest and who first created the sustaining flow of water – Marang Buru was the first to look for the profound depths of the sustaining forest land and Jaher Buri the creator of the sustaining flow of water. Truly that was a worthy search for the human habitation in our deep forest land...Marang Buru did find the deep connect between the forest and the human, needed for survival.]

How human creativity got inextricably intertwined with nature can be traced in traditional Santhal Dong<sup>5</sup> music, usually sung in various social events like birth, death and wedding ceremonies. The word Dong apparently comes from the sonorous echo of the traditional Santhal musical instrument – the ‘Madol’<sup>6</sup>, and such songs attribute human development, emotions and creativity to the rhythms of nature:

*Jhornadhara-r jol-e jonmechhiloaei Dong geet.  
Hihiripiridesh-e jeiDomg gore uthechhilo  
Stobdho jol-e Dong sur purnovaabeholouthsarito  
Hihiripiridesh-e jeiDomg gore uthechhilo*

[where was the Dong song born/the Dong that was nurtured in the hihiripiri land/the Dong songs gain full contour and emerge from the silent calm waters of the forest]

Again, another Dong song strikingly refers to the need for preserving the purity and beauty of nature that sustains human life:

*Pahar-er jhora jol-e goriyemechhejolashoy  
Bondhu, na kore molintumi pan kawro sei jol  
Prangon-er akkon-e sadafulfuteshovamoy  
Bondhu, nao tule fulna venge shakha-tijholmol*

[the water body has been created by the water that flows down the hills/dear friend, drink that water without polluting it/a pristine white flower blooms in one corner of the land/dear friend you may pluck that flower but do not destroy the beautiful branch that holds it]

Another interesting song sung during the Sor Hay festival projects an interesting figure of the deity Naike Baba. Sor Hay is celebrated for five days and five nights from the new moon in October. The married women of the Santhal community return to their paternal home for these five days and several rituals including Chumoura, Bongai, Kuntau, Kulhi and Khuntitoth revolve around worship of various natural elements that sustain human life and development. The figure of Naike Baba evoked in some of the songs is remarkable:

*Didi go, amader gram-e Naike Baba hati-r moto  
Bishal Sor Hay porob-kedaramjanachhe  
Taarnahaat-e royechheghotivora jol,  
Daanhaat-e royechhenotunkulo*



[o elder sister, our Naike baba welcomes the Sor Hay festival in our village like the magnificent and huge elephant, he has the tumbler full of water in his left hand and the new husking device in his right hand]

Water in form of the pristine streams and rivers and the ‘kulo’ that is traditionally used for separating husk from rice, reflect an overt acknowledgement of the central significance of agriculture and preservation of natural resources for human sustenance. In the same tone another Sor Hay song depicts the malady of ecological destruction in the name of development and prays to the ancient spirit Marang Buru for salvaging the human kind in the face of the emerging crisis:

*Bistritoaeidhulardhoronidyakha jay kintukaryrjonosarasobdopelamna.  
Bonovumirdyakhanaai – manusherdyakhanaai  
ManobjibonerdoshadekheMarangBuru kachhekorechhiprarthona  
He Marang Buru manobshishuderdisharidyakhao*

[the vast stretches of the dusty earth is bereft of any human sound, there is no trace of the forest or human beings, o marangburu I pray to thee to show us the way to salvation] However, perhaps the most striking imagery reflected in ancient Santhal folklore is about the genesis of the human race. Majhi Ramdas Tudu portrays this striking belief in his poetry ‘Pilchu Haram PilchuBurhirGaan’, in which we see how the Santhals believe themselves to be direct descendants of divine swans. The Santhals are perhaps one of the very few tribes in India who believe to have descended from birds – essentially a symbol of independence evolved from Mother Nature:

*He KolyanmoyMarang Buru, tomarnirdesheiamaderjonmo/ hnaashnaaslr dimer theke  
Saga gachhergora o kantar ondhokaartheke...amader pita  
chhilenhnaaspakhiaarmatachhilenhnaasli.*

[o benevolent marangburu, we were born of the eggs of the swans , from teh roots of the saga plant and the darkness of the thorny bushes]

In fact the Santhal folklore of genesis documented by Sadhu RamchandMurmu attribute the creation of land, flowers and the forest land by the deity Lita Thakur for the sustenance of the first ever human child borne by the ancient swans. The profound relation between mother nature and the humans is thus ingrained in the ancient Santhal folklore and beliefs.

The theme of dislocation and dispossession as an essential by-product of the commercial ventures in the name of ‘development’ comes up repeatedly in the Santhal and Tenyidie verses. Open mining or planned deforestation for commercial purposes take little or no regard of the local indigenous resistance. The tribals have to migrate for greater interest of the nation’s “development” fanned by purely commercial interests. Indigenous people all over the world have viewed themselves as members of a community of beings coexisting in harmony with fellow creatures like the flora and fauna, streams and rocks. They share a profound bond with their land, which is not a simple factor of production to them, but a source of spirituality and a mother figure. Interestingly ownership of land is vested in the community with no individual power of alienating the sacred land from the community. The community however refers not only to the living members of the tribe but to the ancestors or ancient guardians of the tribe (Areeparampil, 1996). Land and existence are synonymous for the indigenous people opposed to the modern vision of land as a lifeless agency of production with layers of



minerals and ores worth millions of dollars or pounds. Nature is often conceived as sacred as more often than not it sustains human life and it is such traditional beliefs that had played a crucial role in preservation of India's rich heritage of bio-diversity for a long time. Sacred groves are instances of such beliefs. What is interesting is the conflict between state control of these lands and the indigenous preferences. Instances of epistemic violence are many in form of ignorance about the scientific basis of local indigenous beliefs about sacred groves, as the state control of India's forest land betrays. The Forest Department planned to fell a ten hectare sacred grove in Gani-a village in the Shrivardhan taluk of coastal Maharashtra (Gadgil and Guha,1995) ignoring the sustained resistance of the villagers, while the only source of water there remained a stream emerging from the sacred grove of what the forest department held to be merely "overmature timber". While the Forest Department found the "overmature timber" redundant, they apparently failed to discern the true reason behind the grove being held sacred by the indigenous people. Again, the coalfield belt of Jharkhand has been the homeland of indigenous tribes like the Santhals, Mundas, Gonds, Bhumij and Kurmis for centuries. Indiscriminate mining in tandem with illegal dispossession have compelled many indigenous people to dislocate and slog in mines, factories and brick kilns of north Bihar, West Bengal and U.P. (Areeparampil, 1996). CIL<sup>7</sup> and subsidiary companies like BCCL<sup>8</sup>, ECL<sup>9</sup> and CCL<sup>10</sup> acquired extensive land with concomitant eviction of the tribals like Santhals from their sacred forestlands. The Piparwar Coal Project that started mining in 1990 in the north Karanpura Valley, had clear-felled 289 hectares of reserved forests for hauling coal that was transported to thermal stations near Delhi for generating electricity for Delhi-based industry and domestic consumers. The dislocated and dispossessed tribes got nothing or a small number of manual jobs in mines and factories and the environment was callously compromised for this new face of "development". The UCIL<sup>11</sup> mines at Jadugoda in east Singhbhum and Bhatin have jeopardized the sacred groves, shrines, homeland of uprooted Santhals for setting up uranium mines and allied subsidiary plants – a fact endorsed by the 1961 census report. Dispossessed from ancestral homes in Bhatin, Jadugoda, Narwapahar and Turamdih, the Santhals now strive as victims of radioactivity in shanties along dusty railway lines and roadsides near Sundernagar area. Resistance was inevitable. The modern avatar of "development" pandered to economic profits of a handful. The Santhals are not only rendered homeless, but are practically torn apart from their holy ancestral shrines and surrounding bio-diversity that constituted their immediate community. The indigenous Santhal poetry recognizes the crisis that looms large over mankind with such violence against mother earth and resounds with indignation and revolt.

The heat and dust of mindless urbanization and the imposed poverty in the name of increasing mechanical productivity are challenged. The market driven concept of 'a good life' that tends to delude us fails to blind the Santhal poet. Prosperity is not equated with paper currency and the allied gratifications it can buy. Happiness and development are not equated with the attainment of the different levels of marketed commodities and lifestyles. The Santhal vision defies the lure of the western 'commodity culture' created and imposed by the market driven modern economy. The sustenance derived from nature and the prosperity of the agro-based indigenous communities is aptly identified as crucial parameters of sustainable development. The



voices from the soil, increasingly reduced to inaudible groans of urban slums and the dispossessed penury-stricken factory labourers, defy this reductionist western development in favour of our ancestral wisdom: ‘*Amra niswonoi / jhorethakajomashitol jol / praanvorekhabovikkha noy*’ [we are not destitute/we will not beg but drink the cool rain water and that from the streams that accumulates].

The disillusioned Santhal poet yearns for the ancient spirit that would emancipate the soul enslaved by western ‘development’ and return the dislocated to the ancient forest land:

*Kapi Karan aar ‘VoulwayaBijai’ rupe/Birsreshthotumi/Tumi  
tokhonamake/Bnacharrastadekhiyechhile/Mohorerprolovontheke/Oi  
rastayamarroktojhore/Sam pargana, sidhu,  
kanhuaarChnaadvairorpothernirdeshe/...Sei nishanay/Prithibirakash,  
batasaarvumikhondo/Uthechhiloknepe...Koyla-khonitem cha  
bagane,/Karkhanaychasherkhete/Aamichesta kore jachchiaknagarei/Amar osthi,  
mangso, aarbukerrokte/Pathoreroporgoriyepora/Amar chokher jol  
Kokhongyachheshukiye...Bitaritohoyechheamarpriyosongee/Anodomukhor/JaherThane  
rtheke...*

[you are the mightiest in the form of Kapi Karan<sup>12</sup> and ‘VoulwayaBijai’/you showed me the way to survive from the lure of gold coins/that path is smeared with my blood/the sky, soil and air of this earth shook with that gesture given by Sidhu, Kanhu<sup>13</sup>, Chand Bhairo...I keep trying today in the coal mines and tea gardens, in factories and cultivation fields/ my bones, flesh and bold, my tears that fell on rocks have dried long back/my companions have been driven out of the joyful shrine of Jaher ]

Indigenous resistance to the repressive and reductionist western model of commercial development resonate in the songs of the Santal revolt- HulSereng[see end-note 13]. The Santhals had been a fearless warrior tribe who rose up in arms against mindless exploitation and HulSereng remains a reflection of the spirit of resistance and revolt against colossal exploitation and forced dispossession for preserving the forest land and the biodiversity, much needed for sustainable development:

*Go mohishlangol – jomijaygajongolerjonyo  
Purber moto aisobabar fire pabarjonye amra bidrohokorbo*

[...]

*Amra nijeraibnachbo, keuamaderpasgednarabena  
Amra sotyibidrohokorbo*

*Deshermajhi or parganara – gramermorolra – amra nischoibidrohokorbo.*

[we will fight for our land and cattle and to live like we used to live earlier/ we will revolt to get back what we have lost]

Nature and the unadulterated forest land is conceived as the primordial agency that binds human spirit for a sustained progress. Jaher is the deity of the human habitation in the heart of deep, dark forest land and the resistance of the united human spirit against exploitation and indiscriminate destruction of biodiversity greatly centers around Jaher’s presence. Jaher in this case is none other than nature that sustains human life and development. Sadhu RamchandMurmu’s verses reflect this spirit:

*Bnetekhato amra adibasi / somajerunnotirpothe barbe sobarhorsho /  
Jaherthanersutrokanibnadhbeporospore / anyayashuvoshoktijabechhirotore.*



[short we are, we adivasis/all will be happy with the development of the society/the evil will be vanquished as the sacred bond of the Jaher binds us]

Education is rightfully perceived as noble, though interestingly enough, the forest is seen as an integral part of the deity of education or enlightenment – Kayraboni. GorachandTudu in his poem ‘Kayraboni’ depicts the deity as a resplendent figure enshrined by the trees of the forest land:

*Gachhera sari bnedherekhechheghire / dur theke Jodi  
tumiakbaartakao...aarshonotaarswogotokotharprotidhwoni /  
bidyarodishthatriamarKayraboni / tomakeamarpronam.*

[ u must see and listen to the echoes of her words, the trees surround her/I pay homage to you o goddess on knowledge, my Kayraboni]

Education and peace go hand in hand in the Santhal vision, and there is a profound yearning for the rapidly fading depths of the forest land and the ancient wild human habitation blessed with abundance and prosperity. If peace has to be disrupted and the tribe has to rise up in arms, then that has to be in defence of the ancient wisdom that sanctioned the forest a place central significance in the course of human development. Champa emerges as the symbolical land of peace and prosperity nurtured by the natural resources and the verses of GorachandTudu sounds the clarion call of armed resistance against the incursions in from of mechanical progress that tends to challenge diversity and wipe out the ancient aboriginal heritage:

*Hay Champa...dudh o dodhitevora se  
desh...ChayChamparpaharthekesukherjhornadharagoriyeporchhe /  
projaborgerpalokpitaKisku Raja...pakhirkujonetaarsongeetdhararomoniyo...shona jay  
bnashite sur...ChayChamparbitristokalchholonar moto kothaypaarhoye  
jay...shotruralobher moto dokhol kore nay / Ma go amakejuddhersaaajesajiyedao /  
amakedaoshaanlaganotorobari / bejeholechhejuddhershingaeso amra sonar  
Champake fire pai.*

[O Champa<sup>14</sup>, prosperous and flowing with milk and curd/ the happy springs dance on the hills of ChayChampa/the birds sing and the flute plays melody in the kingdom of Kisku raja<sup>15</sup>/ the land and times vanish like a passing shadow..the greedy foe takes hold of the land and drives us out/o mother adorn me with arms for fight/ give me a sharp sword/ the war horn sounds/ we will fight to get back our ChayChampa]

The same tone may be noted in other Santhal verses, where the poet repeatedly reminds us of the spirit of the ancient Santhals who prospered as sons of the green earth. They must rise in armed resistance in defence of mother earth in the face of the mass destruction and colossal violation of nature in the name of mechanical development. Such verses recognize the shadow of death in such mechanistic ventures that project development in terms of market economy, dissociated from the soil and oblivious of the sinister outcome of a callous disruption of the ecological balance. The Santhal poet urges his fellow beings to stand strong as a tree against the tempest.

*‘Purbopurusherdmonirroktotomarmodhyekiprobahito / shokti o sahosetumibir /  
sachchaSnaotaalhobenaprotarito...sobujcharagachhjtne ta  
brikkho...tuminijeshotrusomajerhawovoyonngkor.’*



[if you have the blood of your ancestors in your veins, then you are fearless and mighty/true Santal will not be cheated/ the green sapling becomes a tree/ ypu will be the terror of the foe]. The divine is in the earth and the greenery that springs from the soil. Man must be in touch with the soil and stoop to pay homage to the productive mother earth for true development. Narayan Soren Tore Sutoum sings in earnest prayer – *‘amaketenenamao oi vejashitolmatirupor / jolkadaysongramerjonyo / jatemritwikaghonotomarsporshoamardeho jure romancho tole / tomakejyano ma onuvobkoriuthponno kore tola sonate – shoshyokonate.’* [Pull me down to the wet earth, to prepare for the revolution in mud and water, I must feel your earthly touch in my veins/ mother I must feel you in every grain of crop produced in this soil]. A similar vision is reflected in the verses of Doman Sahur Samir – *‘Rimjghimbarijhoreprithibirmativijekada...kormokande jog daay sob / matiteroyechhesonaaeisotyojene...akattomatirsatheaaj’* [we are all one with the earth today, the gold lies in the soil, we work in the rain , in the wet soil]. SarodaprosadKisku addresses the dusty earth as the productive mother who sustains human life – *‘amarvalotevalotumi go he amarjononi / amakechenaletumikimohotdhulardhoroni’* [o mother you are my wellwisher, you taught me how benevolent this dusty earth is]. The Santal vision of the present civilization is striking. The proud nation stands silent and the depths of forest that once sheltered and nurtured human life stands helpless in the face of greed, commercialization and commodification. The nation is compared to an ancient banyan tree that nurtured human life for prosperity and true development. This imagery in SarodaprosadKisku’s poetry brings to the forefront the remarkable ancestral wisdom that envisaged production and development as inextricably interconnected with the green earth: *‘Mohan desherchhilomohangorob / chhaya ditto mosto se bot...chhaya ditto bonoraajekakinirob...unmad aseorakara / ottohasitebidwesh vase / matitelutiymosto se gacch, dhulidhusoritodeho...chhayavorabonoraajnirob* [the paramount green banyan kept us protected, was our pride, the forest king silently nurtured us/ the foes come with malicious laughter/the deep green forests are silent as the banyan lies dead on the dusty earth.]

Tenyidie verses too reflect a profound understanding of the symbiotic relationship between man and nature. The folklores conceive of human life as an integral part of the greater cosmic scheme that binds mother earth with the human race. Wistful yearning for the green land as discerned in Hay Champa by GorachandTudu finds a striking echo in the poetry from the North Eastern hills. ‘Dzukou Unvisited’ by D.Koulie proffers a vision of the dream: “Somewhere there lies/ An enchanting land of praises worthy/It is named Dzukou, the beautiful, Nestled in the land of Tenyimia/A dreamland for all visitors”. The verses reflect the passionate resistance to planned destruction of forestland for commercial interests. The sheer passion reveals the echoes of our ancestors – the vision of the need to protect mother earth for sustainable development and not for mindless shortsighted massacre: “Leading the good fellows of the nation/To the thickest forests/Beyond the endless horizon/Roar and roar and back to native land/ To defend the land beloved”. ‘Moonlit Love’ reflects the profound ancestral wisdom of remembering the basic source of human sustenance often forgotten in the surface glitter of transient material abundance:



Through the ages, generations of men  
Have found universe beyond your dwelling place  
Yet, if they are not in harmony from the base  
They destroy each other with unforgiving nature  
May we rejuvenate our wisdom from you again.

God is perceived in the greenery that clothes the hills and the verses by Kuolie sound a clarion call to remember the ancestral wisdom and guidance:

On this hill range, the Nagas  
Are destined to live on  
Our ancestors, since the time immemorial  
Fought in wars, resisted their enemies  
And earned their insignia  
But by the fall of their foes only...Ever since their beginning of man's life  
Carved out was the land of the Nagas  
It is reserved for them till date  
Our ancestors occupied and handed it down  
To today's generation...

Elements of nature are acknowledged as the sacred source of human life not to be tainted or tampered with for love for lucre. Nature touches human heart like a mentor and sustaining mother:

Where there is spring of water...It gives life to nature green...And also mankind/without you, no life can ever glorify/And adorn this living world/you are the blood of the world../you open the inner eye, touch the heart...you form a mirror so that we could see ourselves/discard all evils/storing only goodness.

The crisis is great and the consequences fatal to humankind in general. The ancient wisdom summarily rejected as superstitious hindrance to "development" and progress needs to be reconsidered. The modern mind experiences a "foreclosure" – a systematic conditioning by the western scientific ideas that largely panders to commercial omnivores, blissfully oblivious of the future. Gadgil and Guhas's Introduction to Ecology and Equity present a bird's eye view of the malady that infests the nation today: "Satellite pictures help us understand the radical changes in the Indian landscape over the past four decades. It is a landscape in which the natural world is continually being replaced by a world of artefacts:where trees, shrubs and grasses are giving way to plantations and roads and buildings...where old wetlands are being drained and new ones created in form of waterlogged fields"(pp.215). Economic growth and ecological concerns are not at loggerheads, but the developmental agenda must be integrated into every step of policy formulation and implementation today. Taking cognizance of the scientific validity of our ancestral indigenous wisdom, we may design a model of sustainable development. True inclusion instead of contemptuous exclusion of the voices of the soil and redefinition of production and development parameters may still salvage us. The somber resounding voices of the ancestors and guardians from the deep forest land beckons. The 'madol' and ancestral drum beats sound a clarion call for



action. The indigenous poetry echoes the urge to awaken. It is up to us to hark and pay heed for a better world with sustainable development.

**Endnotes:**

1. Shiva, Vandana ,2010. Staying Alive. New York: South End Press.

2. The Santhals are a scheduled tribe, indigenous to Terai of Nepal and India, who live mainly in the Indian States of Jharkhand, West Bengal, Bihar, Odisha, and Assam. There is also a significant Santhal minority in neighboring Bangladesh, and a small population in Nepal (known as Satar in Nepal). They are one of the largest tribal communities in India. The Santhals mostly speak Santali, a member of the Munda language family. The present study is limited to the poetry and folklores of the Santhals in Jharkhand, Bengal and Orissa.

A need for the separate script was felt by some visionary Santhals, as none of the existing scripts was sufficient to communicate the Santali language phonetically. This further resulted in the invention of a new script called OlChiki. This script was invented by Pandit Raghunath Murmu in 1925. He is popularly known as Guru Gomke among the Santhals, a title awarded to him by the Mayurbhanj Adibasi Mahasabha. The alphabets of the language are known as OlChiki, though people are not very well versed in it. He is respected among Santhals for his noble contribution to the script OlChiki for the Santal society.

One of the most studied tribal religions in India, Santhal religion worships Marangburu or Bonga as supreme deity. The weight of belief, however, falls on a court of spirits (bonga), who handle different aspects of the world and who must be placated with prayers and offerings in order to ward off evil influences. These spirits operate at the village, household, ancestor, and sub-clan level, along with evil spirits that cause disease, and can inhabit village boundaries, mountains, water, tigers, and the forest. A characteristic feature of the Santhal village is a sacred grove (known as the "Jaher" or "Santal Sthal") on the edge of the settlement where many spirits live and where a series of annual festivals take place. In fact the name Jharkhand is believed to have come from "Jaher- Khand" or a piece of sacred land or sacred grove.

3. Tenyidie is a Tibeto-Burmese language spoken in the Naga hills in the North-Eastern part of India. The poems are resonant with echoes of rituals, hardships, bonding with mother nature and sufferings that may be associated with the festivities, habits, rituals, lifestyle and a long history of war of the Tenyimia community.

4. In Santali 'Baha' means flower. Baha porob or festival is celebrated among Santhals when new flowers bloom on trees especially on 'Sal' tree which is sacred to the Santhals. Baha festival has its special place in Santal Community, they celebrate it with grandeur. This festival goes on for three days consisting of various traditions and rituals. With the priest distributing Sal and Mahua flowers to both men and women, and tribals dancing to drum beats, the colorful festival of 'Baha' is celebrated amidst gaiety. On the first day the Priest is the person who starts this by purifying their doors with dung then they go to the 'Jaher than' (holy grove) in their village and set up an abode for the deity. Later the priest offers prayers. The worshipping place for 'Bonga - Buru' is also washed, On the first night of this day the priest acknowledges their ancestor, and spirits like 'Marangburu, Jaherenera', etc. On the second day, the Santhals once again gather at the 'Jaherthan' singing and dancing, and the priest after offering prayers, performs various



rituals in honor of the deity and their ancestors and he gives the 'Sal' flowers which is distributed among the men and women. Men tuck these behind their ears while the women adorn their hair with these. Men and Women of the village dance ' Bahaenanj' on this occasion in 'Jaherthan'. They also sing the traditional songs called 'Baha serenj'. After this traditional dance, the priest hands over a pitcher to a bachelor of that village. Soon the priest heads to his home and all the women dance to pay homage to the priest. While entering into the village the priest stops at tribal huts where the women wash his feet and he gives them Sal flowers as per tradition. Sal flowers have a special significance for the tribals.

5. Dong serenj (Song), Dong serenj which is a traditional music and dance style also of Santals, specially 'Dong' is danced in occasion of Marriage. Dong songs is of two type, one which totally signifies the act, and some emotional but joyous words sang for bride and bridal in Santali marriage, and the second one is different from tradition and culture but the music, rhythm are same as in tradition Dong songs.

6. Also called Tumdak. Tumdak, or madol, is a two faced drum with a body brunt clay. Both heads the left one broader than the right are covered by bullock hide and are beaten by the left and right hand.

7. Coal India Limited is an Indian state-controlled coal mining company headquartered in Kolkata, West Bengal, India. It is the largest coal producer company in the world and contributes around 81% of the coal production in India.

8. Bharat Coking Coal Limited is a subsidiary of Coal India Limited with its headquarters in Dhanbad, India.

9. Eastern Coal Fields Limited. Raniganj Coalfield, which falls under E.C.L is the birth place of coal mining in the Country. In 1774, first mining operation in the Country was started in this Coalfield by Sumner & Heatly. In 1820, first Coal Company M/s. Alexander & Company was established. In 1835, first Indian Enterprise i.e. M/s. Carr & Tagore Company was formed. In 1843, the first joint stock coal Company i.e. M/s. Bengal Coal Company was formed. Since then, underground coal mining operation had been continuing in Raniganj Coalfields by numerous small owners. Raniganj Coalfield remained the principal producer of coal in India in 19th Century and considerable period of the 20th Century. In 1973, all Non-coking Coal Mines were nationalized and brought under Eastern Division of Coal Mines Authority Limited. In 1975 Eastern Coalfields Limited, a Subsidiary of Coal India Limited (C.I.L) was formed and inherited all the private sector coal mines of Raniganj Coalfields. ECL mining leasehold area is 753.75 Sq.Kms and surface right area is 237.18 Sq.Kms. It is situated in two States-West Bengal and Jharkhand. Raniganj Coalfield is spreading over Burdwan, Birbhum, Bankura and Purulia Districts in West Bengal. Saherjuri Coalfield in Deoghar District of Jharkhand which is being worked as SP Mines Area under ECL. Hura Coalfields in Godda District of Jharkhand is also under ECL, where ECL's largest opencast mine Rajmahal is situated. Heart of Raniganj Coalfields is located on the north of Ajoy while Mejia and Parbelia are on south of Damodar River. In Dhanbad District, Mugma field lies on the west of Barakar River. Formation of coal seems has occurred mainly in two sequence at ECL- Raniganj measures & Barakar measures. Raniganj measures covers the entire coalfield of Raniganj-Pandaveswar, Kajora, Jhanjra, Bankola, Kenda, Sonepur, Kunustoria, Satgram, Sripur, Sodepur & Partly at Salanpur Areas. Barakar



measures covers two areas Salanpur&Mugma Areas, SP\_Mines&Rajmahal Areas are mainly related to Barakar measure &Talchair series. At present ECL has 98 no. of operating mines out of which 77 are underground mines, 21 are opencast mines. The existing manpower in Eastern Coalfields Limited as on 01.07.2013 is 72973.

10. Central Coalfields Limited is a Category-I Mini-Ratna Company since October 2007. During 2009-10, coal production of the company reached its highest-ever figure of 47.08 million tones, with net worth amounting to Rs. 2644 crore against a paid-up capital of Rs. 940 crore. Formed on 1st November 1975, CCL (formerly National Coal Development Corporation Ltd) was one of the five subsidiaries of Coal India Ltd. which was the first holding company for coal in the country (CIL now has 8 subsidiaries).

11. Uranium Corporation of India (UCIL) is a centrally owned Public Sector Undertaking (PSU), under the Department of Atomic Energy for uranium mining and uranium processing. The corporation was founded in 1967 and is responsible for the mining and milling of uranium ore in India.[1] The firm operates mines at Jadugora, Bhatin, Narwapahar, Turamdih and Banduhurang. There was criticism from certain sections of the local community that the mining operations of UCIL were resulting in harmful radiation to the public. UCIL was also among the 63 Indian establishments put under sanction by USA in 1998. The mining activities of UCIL in the Khasi Hills were also fiercely opposed by the local tribals protesting against potential health effects.

12. History and Ethnology of an Indian Upland by Francis Bradley (1990) narrated the mythology associated with Kapi Karan and Bhouwayabijai. A son of the Birhor community was reared by the king and named Madho Singh who grew up to be a cruel collector who forgot his roots and tried to take advantage of the Santal tradition of 'itut' marriage by putting vermilion on Santal girl's forehead and claiming her chastity. It being against the Santal law to admit any outsider as a husband for a Santal girl whose sanctity was then held to be at stake, the elders decided to leave their prosperous land Champa and migrate in the dark of the night. At this juncture they found their way obstructed at the main gates of the city with a huge stone which two young men, supposedly spirits in guise of human, came and shot magically powerful arrows to shatter the stone and make way for the tribe. They were called Kapi Karan and BhouwayaBijai.

13. Santal Hul was one of the fiercest battles in the history of Indian freedom struggles causing greatest number of loss of lives in any battles during that time. The Santal Hul of 1855-57 was master minded by four brothers Sidhu, Kahnu, Chand and Bhairav; a heroic episode in India's prolonged struggle for freedom. It was, in all probability, the fiercest liberation movement in India next to Great Sepoy Mutiny in 1857. With the capture of political power of India by the East India Company, the natural habitats of the Adivasi (indigenous) people including the Santals began to shatter by the intruders like moneylenders. Traders and revenue farmers, who descended upon them in large numbers under the patronage of the Company. Sido Murmu and Kanhu Murmu, hailing from the village Bhognadih in Sahibganj district, had long been brooding over the injustices perpetrated by the oppressors like hundreds and hundreds of their tribe's men. The situation finally reached a flash point and, not surprisingly, a small episode that took place in July 1855 triggered one of the fiercest uprisings that the British administration ever faced in India. The emergence of Sido and Kanhu, youthful,

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dynamic and charismatic, provided a rallying point for the Santals to revolt against the oppressors .On 30th June 1855, a large number of Santals assembled in a field in Bhagnadihi village of Santal Paragana, They declared themselves as free and took oath under the leadership of SidoMurmu and KanhuMurmu to fight unto the last against the British rulers as well as their agents. Militant mood of the Santals frightened the authority. A Police agent confronted them on the 7th July and tried to place the Murmu brothers under arrest. The angry crowd reacted violently and killed the Police agent and his companions. The event sparked off a series of confrontations with the Company's Army and subsequently reached the scale of a full-fledged war.

14.The Santals believed that though they were originated at Ahili-pipiliorhili-pipili, but they became the settlers at Chai-champa which was regarded as their home land. They recite the dong song: "HihilipilirebanJanamlenKhoj Kaman rebankhojlen Haratreban hara lena Sasangbedareban Jatelenho". The Bengali version of the Santali song is described as follows.

'HihilipipiriteJonmechhulamKhojkamaneKhojparchiloHarata dese  
Bansabadralsasangbeda dese Jatibhagholo'

A.Campbell narrates: "In Hihiri, mother I was born In pipili, Mother I saw the light In Haradata, Mother I grew up In Khojkaman, Mother I was faught for". P.O. Bodding narrates: "In Hihiripiri We were born In Khoj Kaman We were called for In Harat We grew up In Sasangbeda We became sept." From Khoj Kaman they went to Chai and then to Champa, where they resided for many years. Their social in division was instituted here. Regarding the identification of Champa, subhas Chandra KaruaIn Orissa Review (2009) quotes E.T.Dalton who concedes that he is unable to identify the Ahiripipiri, but Khairagarh and Chai Champa are in the Hazaribagh or Ramgarh district. Karua also cites L.O. Skrefsud who derives the name Hihiri or Ahuripipiri from the Hir origin, but others identify it with Ahuri pargana in the Hazaribagh. From Ahuri pargana they moved to Khoj Kaman, then to Hara, then to Sasangbeda, then to Jarpi, then to Koinda, Chai and finally reached Champa. In Champa, they soujourned for many generations and the present social institution of the tribe was also formed there. Champa was the capital of Anga(South East Bihar). It was situated at the confluence of the river of the same name and the Ganges. It is stated in the Mahabharata, the Purana and in 'the Hari Vamsa' that the ancient name of Champa was Malini. "ChampasyatuPurichampaYamaliny - ab bhavatpura". A great calamity took place with this race probably due to the invasions of the Muhammadans. Peace and order disappeared and the reign of terror prevailed. E.T. Dalton has found the existence of an old fort at Chai, the walls of which were of earth and stone. A space of about five acres of land surrounded the fort. It was the abode of the Santal Raja named Jangra. He destroyed him-self and his family members on hearing the approach of a Muhammadan army under Sayid Ibrahim Alli, a general of Muhammad Tughluq. Ibrahim was also known as Malik Baya and died in 1453 A.D. The existence of the fort is also substantiated by J. Phillips who states that while Santals were dwelling in Chai Champa, they multiplied. Further he states that there were two gates-Ahin gate and Bahin gate of the fort of Chai Champa. The date of the capture of the fort by Ibrahim Alli may be 1340 AD. After the Santals might have migrated to different directions in-groups in search of the site for their settlement.

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15. A Santal clan is a group of many people believed to have descended from the proverbial Swans or a common ancestor. There are twelve principal clans namely, Hasdak, Murmu, Kisku, Hembram, Mandi/Marandi, Soren, Tudu,[the original 7 clans named after the first seven sons of the race] followed by the Baske, Beske, Pauria, Core and Bedea. The Kisku King ruled over the prosperous land of Champa.

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## **IMPACT OF COVID -19 ON STUDENTS AND THEIR EDUCATION SYSTEM DURING LOCKDOWN IN BANGALORE, INDIA**

**Dr. Pooja Kumari**

Assistant Professor, Commerce Department  
Jain Deemed To Be University  
Bangalore, India

### **ABSTRACT**

The whole world is facing biggest problem of the century due to outbreak of corona virus which was started in Wuhan Chain and spread all over the world. Due to corona virus developed and underdeveloped countries are facing greatest impact and trying to control the spread of this virus by imposing lockdown in their countries. This virus has affected each and every sector in every economy, at present you won't find single sector which has not affected due to corona virus. Once of such sector is education sector. In the present study we are taking education sector. Due to corona virus all educational intuitions are closed and old method of teaching has been replaced with online teaching. In this study impact of lockdown on student's education was studied. A well developed questionnaire is prepared to meet the objective of the study. The study population includes 300 students from various colleges and universities. The questionnaire consists of 10 closed ended questions. The result of the study shows that lockdown has negative impact on the students.

**Keywords:** Lockdown, Covid- 19, Students

### **INTRODUCTION**

The whole world is facing biggest problem of the century due to outbreak of corona virus which was started in Wuhan Chain and spread all over the world. Due to corona virus developed and underdeveloped countries are facing greatest impact and trying to control the spread of this virus by imposing lockdown in their countries. This virus has affected each and every sector in every economy, at present you won't find single sector which has not affected due to corona virus. The epidemic of corona virus has also changed the way millions of people around the world was educated. These changes have been inconvenient but they have also given new example of educational innovation. In order to reduce the spread of corona virus students from different parts of the world including India started reading and learning at home through various applications, due to which students are facing lot of problems. In the present study we are focusing on education sector. Due to corona virus all educational intuitions are closed and old method of teaching has been replaced with online teaching. In this study impact of lockdown on student's education system will be studied

### **OBJECTIVE**

To study the impact of Lockdown on students education.

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## RESEARCH METHODOLOGY

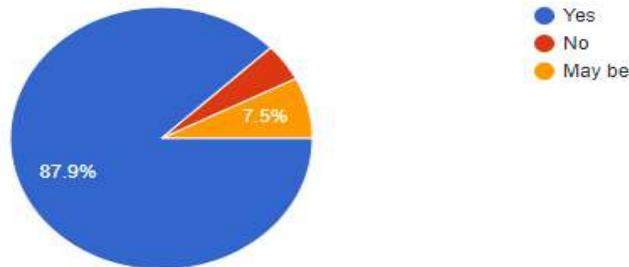
This study was based on primary data. A well developed questionnaire is prepared to meet the objective of the study. The study population includes 300 students from various colleges and universities. The questionnaire consists of 10 closed ended questions. To represent the results pie charts is used.

### Analysis and Interpretation

The results of online survey given below

#### Do you think Covid-19 has impact on Education

According to the survey result 87.9 percent of students think that Covid- 19 has huge impact on their education, 4.6 percent of students feel that it covid-19 did not have any impact on their education system and 7.5 percent students are neutral in their decision



**Figure 1: Covid-19 impact on Education**

#### How do you see the lockdown period of Covid-19

33.1 percent student's think that they are unable to concentrate in their studies due to the risk of corona virus as their minds are full of fear. 36 percent of the students feel that lockdown increase their confusion as they don't know how to manage themselves. 19.2 percent students get good time to study other books where as 11.7 percent students get good time to study for exam.

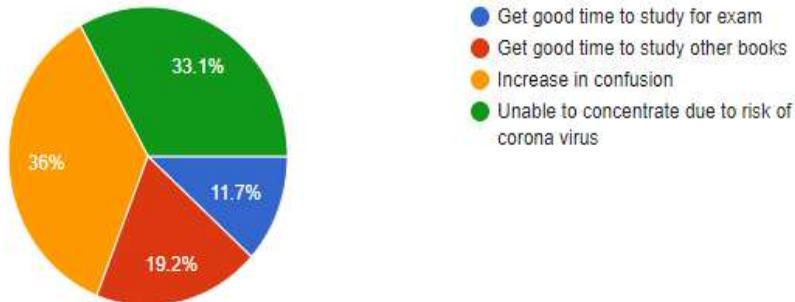


Figure 2: lockdown period of Covid-19

### Do you think lockdown has positive impact on students?

53.6 percent student are not agree that lockdown has a positive impact on them because their minds are full of fear about Corona virus which distracted them and affecting their mantel state a lot. 20.5 percent students feel that lockdown has a positive impact on them because there are able to study and do the activities which they are not getting time. 25.9 percent students feel that neutral with their decision

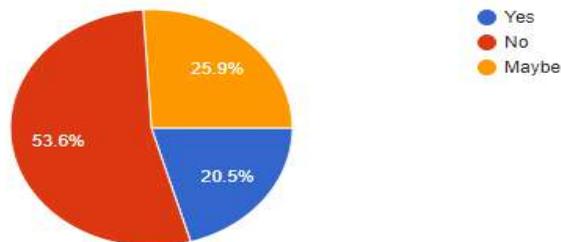
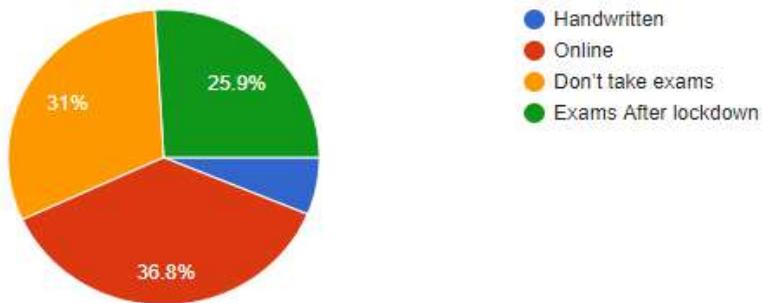


Figure 3: lockdown has positive impact on students

### Which option is good to take examinations in such situation

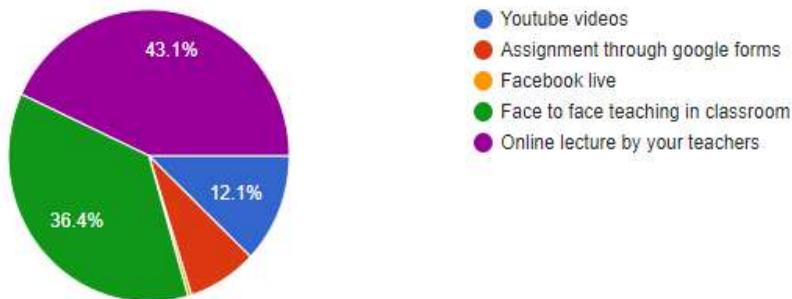
36.8 percent of students feel that taking online exam is best option as this will not affect their academic year and chance of spreading virus is also less. 31 percent students don't want to write exam. They want to cancel all exams and promote them. 25 percent students feel that exam should be conducted only after lockdown. 6.3 percent students wants the exam should be happen in offline mode that is handwritten because there are lot of problem while writing online exam because of weak connectivity, network issue etc.



**Figure 4: Examinations during lockdown**

#### **Which one are effective learning tools in lockdown period**

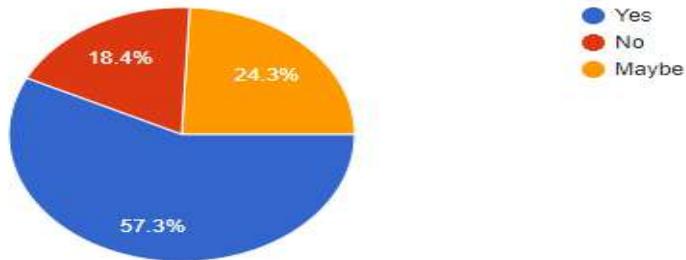
43.1 percent of students feel that online lectures by their teacher are most effective learning tools during lockdown period as it help them to stay connected with their teachers and classmates where as 36.4 percent students feel that face to face teaching in classroom was best as it cannot be replace with online teaching.12.1 percent students opted YouTube videos as effective learning tools in lockdown period.0.4 percent opted for face books live as effective leaning tools.



**Figure 5: Effective learning tools in lockdown period**

#### **Do you think cancellation of examination is right**

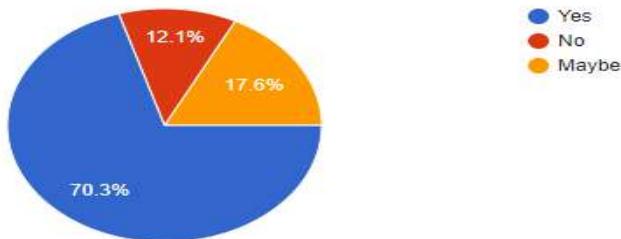
57.3 percent students thinks that cancellation of examination is right decision due of covid-19 because their minds are full of fear about Corona virus which distracted the, and affecting their mantel state a lot. 18.4 percent students feel that exam should be conducted as they are worried about their future, job ect. 24.3 percent student are neutral in there thinking.



**Figure 6: Cancellation of examination**

**Do you think students are most affected class during lockdown period**

70.3 percent students think that they are most affected class during lockdown period because they are futures for any county and if there studies and exam are affected like this then it will affect their carrier. 12.1 percent students prefer there safeties where as 17.6 percent of them are neutral with their thinking.



**Figure 7: Students are most affected class during lockdown period**

**Does Covid-19 increases expenses on education**

65.7 percent students feel that due to Covid- 19 there education expenses increased because along with fees they have to spend money on internet package. Some of them face difficulty in paying fees as they are facing financial difficulties. 13.4 percent students don't think that there education expenses has increased where 20.9 percent of them are neutral with their decision.

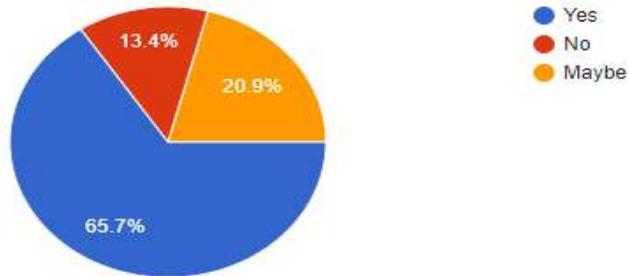


Figure 8: Covid-19 increases expenses on education

**Do you think post Covid- 19 will create ample of opportunities for students in education**

25.5 percent of students think that post Covid-19 will create ample of opportunities for students in education as they will get other mode to study rather than just relying on classroom teaching. 38.1 percent of them are not agree with this statement as they prefer normal class room teaching where as 36.4 percent of them are neutral with their decision.

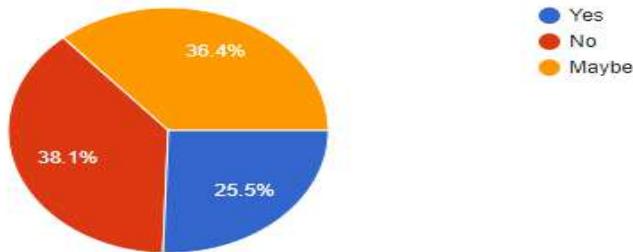


Figure 9: Covid- 19 create ample of opportunities for students in education

**Do you want Education institution to open soon**

66.1 percent of students are eagerly waiting for education institutions to open soon so that they can back to their normal life. Whereas 33.9% want to wait till present situation comes in control.

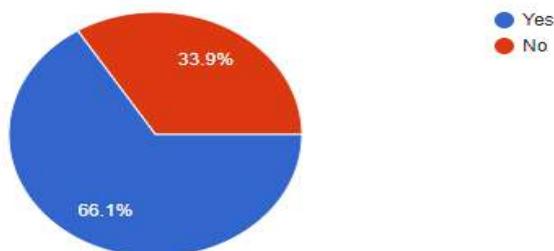


Figure 10: Education institution to open soon



## **CONCLUSION**

After taking the opinion of the students, it is understood that lockdown has negative impact on the students. Due to lockdown students cannot concentrate on their studies because their minds are full of fear about Corona virus which distracted them and affecting their mental states. Few of them feel that lockdown has a positive impact on them because they are able to study and do the activities which they are not getting time. Students feel that online lectures by their teacher are most effective learning tools during lockdown period as it helps them to stay connected with their teachers and classmates but at the same time it cannot replace face to face teaching in classroom. Students feel that exam should be held in offline mode because there are a lot of problems while writing online exam because of weak connectivity, network issues etc. At the same time they are worried about spreading virus. Many of them wanted online tests to be conducted. They feel that due to Covid-19 their education expenses increased because along with fees they have to spend money on internet packages. Lockdown has created a lot of opportunities for students in education as they will get other modes to study rather than just relying on classroom teaching. Students are eagerly waiting for education institutions to open soon so that they can return to their normal life.

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## COMPARATIVE STUDY ON USE OF LABETALOL AND METHYLDOPA DURING PREGNANCY INDUCED HYPERTENSION

Dr.R.Dinesh Kumar<sup>1</sup>, M.Mohankumar<sup>2</sup>, Nishma.E.K<sup>2</sup>, Oliviyajoseph<sup>2</sup>,  
M.A.Muhamed Abjith<sup>2</sup>

<sup>1</sup>Asst. Professor, Department of Pharmacy Practice, The Erode College of Pharmacy, Erode, Tamilnadu

<sup>2</sup>Doctor of Pharmacy, The Erode College of Pharmacy, Erode, Tamilnadu

### ABSTRACT

#### INTRODUCTION :

Hypertension is the most common medical disorder of pregnancy. treatment of pregnancy related hypertension remains challenging problem for obstetricians. Labetalol and methyldopa are most commonly used drugs during pregnancy related hypertension, but the safety and effectiveness of these medications were have a limited source. so, this study compares both drugs used during pregnancy to evaluate them.

#### OBJECTIVES :

To assess and evaluate the use of labetalol and methyldopa in pregnancy induced hypertension.

#### METHODS :

The study was comparative observational study of labetalol and methyldopa during pregnancy-induced hypertension reported on Tirupur medical college government hospital. The study was conducted on 21 patients whose mean arterial pressure(MAP) was persistently >102.3mmHg.

#### RESULTS :

Small decreases ( $P < 0.001$ ) in BP occurred only in the group treated with labetalol, and frequent BP regulation was greater in this group. There was a higher frequency of spontaneous labor in the labetalol group and a significant difference ( $P < 0.05$ ) in the cervix bishop score between the two groups. Antenatally, during childbirth or postpartum, there were no obvious adverse effects on the fetus. Slight breathlessness was the only side-effect observed in one patient treated with labetalol but drowsiness, headache and postural hypotension were recorded in patients receiving methyldopa.

#### DISCUSSION :

Slight breathlessness was the only side effect reported in one labetalol-treated patient, but drowsiness, headache, and postural hypotension were documented in patients receiving methyldopa.so labetalol is safer than methyldopa medication.

#### CONCLUSION :

Labetalol is the better medication in pregnancy-induced hypertension with a sufficient reduction of BP than methyldopa and does not seem to have any adverse effects on the fetus antenatally, during labor, or after partum.

**Key words :** Mean Arterial Pressure, labetalol, methyldopa, bishop score, apgar score



## **INTRODUCTION**

Hypertension is the most common medical disorder of pregnancy and is reported to complicate up to 1 in 10 gestations and affects an estimated 240,000 women in the United States every year [1]. The National High Blood Pressure Education Program of the NHLBI classifies hypertensive disorders of pregnancy into following categories: gestational hypertension, chronic hypertension, preeclampsia, and preeclampsia superimposed on pre-existing hypertension.[2]

Hypertension in pregnancy is defined as a systolic of 140mmHg or greater or a diastolic of 90mmHg or greater. Hypertension in pregnancy includes a range of conditions, most notably preeclampsia, a form of hypertension unique to pregnancy that occurs de novo or may be superimposed on chronic hypertension. The other forms, chronic and gestational hypertension, usually have more benign courses [3]. Controversy remains as to the blood pressure criteria used to define preeclampsia. Some experts of this specialized area of medicine have argued that a rapid rise in blood pressure of 30mmHg systolic or 15mmHg diastolic should be sufficient to diagnose preeclampsia. However, the current recommendations of the 2000 working group suggest that women who experienced only this change are not yet preeclamptic but do warrant close observation, especially if this finding is accompanied by proteinuria and hyperuricemia [4].

Hypertensive pregnant women are at risk for cerebrovascular accident, cerebral oedema, hepatic rupture, renal failure, heart failure and death. The foetuses of hypertensive women are at risk for complications of preterm birth after delivery for maternal indications, intrauterine growth restriction and stillbirth. The risk for the severest of outcomes such as maternal mortality and cerebral injury is moderated through prenatal care[5].

Preeclampsia (PE) is a clinical entity characterized by either the new onset of hypertension and proteinuria or end organ damage after 20 weeks of gestation. It is one of the major pregnancy related hypertensive disorders and can occur postpartum. Additional clinical signs and symptoms include headache, visual disturbance, epigastric pain, thrombocytopenia, and abnormal liver function[6]. Traditionally, the clinical diagnosis of PE is made when new-onset hypertension in the second half of pregnancy is associated with new-onset proteinuria. However, following the observation that some patients show evidence of multiorgan damage without proteinuria, under certain circumstances PE can be diagnosed without proteinuria. In the absence of proteinuria, the diagnosis can be made if any of the following is present: abnormal liver function, thrombocytopenia, renal insufficiency, pulmonary oedema, visual impairment, or cerebral symptoms [7]

Treatment of pregnancy-related hypertensive disorders, such as preeclampsia (PE), remain a challenging problem in obstetrics[7].

Although methyldopa is no longer used in nonpregnant women because of limited antihypertensive action and a short half-life,[8] it is generally accepted as first-line antihypertensive medication during pregnancy in most countries followed by  $\beta$ -blockers and calcium channel blockers.[9] Safety of methyldopa during second and third trimester of pregnancy initially suggested by Redman et al [10] has since been



confirmed by many other studies,[11] but efficacy in pregnancy has not been evidenced yet.

Labetalol has been shown to be effective in the treatment of essential hypertension and its use in treatment of pregnancy hypertension is currently being assessed.[12]

Here we describe the initial findings of a randomized study evaluating the use of labetalol and methyldopa in the treatment of hypertension caused by pregnancy.

## **METHODS**

We conducted the comparative observational study on 21 patients with pregnancy-induced hypertension were studied. All patients in the study were pregnant for less than 38 weeks, and prior to week 17 of pregnancy were normotensive. Mean arterial pressure (MAP) was 102.3 mmHg 24 hr after hospital admission and remained greater than or equal to this value for an additional 2 d following admission. Informed consent was obtained and patients were assigned randomly to each category of treatments. Patients were given either 400 mg labetalol, or 750 mg methyldopa daily. If adequate BP monitoring had not occurred this dose was repeated 3 d later. BP regulation was deemed adequate if there were less than 102.3 mmHg in two of the three consecutive MAP readings. There was no contraindication to the blockade of beta-adrenoreceptor patients. All patients have had an unlimited diet of salt required. BP was registered using a sphygmomanometer and taken during the time the patient was on medication before delivery at the same time per day. After a 20 min rest in left supine position, all values in the study were registered. The Korotkoff phase IV sounds were taken to assess the diastolic BP. The formula used to measure MAP was:

$$\text{MAP} = \frac{\text{Systolic BP} + \text{diastolic BP} \times 2}{3}$$

Venous blood was then taken for biochemical analysis. Samples of 24 hours of urine were also obtained to determine complete excretion of oestrogen. Detailed analysis of the results of all 21 pregnancies and the frequency of side effects. At 6 weeks post-partum the patients were also seen. Student's t test was used to evaluate variations between BPs.

## **RESULTS**

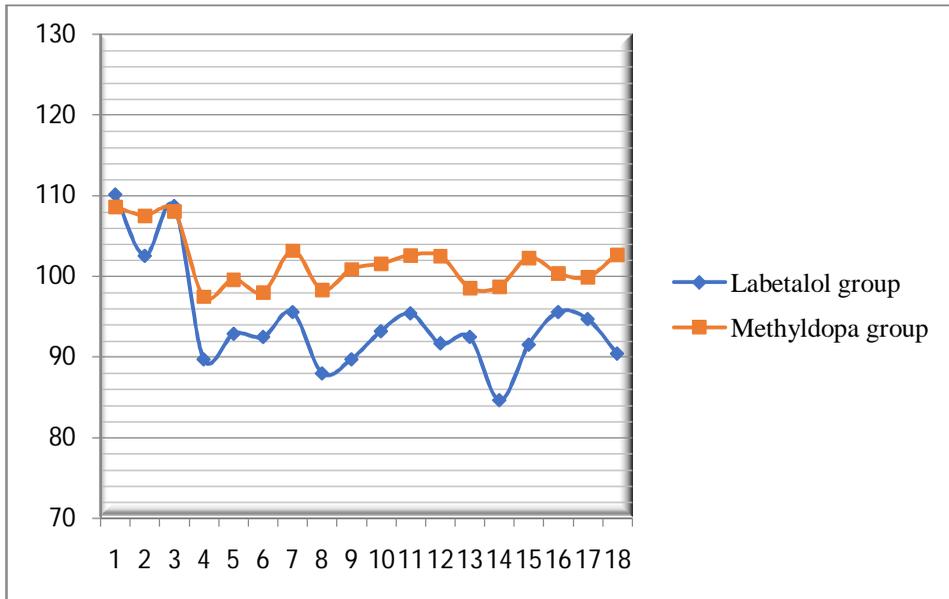
### **BP control (oral treatment)**

Table 1 displays MAPs for each individual patient before and after treatment. Before starting treatment the initial BP values were taken as the mean of the observed values for 3 d. After treatment the MAP is the average of the MAP registered before delivery every day. In both groups the average MAP was the same before diagnosis. There was a very substantial decrease in MAP in labetalol group care ( $P < 0.001$ ), but no significant drop in methyldopa-tested group ( $P > 0.05$ ). Group's daily average BP before delivery also suggests that the BP regulation in the group treated with labetalol was stronger (Figure 1).



**Table 1 Effect of labetalol and methyldopa on MAP in 21 pregnancy-induced hypertensive Patients**

Labetalol			Methyldopa		
Patient number	MAP before treatment	MAP after treatment	Patient number	MAP before treatment	MAP after treatment
1	118.2	102.4	12	109	96.1
2	102.4	84.4	13	111.1	103.2
3	114.5	97.6	14	103.1	94
4	109.1	93.6	15	113.6	111.5
5	112.6	87.4	16	114.6	102.7
6	115	95.3	17	103.7	81.3
7	118.1	100	18	120	119.4
8	109	81.2	19	102.4	88.5
9	106.6	85.4	20	118.4	109.6
10	113	86.7	21	105.8	101.7
11	115.2	94.6			
Mean	112.1	91.6	Mean	110.1	100.8
s.d	4.90	7.0	s.d	6.4	10.71
s.e	1.55	2.21	s.e	2.13	3.76
P <0.001			P <0.10		



**Figure 1 [X-axis :Time in days ; Y-axis :MAP](day-1: Admission ; day-3 Rx commenced) Comparison of change in MAP after commencing labetalol (P <0.001; n = 11) or methyldopa ( P <0.01; n = 10). P value between groups <0.001.**

### Labour

Comparison was made between the ratio of natural to induced labor and the cervix bishop score (13) at the induction or start of labour (Table 2). In the labetalol group, there was a higher occurrence of spontaneous labour, and the Bishop score was significantly higher (P < 0.05), given the fact that the average treatment period was the same. In the labetalol community the average labour-length was 5.36 hours. There were nine vaginal deliveries and one segment Caesarean. The section was accomplished due to persistent fetal bradycardia that occurred immediately after induction. The average labour-length in the methyldopa group was 4.03h and five vaginal deliveries were made. Owing to elevated hypertension three babies were delivered by elective Caesarean section, and one emergency Caesarean section was performed owing to fetal distress.



**Table 2 Comparison of labetalol and methyldopa given to 21 pregnancy-induced hypertensive patients**

	Labetalol	Methyldopa	
<b>Labour</b>			
<b>Spontaneous/induced</b>	7/2 (1LSCS)	3/3 (2 elective LSCS) (1 emergency LSCS)	
<b>Bishopscore</b>			
<b>Mean</b>	<b>10</b>	<b>7.1</b>	<b>P value &lt;0.05</b>
<b>s.e</b>	<b>0.56</b>	<b>0.89</b>	
<b>Lengthoftreatment</b>			
<b>Mean(d)</b>	<b>18.4</b>	<b>19.1</b>	<b>NS</b>
<b>s.e</b>	<b>2.7</b>	<b>2.64</b>	

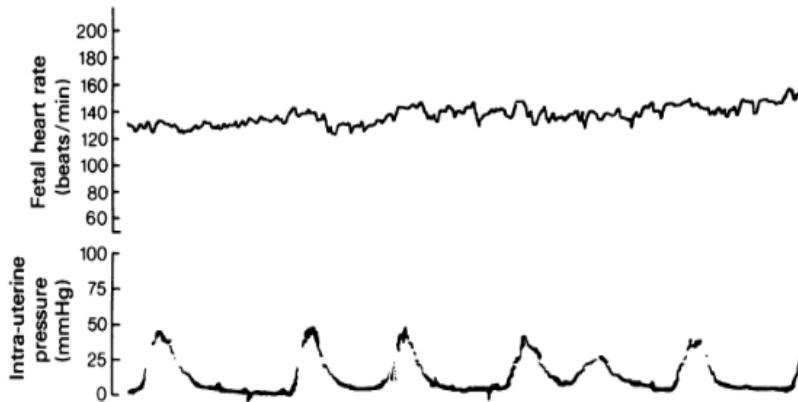
**Foetal effects**

After diagnosis, improvements in placental function, the fetal heart during labor, and a 1 min Apgar score were contrasted between treatments. Placental function results improved in five labetalol-treated patients while one methyldopa-treated patient showed a decrease in placental function.

**Table3Comparisonoffoetaleffects of labetalol and methyldopa given to 21pregnancy-inducedhypertensivepatients**

	Labetalol	Methyldopa
<b>Placental tests Improved after treatment</b>	5Improved 6Nopercentilechange	9 Nopercentile change 1Deteriorated
<b>FoetalHeartduringlabour</b>	9Normalduringlabour 1Shortepisodeof foetaltachycardia 1Episodeoffoetal bradycardia	6Normaltracings 1Bradycardia LSCS (3Elective LSCS)
<b>Apgar score(1min)</b>	10greater than8 1(breechdelivery)5	Allgreaterthan8

The birth weights of the babies in the two classes were not substantially different (labetalol mean 2.84 kg, methyldopa mean 2.61 kg). For the labetalol group the mean delivery gestation date was 37.3 weeks and for the methyldopa group 36.1 weeks. In the labetalol group, four babies experienced mild jaundice that did not require phototherapy and the remaining seven babies had no problems. Three babies have developed mild jaundice within the methyldopa community. Because of low birth weight, two babies were admitted to the neonatal unit, and one baby was drowsy until 2 d old. The other three babies have had an uncomplicated course. Figure 2 shows a typical fetal heart rate trace of a patient who was treated for 19 d with oral labetalol before labour-induced on term. No unexpected decelerations were detected, and the variability in beat-to-beat seemed natural.



**Figure2: Patient No. 5 treated with labetalol for 19 d before induction of labour at term. Foetal tracing obtained at 5 cm cervical dilation.**

### Maternal effects

One patient treated with labetalol complained of mild dyspnoea but stopping treatment was not necessary. Three patients complained about drowsiness in the group treated with methyldopa; two patients complained about headaches.

### DISCUSSION

While one foetus displayed an episode of tachycardia, nine regular tracings were obtained with strong variability of beat-to-beat and the remaining trace showing foetal bradycardia. Ten Apgar scores at 1 min were higher than 8 and the remaining boy, a breech delivery, had an Apgar score of 5. All babies had 10 at 5 min after birth, an Apgar ranking. No substantial difference was noted between mean birth weights of both classes, while 35 weeks had been the earliest gestation that oral labetalol had begun.



These findings indicate that labetalol is a useful and safe medication of choice for the hypertension caused by pregnancy. It satisfactorily reduces BP pressure and does not seem to have any adverse effects on the foetus during the test.

## CONCLUSION

Labetalol is the useful drug than methyldopa during pregnancy induced hypertension with a sufficient reduction of BP and does not seem to have any adverse effects on antenatal, delivery or post-partum foetus.

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## A STUDY ON RELATIONSHIP BETWEEN EMPLOYEE INVOLVEMENT IN CSR ACTIVITIES AND HIGH EMPLOYEE MORALE

Dr. Simple Verma<sup>1</sup>, Dr. Simranjeet Kaur Sandhar<sup>2</sup> and Dr. Shikha Agrawal<sup>3</sup>

<sup>1</sup>Assistant Professor, Amity Global Business School, Indore

<sup>2</sup>Associate Professor, Indore Institute of Management and Research, Indore

<sup>3</sup>Associate Professor, Chameli Devi Group of Institutions, Indore

### Abstract:

In the modern era CSR has become the buzzword for organizations; they are not only trying to do their bit for the society but are also trying to involve employees in a positive manner in the CSR activities. Employee activism is a term which is gaining prominence in the Western world. The employees these days are also concerned with the moral and ethical standing of the organization they work for. That is why the CSR activities of the organization influence the morale of the employees.

The paper aims to find out the relationship between employee involvement in CSR activities of the organization and higher employee morale. For data analysis Karl Pearson's coefficient of correlation and multiple regression techniques have been used. The paper establishes a relationship between both the variables. Managerial solutions for the organizations have been recommended so that they can be used for high employee engagement involvement and morale.

**Keywords:** CSR, Employee Involvement, High Employee Morale. Employee Activism

### Introduction

The term Corporate Social Responsibility may be a modern concept but the ideology dates to ancient history. CSR has been practiced in formerly in ancient times by means of charity and help to the poor and to the especially abled. In the Indian culture sharing and caring is deeply rooted. The Indian scriptures talk about the importance of sharing one's earning with the less privileged at more than one places. One cannot deny the role of religion in promoting the concept of CSR. Zakaat that is the law of Islam which says that certain portion of your earning must be shared with the less privileged in the form of donations is a type of CSR. Hindu religion gave its merchants the concept of building temples night Shelters and giving arms to the poor class. Dharmada that is a concept where the manufacturer or seller charged a low amount from the purchaser. This amount not charged was known as Dharmada.

The historical development of India and the history of CSR run parallel to each other. The four phases of CSR have been community engagement, socially responsible production followed by socially responsible employee relations. And eventually sustainability. In India, the history of CSR can be divided into four phases:

**The first phase:** The philanthropist and the charity done by them was a part of the first phase of CSR. This charity found its emergence from religion culture family values and



traditions this went together with industrialization. Setting up temples, sharing riches with society or industrial institutions was a part of working by the wealthy businessman till 1850s. In the times of natural disasters such as a family or floods please when the merchants opened their granaries for the hungry the deprived or the poor. The advent of colonial rule in 1850 changed the approach towards CSR. The industrialists supported the concept of CSR in the pre independence era. Industrialists such as the Bajaj, Godrej, Modi, Birla, Tatas introduced and set the foundation of the concept of CSR by setting up healthcare institutions, charity foundations, schools, colleges and charity trust for community development. But one cannot deny that many times these moves of the industrialist were due to political motives.

**The second phase:** This phase witnessed the struggle for Indian Independence. The industrialists were under pressure from the Congress to prove their dedication for the country. Mahatma Gandhi introduced the model of trusteeship. He also urged the industrialist to share their wealth with the poor sections of the society. This phase saw the socio-economic growth of the country. The Indian companies were given the name Temples of Modern India and they started opening educational institutions for free education in the country. The industries also focused on development of rural areas and empowering women.

**The third phase** lasted from 1960 to 1980. This period saw the growth of the public sector undertakings in the country which ensured proper distribution of wealth. But because of the restrictions on the private sector and strict taxation policies malpractices started in the private sector. This made government make stricter regulations regarding environment and labor issues. People started expecting socially responsible behavior from the private sector undertakings as well. A national level workshop was organized for the first time in the year 1965. The workshop emphasized on being socially responsible.

**The fourth phase:** Since Foreign Direct Investment started in India the Indian companies also felt the need for integrating CSR with sustainable business strategies. The legal environment was made pro companies during this period and control and licensing were partially withdrawn. The consumers also started taking note of socially responsible behavior of the Corporates. New trends and practices of CSR were introduced during this period and Corporate Communications became very important aspect. CSR was later legalized in the Companies act of 2013.

### **Review of Literature**

Dr Pestonjee's (1977) one of the leading researchers on employee morale showed in his research that morale of an employees is nothing but the attitude of the employee towards the company's leaders and or supervisors. It also showed that employee morale contributes towards need satisfaction. Morale is also made by employees individually and groups of employees. Morale is also group phenomenon that is made of factors such a group involvement and progress that is done

for meeting the goals. Employee morale is the attitude of that employee that is the outcome of the employee belief about how fair their organization is in making its policies and practices. The employee also develops a positive morale when he witnesses the leadership to be fair and just. In all he commented that employee morale is an index of all the above discussed factors.



Mitchell, Agle and Wood, (1997) mentions that CSR strategies are viewed as external activities that are visible to the stake holders and employees contribute to be the credible source of information regarding the organizations true CSR activities. Uusi- Rauva, C. and Nurkka, J. (2010) also complemented the same findings by suggesting that employees are the source that enhance the reputation of the company and act as agents of CSR activities. It will be difficult for the organization to convince the external stake holders about the correctness of the organization's CSR activities until and unless these are visible consistently in the desired areas of the social and environmental outcomes.

Mirza (1977) showed that employee morale is influenced when the workers can participate in the decision-making process. Such participation reduces their work apathy, tensions, and conflicts. It indirectly helps in boosting their morale. Rupanda's (1977) findings indicated stable employees in the organization have more importance needs. This need fulfillment stops them from leaving the organization.

Collier and Esteban, 2007, showcased that it needs to be understood that employees are the ones who actually carry out the activities of the CSR by implementing ethical behavior in the company in the day to day company work and hence it is a must that an employee should be included in the stakeholder issues of CSR. Chen and Hung-Baesecke (2014) suggested when the employers include the employees in the CSR activities the CSR program becomes most effective. For example, if the CSR initiative is focused on reduction of the energy consumption then this can be achieved only when the employees are a part of this activity and they get involved in it. It is important to understand that CSR affects the attitudes and the behavioral patterns of the employees and this in turn makes the CSR successful.

Bhattacharya et. al., 2009 opined that to remove the gap between the operations of a firm and the perception of the reputation of a company in the minds of its stakeholders such as employees, customers, and society at large, CSR is one of the important components. Kotler & Lee, 2005 and Rego et. al., 2003 concluded that one of the most derived benefits by getting involved in the CSR activities is that the relations between the companies and the stake holders get improved.

Maignan & Ferrell, 2000, in their research put forth the notion that when a company follows all the rules and regulations of reducing the wastes, decreasing pollution and also treats its employees and all other stakeholders properly along with getting involved in the community development activities all this is a part of CSR. There is a positive impact of the CSR involvement in enhancing the personal as well as professional skills. These skills may be teamwork, communication, leadership qualities and so on. The activities of CSR also are important means of developing social networking and recognition in groups which in a way is a motivational factor for the employees to be committed to the organization.

Jenkins, 2006; Ogden et al., 2005, commented that here are large number of benefits that can be derived from CSR. The hidden positive effect of CSR is on the motivation of the employees and the increase in the goodwill of the company. This motivation leads to better performance of the employees by increasing their productivity and the company enjoys a good reputation in the society. He also said that the companies that are involved in the CSR activities have a positive brand image as compared to those who do not adopt the CSR activities.



Jones, 2005; McWilliams et al., 2006, opined that the positive image created by CSR activities can be used as a strategic tool towards the expectations of the stakeholders and will also augment the creation of the better social standing of the organization. Walsh et al., 2009 have debated that those companies who provide quality products and deliver good services are able to gather trust of the customers that in turn is spread through the word of mouth and helps in building the customer loyalty and definitely contributes towards increasing the profits of the firms.

### **Research Methodology**

The research design provides the blueprint of the report to be conducted. Zikmund states that “**Research design** is a master plan specifying the **methods** and procedures for collection and analyzing the needed information.” conceived in order to derive answers to **research** questions and to control variance.” The research design in the study is descriptive and analytical in nature. For the study purposive sampling was used. The companies who are engaged in CSR activities were identified. For this the units whose employees were involved in CSR activities and where the CSR activities were looked after by the Human Resource department asked to respond in this part of the survey. The total number of respondents was 120. The tool used for this was google forms.

The people from human resources who filled the questionnaires were also contacted telephonically and few of them personally for qualitative data that was collected thru in-depth interview. The study has used both primary and the secondary data sources.

Instrument used for the study: To collect data during the study, a questionnaire was designed which had eight sections. The sections had the following information in the chronological order.

1. Company Demographic Information
2. Company Profile
3. CSR Cell Structure
4. Human Resource Department Involvement
5. Employee Involvement
6. Problems and Obstacles Faced
7. Future Agenda

### **8. Suggestions**

The universe in this study are all the organizations which are involved in the CSR activities in the and the employee participation is there in the CSR activities carried out by the organization. The sampling design was purposive and judgmental in nature.

Reliability and Validity: For the scientific outcome of results the reliability and the validity of the construct are very important. The test of reliability is for the consistency of the instrument used and the validity test helps in the valid content present in the instrument. A pilot test was conducted.

Variables for the study: A variable is any factor or trait that can be present in different types and amounts. The three variables that can be identified in this research are dependent variables, Independent variables, and the controlled variables. The Independent variable is Employee Involvement in CSR Activities. The dependent variable in second part of study is High Employee Morale.

The data analysis was carried out using statistical tool like Ms. Excel, SPSS (Statistical Package for Social Sciences) and other online statistical calculators. The graph analysis



was done for better result depiction along with percentage analysis. The major statistical test used is Karl Persons Coefficient of Correlation which is helpful in finding statistical relationship between variables.

Linear Multiple Regression analysis was done to find out the movement of the variables of the study.

**The objectives of the study are as follows:**

- i. To find out correlation between employee involvement in CSR activities and high employee morale.
- ii. To make suggestions for organizations so that the employee engagement and morale can be increased through CSR activities.

For the study the following hypotheses have been framed.

**H0:** *There is no relationship between employee involvement in CSR activities of the organization and high employee morale.*

**H1:** *is a relationship between employee involvement in CSR activities of the organization and high employee morale.*

For finding out the relationship between employee involvement in CSR activities and High employee morale Karl Pearson Coefficient of Correlation and High employee morale. The results are discussed below.

**Data Analysis, Result Details & Calculation**

The results of the data analysis are depicted and discussed below.

Descriptive Statistics			
	Mean	Std. Deviation	N
EPC	4.5000	.50210	120
HEM	4.1000	.70294	120

Correlations			
		EPC	HEM
EPC	Pearson Correlation	1	.714**
	Sig. (2-tailed)		.000
	Sum of Squares and Cross-products	30.000	30.000
	Covariance	.252	.252
	N	120	120
HEM	Pearson Correlation	.714**	1
	Sig. (2-tailed)	.000	
	Sum of Squares and Cross-products	30.000	58.800
	Covariance	.252	.494
	N	120	120

\*\* . Correlation is significant at the 0.01 level (2-tailed).

**Regression**

Descriptive Statistics			
	Mean	Std. Deviation	N
HEM	4.1000	.70294	120
EPC	4.5000	.50210	120



**Variables Entered/Removed<sup>a</sup>**

Model	Variables Entered	Variables Removed	Method
1	EPC <sup>b</sup>	.	Enter

- a. Dependent Variable: HEM
- b. All requested variables entered.

**Model Summary<sup>b</sup>**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics		
					R Square Change	F Change	df1
1	.714 <sup>a</sup>	.510	.506	.49403	.510	122.917	1

**Model Summary<sup>b</sup>**

Model	Change Statistics		
	df2	Sig. F Change	
1	118	.000	1.667

- a. Predictors: (Constant), EPC
- b. Dependent Variable: HEM

**ANOVA<sup>a</sup>**

Model		Sum of Squares	df	Mean Square	F	Sig.
	Residual	28.800	118	.244		
	Total	58.800	119			

- a. Dependent Variable: HEM
- b. Predictors: (Constant), EPC

**Coefficients<sup>a</sup>**

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Correlations Zero-order
		B	Std. Error	Beta			
1	(Constant)	-.400	.408		-.979	.329	
	EPC	1.000	.090	.714	11.087	.000	.714

**Coefficients<sup>a</sup>**

Model		Correlations			
		Partial	Part	Tolerance	VIF
1	(Constant)				
	EPC	.714	.714	1.000	1.000

- a. Dependent Variable: HEM

Coefficient Correlations <sup>a</sup>					
Model				EPC	
1	Correlations	EPC	1.000		
	Covariances	EPC	.008		
Collinearity Diagnostics <sup>a</sup>					
Model	Dimension	Eigenvalue	Condition Index	Variance Proportions	
1	1	1.994	1.000	(Constant)	EPC
	2	.006	18.055	1.00	1.00

a. Dependent Variable: HEM

After the analysis, the regression equation can be given as follows =  $-0.4000+1.0000X$ .

### 1. Y and X relationship

The output of R Square ( $R^2$ ) is 0.5102. So it can be concluded that the fifty one percent of variance of High Employee morale is due to employee involvement in the CSR activities. There is strong positive correlation between both the variables as correlation (R) equals **0.7143**.

### 2. Goodness of fit

The value of,  $F(1,118) = 122.9162$ , p-value = **0.000**. Since p-value  $< \alpha$  (0.05), we reject the null hypotheses. The regression equation for the model is  $Y = -0.4000+1.0000X$ .

### 3. Residual normality

The linear regression assumes normality for residual errors. Shapiro will p-value equals  $6.661e-16$ . The data is also normally distributed.

The pictorial depiction for the predictors is as follows.



So, the data analysis proves that there is strong positive relationship between employee involvement in CSR activities and high employee morale the hypotheses framed for the purpose of the study is not accepted.

### Conclusion and suggestions:

It is found that employee involvement in CSR activities has an impact on employee morale. It is been observed in the study that CSR helps employee engaged in a positive manner in the organization. Sustainability and CSR is one of the best ways to Foster engagement it in any organization. This study also proves that CSR has a major influence on employee morale and productivity that is why it is very important to keep



employees involved in CSR activities of the organization. CSR program should involve leaders from across the organization to motivate employees to get involved in the CSR initiatives. The organizations should also focus on CSR initiatives which involves direct in employee involvement like diversity and inclusion practices, benefits, and healthy work environment. The purpose of the CSR activities of the organization should in line with the mission and purpose so that their employees can identify with them.

The CSR goals should be set for employees also like reducing electricity consumption and should focus on them developing green habits at the workplace. The employees of an organization should also be educated and informed on the sustainability goals and the CSR objectives of the organization to expect employee involvement and contribution in the activities. The ownership of employees in the projects related to CSR should be encouraged which would increase their involvement and stakes in the CSR activities.

The CSR achievements of the employees should be celebrated in the office and motivational reward programs should be introduced which would encourage all the employees to participate in the CSR activities apart from the sustainability report which is published on the website.

If the organization has field projects in the area of CSR the employees should be taken to the field and direct contribution should be expected from them in CSR drives like cleanliness projects, plantation drives, education and health checkup camps, and spreading awareness in rural communities. The employees should be informed about the progress in the CSR projects carried out by the company through government for NGO collaboration. Ethical and fair practices of the company in the era of employee activism should be made familiar in the organization this would help this would help in creating positive employee activism. Feedback and employee suggestions should be encouraged for CSR activities. So, it can be concluded that If the organizations start engaging employees in the CSR activities that will lead to high employee morale and more productive environment in the organization.

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## POLITICAL VALUE OF SOCIAL VERSUS TRADITIONAL MEDIA: A SURVEY

**Kusum Lata**

Assistant Professor, Department of Political Science  
Daronacharya Government College Gurugram

### ABSTRACT

Our inclinations in communications and advertising are rapidly moving to the internet and social media. Tech development has led to the emergence of new media channels and traditional media theory has been stepped up with network and social networking theory. These changes have influenced political discourse, not least through the transition from top-down communication patterns to horizontal and interactive ones. Previous studies found that an interest in politics is one of the important factors for political participation. This paper looks to the role of social media in influencing the interest of young people in politics and political issues. This study was carried out by using Survey method targeting government college students of Gurugram and Faridabad districts of Haryana. Sample size of the study is total 392 respondents. The study found that youth are more reliant on social media for political purposes than the traditional one. As compare to traditional media, Social media emerges as more essential part of youth's routine life to their political life.

**Key Words:** Political Interest, Political Value, Traditional Media, Social Media

### INTRODUCTION

For several years the media evolution has continued to affect public attitudes and expectations from print to radio, to television and now online media. The advent of social networking platforms, however, took this very idea a step further, with some arguing that social media is now influencing the attitudes, expectations and behaviour of the majority whose views were previously influenced by the knowledge gained from conventional media houses. Today's network and the digital media support the capacity to generate impressions of instant contact. A news statement will advance from zero to millions viewers overnight from Facebook, Twitter, WhatsApp, YouTube and a set of blogs. The viral nature of this highly interactive, user-driven world allows total strangers to communicate over shared values, preferences or interests and make winners and losers together. Our technical developments in the field of ICT have helped address time and space constraints in communication, knowledge exchange and networking in what we describe to as the "age of information" or "digital era." This influences not just how we communicate with others and how we do business but also how we engage in the political processes. Social media may be viewed in that sense as a possible medium for promoting the social contract between the people and the state. Likewise, Govt can



theoretically use social media platforms to obtain input on its policies and initiatives, while people can use the same platforms to convey and dismiss their indignation, dissatisfaction or approval of whatever government actions are undertaken. Online platforms and social media will open up new ways of interaction. Social networking networks can help citizens discover new ways of organising and taking joint action, provide spaces to unite people around a common cause, or raise public awareness about specific issues. In comparison to conventional media, social media is an open platform, potentially giving each person a way to reach out to the public directly. It is no longer a privilege of conventional media to tell stories to the general public, provide critical knowledge and shape opinions. The distinction remains that social media can circulate news without any filtration because of its unregulated existence, whereas traditional media houses still play the role of an intermediary that filters, analyses and explains data before it goes public. If we perceive access to information and participation essential democratic features, then we can argue that the rise of internet and social media can have a democratic impact on our modern societies. But how deep in fact is this effect of democratisation? Will the availability of diverse knowledge in the internet's open space boost openness and accountability? Or is the flood of unfiltered knowledge more likely to cause chaos, hysteria, slander, and expression of hate? Should we see a more educated and more engaged citizenry? Or are we looking, as some commentators say, at a generation of "slacktivists" or "clicktivists?"<sup>1</sup>

## REVIEW OF RELATED LITERATURE

Russo, S., Statti, H. (2017) in their paper "*Stability and change in youth's political interest*" point out that 'political engagement is a key to the survival and growth of democracies.' Same thing is pointed out by Dostie-Goulet, E. (2009) in their work "*Social networks and the development of political interest*" by saying that Political engagement can be explained clearly by how appealing politics are to anyone. Levy, B. L., Solomon, B. G., Collet-Gildard, L. (2016) in their paper titled as "*Fostering political interest among youth during the 2012 presidential election: Instructional opportunities and challenges in a swing state*" explained that Political interest of Youth is significant because it is one of the most reliable predictors of political engagement. When examining social networks and political interests together, it is important to note papers by Boulianne, S. (2011.) which is titled as "*Stimulating or reinforcing political interest: Using panel data to examine reciprocal effects between news media and political interest*" in this paper they come to the conclusion that social networks allow disinterested political users to 'experience politics uniquely through their peer's political mobilization of action and messages and incidental exposure that could help foster political engagement'. Abdu, S. Dauda, Mohamad Bahtiar, and M. Suhaini, (2017).in

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<sup>1</sup>Edited by Mathias Kamp, (2016), "Reality check: Assessing the Impact of Social Media on Political Communication and Civic Engagement in Uganda, available at: [https://www.kas.de/c/document\\_library/get\\_file?uuid=95eec5bf-c11c-c4eb-f504-90a4e5a4d54d&groupId=252038](https://www.kas.de/c/document_library/get_file?uuid=95eec5bf-c11c-c4eb-f504-90a4e5a4d54d&groupId=252038)



their study “*Youth Online Political Participation: The Role of Facebook Use, Interactivity, Quality Information and Political Interest*” concluded that there is a direct link between the use of Facebook, quality content, political interest and political participation online. Not only this, it appears that political engagement has the highest association with online political participation. Abdulrauf – Salauet. al (2015) in their study “*Social Media and Youth Online Political Participation: Perspectives on Cognitive Engagement*” explains relationship between online youth political participation and social media by using Cognitive Engagement Theory. The findings of this study says that online political participation through social media is simpler, much less costly and by extension an extra boost to cognitive involvement for youth.

The previous studies focused on only on political participation of youth and their political interest in the light of new media emergence but political value of social and traditional media in influencing youth’s political orientation is studied less. Present study is a moderate attempt to fill the research gap.

## **RESEARCH OBJECTIVES**

1. To study and compare the political value of social and traditional media?
2. To study and compare the level of awareness of social /traditional media users?

## **HYPOTHESES**

1. Social media users are more aware about social/political issues as compare to traditional media users.
2. Social media is perceived as more politically valuable than the traditional media.

## **METHODOLOGY**

Study is conducted using survey method. Total sample size was 392. All respondents who are studying in government colleges in two districts of Haryana namely Gurugram and Faridabad are targeted as subject area and Data is collected using structured questionnaire using random sampling technique. Data is analysed with the help of SPSS and Excel Program.

## **DATA INTERPRETATION**

To measure the perception of youth towards political value of social and traditional media, the respondents were asked the following statements-

- Social media explains Social/Political issues better than the Traditional /Mainstream media.
- Social Media is more successful in engaging the first time voters in recent general elections in comparison to Traditional media.



- People who are using Social media are more aware about Government Policy/ Programs as compare to traditional media followers.

The answers were coded on five point scale (Strongly Agree-1 Agree-2 Strongly Disagree-3 Disagree-4 Can't Say-5).

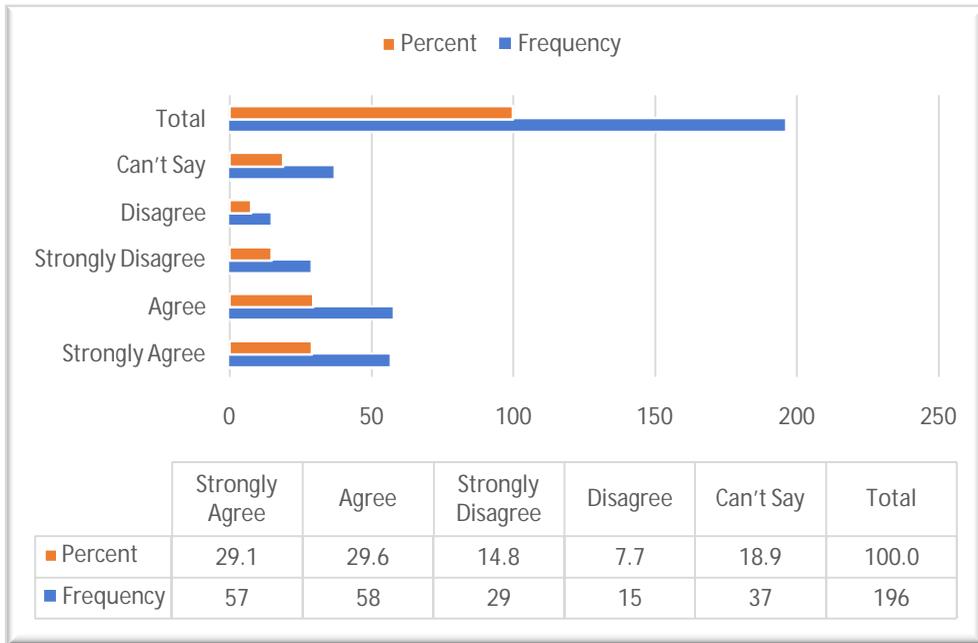
### Responses of Faridabad's Youth

		Respondents Number	Percentage
Social media explains Social/Political issues better than the Traditional /Mainstream media	Strongly Agree	83	42.3%
	Agree	46	23.5%
	Strongly Disagree	17	8.7%
	Disagree	19	9.7%
	Can't Say	31	15.8%
Social Media is more successful in engaging the first time voters in recent general elections in comparison to traditional media.	Strongly Agree	53	27.0%
	Agree	74	37.8%
	Strongly Disagree	21	10.7%
	Disagree	14	7.1%
	Can't Say	34	17.3%
People who are using Social media are more aware about Government Policy/ Programs as compare to Traditional media followers.	Strongly Agree	61	31.1%
	Agree	66	33.7%
	Strongly Disagree	15	7.7%
	Disagree	17	8.7%
	Can't Say	37	18.9%

The above table clearly shows that majority of respondents accepted the fact that Social media explains Social/Political issues better than the Traditional /Mainstream media and a huge number of respondents also agreed with the fact that Social Media is more successful in engaging the first time voters in recent general elections in comparison to traditional media. The table also indicates that majority of surveyed people recognised the fact that people who are using Social media are more aware about Government's Policies/ Programmes as compare to Traditional media followers.

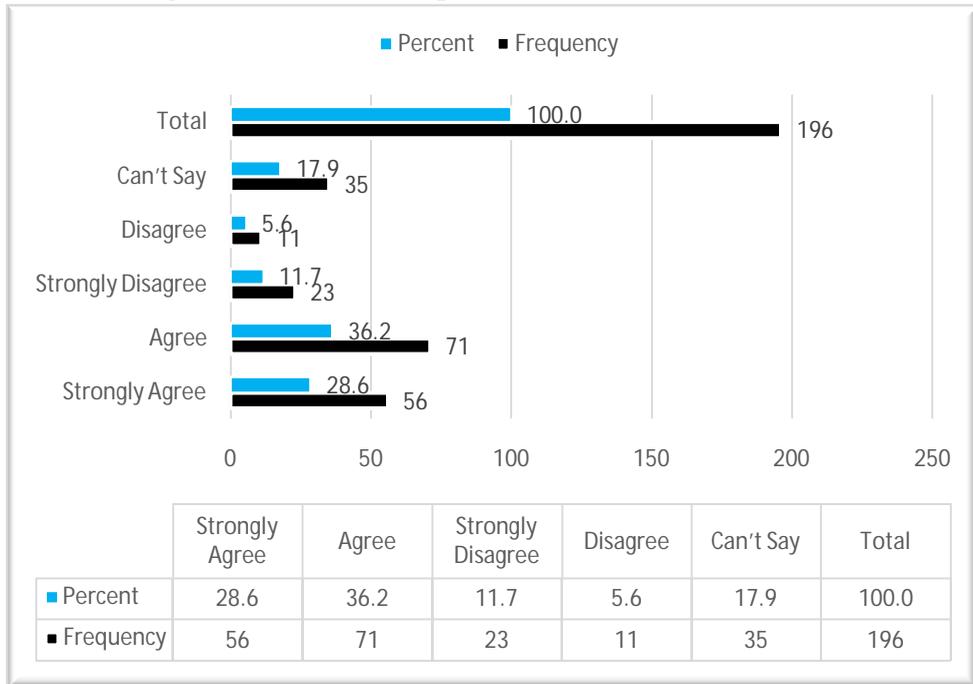
**RESPONSES OF GURUGRAM’S YOUTH**

**Figure 1-Social media explains Social/Political issues better than the Traditional/Mainstream media**



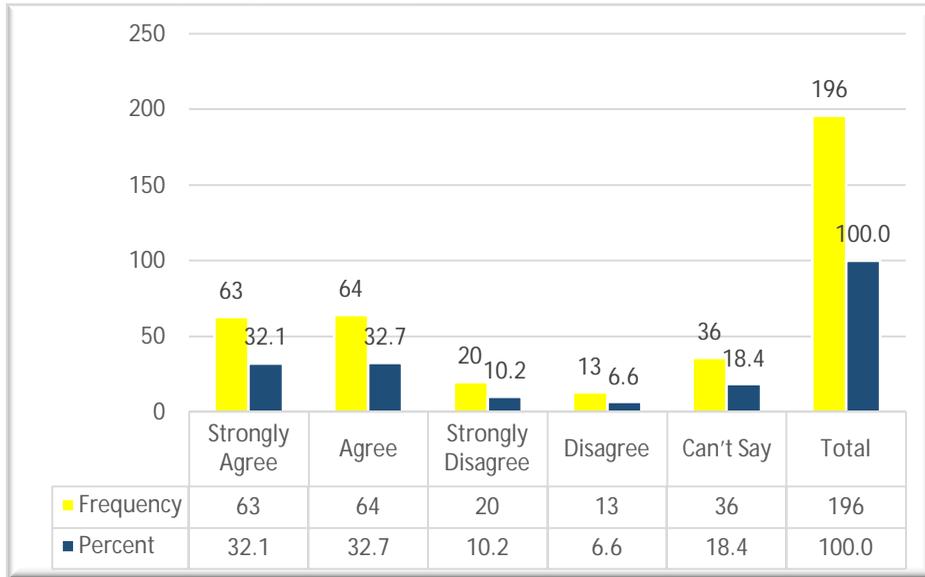
As figure-1 reveals that 29.1% respondents are strongly agree with the statement that Social media explains Social/Political issues better than the Traditional /Mainstream media. 29.6% of respondents also agreeing with the same statement. 14.8% strongly denied the statement and 7.7% of respondents also disagreeing with same statement. 18.9% of respondents have no sure about it. **Majority of respondents accepting the fact that Social media explains Social/Political issues better than the Traditional /Mainstream media. It seems that mainstream media have some restriction which social media has overcome that makes it better than the traditional one.**

**Figure 2-Social Media is more successful in engaging the first time voters in recent general elections in comparison to Traditional media.**



As shown in the figure-2 that 28.6% respondents are strongly agreeing with the statement that Social Media is more successful in engaging the first time voters in recent general elections in comparison to traditional media. 36.2% of respondents also agreeing with the same statement. 11.7% strongly denied the statement and 5.6% of respondents also disagreeing with same statement. 17.9% of respondents have not sure about it. Majority of surveyed youth of Gurugram accepted the fact that Social Media is more successful in engaging the first time voters in recent general elections in comparison to traditional media.

**Figure 3-People who are using Social media are more aware about Government Policy/ Programs as compare to Traditional media followers.**



The above figure 3 shows that 32.1% respondents are strongly agreeing with the statement that people who are using Social media are more aware about Government Policy/ Programs as compare to Traditional media followers. 32.7% of respondents also agreeing with the same statement. 10.2% strongly denied the statement and 6.6% of respondents also disagreeing with same statement. 18.4% of respondents have not sure about it. Majority of surveyed people recognised the fact that people who are using Social media are more aware about the Policies/ Programmes of the government as compared to Traditional media followers.

### FINDINGS

The study found that majority of respondents accepting the fact that Social media explains Social/Political issues better than the Traditional /Mainstream media. It seems that mainstream media have some restriction which social media has overcome that makes it better than the traditional one.

Findings of the study also suggests that majority of respondents recognized the fact that people who are using Social media are more aware about the Policies/ Programmes of the government as compared to Traditional media followers. Comparatively Faridabad's youth are higher in number while supporting the statement. It is no longer a privilege of mainstream media to tell stories to the general public, to provide essential information and to control perceptions. The distinction remains that social media can disseminate news without any filter or direct control because of its unregulated existence, whereas



conventional media houses often play the role of an intermediary who collects, analyses, filter and illustrates information before it goes on public domain.

The study reveals that majority of surveyed youth accepted the fact that Social Media is more successful in engaging the first time voters in recent general elections in comparison to traditional media. Gurugram respondents are believing it more than Faridabad's youth.

## **CONCLUSION**

The findings of the study suggest that there is a positive and significant relationship between social media and political interest of youth. Social media have a great potential to revolutionise the youth. The aim of the research was to establish whether using social networks for political discussion increases the level of political interest. The results have shown that Social Media is more successful in engaging the youth for social/political discussion than the traditional media. The more active young people are on Social media, the greater is their political interest. Therefore, social media sites can be a very useful tool to reach young people and get them to be more involved in politics. It is necessary to encourage young people to be more active on social networks in political context and to develop their political interest because they are the ones who will shape the future of politics and thus the future of the entire country.

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## A STUDY ON COGNITIVE STYLE OF WOMEN STUDENT TEACHERS OF VIJAYAPUR & KALABURAGI CITY

<sup>1</sup>Savitri G Beelagi and <sup>2</sup>Dr.Venkoba Narayanappa

<sup>1</sup>Research Scholar, Akkamahadevi State Womens University, Vijayapur

<sup>2</sup>Research Guide, Dept of PG Studies and Research in Education,  
Akkamahadevi State Womens University Vijayapur

### Abstract

In the present study / Investigation has been to measuring the Cognitivestyle of women student Teacher . Cognitive style inventory scale by Dr.Praveen Kumar Jha .The means and standard deviations were computed for the selected sample from the raw data to find out the significant difference between sub groups.t test was employed .a significant difference was observed between women student teacher of Government and Private ,Rural and Urban, Science and Arts, Kannada medium and English medium with respect to occupational self efficacy scores. No significance difference between women student teachers of government and private colleges of Education with respect to cognitive style.

### I] INTRODUCTION:-

Cognitive style is a hypothetical construct that has been developed to explain the process of mediation between stimulus and response .The term cognitive style refers to the characteristic ways in which an individual conceptually organizes the environment. It is viewed that cognitive style refers to the way an individual filters & process stimuli so that the environment takes on psychological meaning .cognitive style is also understood in terms of consistent patterns of organizing & processing information. The notion of cognitive style has been defined as self evident modes of functioning which the individual shows in his perceptual & intellectual activities.

### II] STATEMENT OF THE PROBLEM:-

“A STUDY ON COGNITIVE STYLE OF WOMEN STUDENT TEACHERS OF GULBARGA AND VIJAYAPUR CITY.”

### III] OBJECTIVES OF THE STUDY:-

- To assess the difference between moderate variables of women student teachers of colleges of education with respect to their cognitive style scores.
- To assess the interaction effect of moderate variables i.e types of management, location, streams and medium occupational cognitive style scores of women student teachers of college of education.
- To assess the relationship between rural and urban cognitive scores of women student teachers.



#### IV] SIGNIFICANT OF THE STUDY:-

- The researcher felt the need to study this area. since last decade, it has been observed that most employees take up job assignment that they are either not qualified for or interested in.
- Some may be qualified, but may not have a proper 'career fitment' at the organizations.
- The researcher wanted to study this and see if the employees have the cognitive style to make decisions pertaining to their careers.
- Use the career anchor scale and to see the various career orientations in the for chosen sector. the need was then to study all of this under the backdrop of career satisfaction.

#### V] METHOD:-

##### a) SAMPLE :-

The study was conducted on a sample of 480 college students of vijayapur and kalaburagi city. The simple random sampling technical was adopted for the present study. the sample design is as follows

N = 480

SL NO	VARIABLE	SAMPLING	N
1	Institution	Govt/private	240/240
2	Location	Urban/Rural	120/120
3	Subject	Arts/Science	60/60
4	Medium	Kannada/English	30/30

##### b) OPERATIONAL KEY TERMS :-

##### Cognitive style

#### VI] RESULTS :-

The means and standard deviations were computed for the selected sub groups. to find out the significant difference between then sub groups t test is employed.

##### • Null Hypotheses 1:

There is no significant difference between women student teachers of government and private colleges of education with respect to cognitive style scores. hypothesis the independent t test was performed & the results are presented in the table given below.



Managements	N	Mean	SD	SE	t - value	P -value
Government	240	76.33	6.611	0.39	2.5262	0.0119,S
Private	240	77.76	6.28	0.41		

From the above Table ,it is clearly shows that ,the calculated value of t test is 2.5262 & the critical value of t with 478degrees of freedom at 5% level is 1.9600. It indicates that the calculated value i.e.2.5262 is greater than 1.9600. It means that ,significant difference was observed between women student teachers of govt & private college of Education with respect to cognitive style score.

Therefore null hypothesis H(0) is rejected & alternative hypothesis H(1) is accepted. it concludes that, the women student teachers of private college of education have significant and higher cognitive style scores as compared to women student teacher of government college of education.

**Null Hypothesis 2 :-**

There is no significant difference between women student teachers of Urban & Rural colleges of education with respect to cognitive style scores.

Location	N	Mean	SD	SE	t - value	P -value
Urban	240	78.20	6.34	0.41	4.1016	0.0001,S
Rural	240	75.90	5.92	0.38		

From the result of above table, it clearly shows that ,the calculated value of t test is 4.1016 & the critical value of t with 478 degrees of freedom at 5% level is 1.9600. It indicates that the calculated value i.e 4.1016 is greater than 1.9600.It means that significant difference was observed between women student teachers of rural & urban colleges of education with respect to cognitive style scores. therefore, the null hypothesis(H0) is rejected & alternative hypothesis (H1) is accepted. It concludes that ,the women student teachers of urban colleges of education have significant and higher cognitive style scores as compared to women student teachers of rural college of education .

- **Null Hypothesis 3:-**

There is no significant difference between women student teachers of Arts & science stream colleges of education with respect to occupational self efficacy scores.



Streams	N	Mean	SD	SE	t - value	P -value
Arts	240	76.54	6.03	0.39	1.7838	0.0751, NS
Science	240	77.55	6.40	0.49		

From the result of the above table , it clearly shows that ,the calculated value of t test is 1.7838 & the critical value of t with 478 degrees of freedom at 5% level is 1.9600. It means that, non significant difference was observed between Arts & science stream women student teachers of colleges of education with the respect to cognitive style scores.

Therefore, the null hypothesis (H0) is accepted and alternative hypothesis (H1) is rejected. It concludes that Arts and science stream women student teacher of college of education have similar cognitive style scores.

• **Null Hypothesis – 4:-**

No significant difference between Kannada medium and English medium women student teachers of college of education with respect to cognitive style scores..

Mediums	N	Mean	SD	SE	t - value	P -value
Kannada medium	240	76.05	5.07	0.33	3.5352	0.0004,S
English medium	240	78.04	7.08	0.46		

From the above cited table it clearly shows that, the calculated value of t test is 3.5352 & the critical value of t with 478 degrees of freedom at 5% level is 1.9600. It indicates that ,the calculated value i.e. 3.5352 is greater than 1.9600.It means that significant difference was observed between Kannada medium & English medium women student teacher of college of education with respect to cognitive style score. Therefore the Null Hypothesis (0) is rejected & alternative hypothesis is H(1) is accepted. It concludes that, the English medium women student teachers have significant and higher cognitive style scores as compared to kannada medium women student teachers of college of education.

**VII] MAJOUR FINDINGS OF THE STUDY:-**

- 1) A significant difference was observed between women student teachers of government & private colleges of education with respect to cognitive styles scores.



- 2) A significant difference was observed between women teachers of Rural and Urban colleges of education with respect to cognitive style scores.
- 3) Non significant difference was observed women student teachers of Arts and science stream college of education with respect of cognitive style scores.
- 4) A significant difference was observed between Kannada medium & English medium women student teachers of college of education with respect to cognitive style scores.
- 5) The women student teachers of private college of education have significant & higher cognitive scores as compared to women student teachers of government colleges of education.
- 6) The women student teachers of urban colleges of education have significant & higher cognitive style scores as compared to women student teachers of rural college of education.
- 7) The arts & science stream women student teachers of college of education have similar cognitive style scores.
- 8) The English medium women student teachers have significant & higher cognitive style scores as compared to Kannada medium women student teachers of college of education.

#### **VIII] EDUCATIONAL IMPLICATIONS:-**

\* In the present study, cognitive style of women student teachers of college of education are used. The moderate variables like, types of management, locations, stream of subjects; mediums of study are taken into deliberation.

\* All women student teachers of education should properly trained and suggest conducting practical oriented classes frequently.

\* women student teachers of college of education should be given more practical work in the concerned variables like problem solving ability in various subjects.

\* cognitive style is very important to the women student teachers of college of education should have positive cognitive style.

\* Attempt should made to identify the strong and weak point of the of women student teachers of college of education hence; it will help to the women student teachers for the better instruction, which will help for the better outcome of the women student teachers in the college of the education.

\* The present study helps to explain the women student teachers with different aspect of subject use in daily life.

\* The present study helps to develop the power of reasoning, critical thinking and application of scientific knowledge among the women student teachers of college of education.

\* It helps to expose the student teachers of education to different process used and increase student teachers of college of education understanding to such a level that the he/she can understand various concepts and theories which unify various branches of various subjects.



**IX] LIMITATIONS OF THE STUDY :-**

- The present study was restricted to student teachers of colleges of education only and further confined to student teachers of college only.
- The study was limited to 480 students of college of education.
- The study was limited to government & private college of education.
- The study was covered student teachers of colleges of education of both urban and rural areas.
- The study was also limited to only Arts and Science stream student teachers of college of education.
- The study was confined to the students of Kannada and English medium.

**X] SUGGESTIONS FOR FURTHER RESEARCH :-**

- 1) The identical study may be undertaken for larger sample of women student teachers of college of education in the study area.
- 2) The same study may be conducted for women students of primary school & secondary schools in both combined and separate.
- 3) The comparative study may be conducted for women students of pre –university and women student teachers of college of education.
- 4) The correlation study may conduct to see the relationship between occupational self efficacy ,cognitive style with their performances of women student teachers of college of education.
- 5) The study like this may conduct for women students studying in any residential schools of karantaka.
- 6) The study may be conduct with other variables like women student teachers of college of education ,administrators, and environment of the school in college level.

**XI] CONCLUSION :-**

The women student teachers of urban government college of education have significant higher cognitive style score as compared to women student teachers of rural government college of education.

The women student teachers of urban government & Urban private colleges of education have similar cognitive style scores.

The women student teachers of urban government & Rural private colleges of education have similar cognitive style scores.

The women student teachers of urban private college of education have significant higher cognitive style scores as compared to women student teachers of rural government college of education.

The women student teachers of rural private college of education have significant higher cognitive style scores as compared to women student teachers of rural government college of education.

The women student teachers of urban private & Rural private colleges of education have similar cognitive style scores.



The women student teachers of science stream in government college of education have significant higher cognitive style scores as compared to women student teachers of Arts stream in government college of education.

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## ADOLESCENTS' RISK-BEHAVIORS AND EXPRESSIVE ARTS' THERAPY AS AN INTERVENTION

<sup>1</sup>Sangeeta Bhatia and <sup>2</sup>Pallavi Sharma

<sup>1</sup>Associate Professor ,Department of Psychology ,Gargi College, University of Delhi , Siri Fort Road , New Delhi, India

<sup>2</sup>Department of Psychology , University of Delhi ,Delhi, India

### ABSTRACT

**Background:** Adolescence is a developmental stage marked by a complex interplay between the biological, social and cognitive changes . Biological changes occur primarily in pathways of Prefrontal Cortex and sub-cortical areas involved in emotion and reward processing. These still immature connections make adolescents' vulnerable to psychosocial difficulties in the form of externalizing behaviors (violence, crimes, substance use) or internalizing issues (depression, anxiety). Imaging research on the adolescent brain suggests the possibility of reshaping the brain architecture towards enhanced self-regulation, indicating the usefulness of developing and implementing interventions during this stage.

**Method:** The Youth Risk Behaviour Survey (YRBS) and Smartphone Addiction Scale-Short Version (SAS-SV) were administered on a sample of 236 participants (Females–161; Males–75) in the age range of 17-21 years. Based on the findings of the survey, volunteers were invited to participate in a workshop that was to be conducted by the authors using Expressive Arts with the objective of promoting self-regulation in line with the developmental issues identified by the participants.

**Results:** The survey revealed risky behaviors such as rash driving, drinking alcohol, internet addiction. The core developmental issues of adolescents were first identified by the authors through focus group discussions with small groups, based on which an intervention using expressive arts was subsequently administered in seven sessions of 45-90 minutes each, spread over a period of three weeks. Activities included a focus on the adolescent's body-image, anxiety experienced related to lack of a clear identity, and a discrepancy perceived between their real and ideal self as the target of change. Feedback from the adolescents showed a perception of enhanced self-awareness and capacity for self-regulation post the workshop and interactive sessions.

This study has implications for the improvement in self-regulation of adolescents through administering interventions. Further, this intervention leads to creation of peer facilitators.

**Keywords.** Adolescence, Developmental Issues, Expressive Arts Therapy, Risk-Behaviours, Self-Regulation.

Adolescents' risk-behaviors and Expressive Arts' therapy

Adolescence, a formative and protracted period of life, is marked by a complex interplay between the biological, social and cognitive changes for the purpose of attaining a sense of self and identity. It is usually understood as the years between the "onset of puberty and the establishment of social independence" (Steinberg, 2014). The onset of puberty, including rapid hormonal changes and escalated body growth, marks the first and most identifiable step towards this progression of achieving an adult identity. This is the period of venturing away from family and increased affiliation with peers. It is further related with involvement in increasingly novel and adult-like behaviours(Spear, 2007). Researchers have suggested that significant developmental changes are taking place at the reward circuits – dopaminergic and frontostriatal – during puberty, which could be responsible for involvement in novel, adult-like behaviours (Chambers, et al.



2003; Spear, 2000). These changes in reward circuits are due to peaks in Striatal and NAcc dopamine receptor binding of D1 and D2 receptors during adolescence (P40) at levels that are about 30–45% greater than those seen in adulthood and lead to increased sensitivity towards rewards (Teicher et al., 1995; Tarazi, et.al., 1998, 1999). Also accompanied by, is the rise in sensation seeking tendency and impulsivity, which could be due to dissimilar development happening at the socio-emotional and the cognitive brain network, as explained by Steinberg (2014). Though by this time, areas involved in emotional processing, namely limbic and paralimbic system, have matured. But the prefrontal cortex which is responsible for high level cognitive and executive functioning including planning, problem-solving, decision making, cognitive control (important for inhibition of inappropriate or risk-behaviors), social interaction (understanding other people) and self-awareness, is not yet completely developed. So, any form of emotionally exciting stimuli, like the presence of peers or novel activities, lead to an emotionally-driven reaction from adolescents in the absence of an immature regulation system. This is of particular concern because continued exposure to any environmental stress or internal mental conflicts happening during this period could lead to psychosocial difficulties in the form of externalizing behaviors (violence, crimes, substance use) or internalizing issues (depression, anxiety).

In a survey of over nine thousand people, it was found that three-fourths of all cases of anxiety, impulse-control disorders, substance use, and mood disorders start before the age of 24 years (Kessler, et al. 2005). The same has been confirmed by various surveys and studies looking at adolescent issues. Youth are also found to be involved in crimes, with 16-25-year-olds being involved in almost 56% of the crimes (Crime in India, Statistics, NCRB, 2016). Road traffic injuries have become the leading cause of unintentional injury mortality in India with 21.1% in the age group of 18-25 year (Road Accidents in India Report, 2016) Furthermore, illicit substances' usage worldwide poses a serious health challenge for children and adolescents. As per the National Commission for the Protection of Child Rights (2013) report of a survey done on around 4024 youngsters of 5-18 years old, lifetime prevalence of substances was found to be tobacco (83.2%), alcohol (67.7%), cannabis (35.4%), inhalants (34.7%), pharmaceutical opioids (18.1%), sedatives (7.9%), heroin/smack (7.9%) and injectable substances (12.6%). Though, major issue for the age group of 18-21-year-olds is anxiety and depression. In the CSDS-KAS Report on 'Attitudes, anxieties and aspirations of India's youth: changing patterns' (2017), over 55% of participants were found to be highly anxious and 31% having high or moderate emotional distress. Another significant finding from this survey was that 18-21-year-olds found to be most anxious about all age-groups. In another study on college students of India, the prevalence of depression, anxiety, and stress were reported to be 59.2%, 86.5% and 52.7% respectively (Singh & others, 2017). These findings point towards the need for intervention, not just for those who are suffering from major issues of substance use, depression, or anxiety; but also those who might or might not be facing any form of stress for the purpose of prevention and skill-building as vulnerability seems quite high during adolescence.

Neuroplasticity research has shown that it is possible to reshape the architecture of the brain with the help of interventions. Growing evidence supports the use of self-regulation intervention (deCharms et al. 2005, 2007; Johnston et al. 2010), which is, the set of psychological processes through which people bring their thoughts, feelings, and behavior in line with abstract standards, goals, or values (Baumeister, Heatherton, & Tice, 1993; Carver & Scheier, 1999). Expressive arts, a newly emerging form of therapeutic practice, has been suggested in some studies to be useful for self-regulation (Drake & Winner, 2012; Lowe, 2006; Perryman, Moss, & Cochran, 2015).

Expressive arts therapy provides an opportunity for differing forms of expression using arts modalities and creative processes for the purpose of developing self-awareness, which is expressed by directly experiencing the “now” in terms of thoughts, emotions and interpersonal



relatedness (Kim, Kirchoff, Whitsett, 2011). It is used for intentional interventions to foster health and well-being. Use of expressive arts has been explored mostly for dealing with trauma-related issues of adults and children (Slyter, 2012; Lyshak-Stelzer, Singer, Patricia Chemtob, 2011). Furthermore, it has been found to be useful in studies for children with autism, attention-deficient disorder, family problems, peer problems, low self-esteem and depression (Shokouhi et al. 2014, Henley, 1999). But the use of expressive arts for improving self-regulation and dealing comprehensively with pertinent adolescent issues hasn't yet been researched adequately.

Henceforth, the present study put forth objectives of:

1. Understanding risk-behaviors of adolescents' using the Youth Risk Behaviour Survey (YRBS) and Smartphone Addiction Scale- Short Version (SAS-SV).
2. Administering a short module of Expressive Arts for adolescents' exhibiting risk-behaviors, with the aim of working on enhancing their self-regulation based on the issues identified by them.

2. METHOD

2.1 Participants

First phase (Data collection): To identify and select the relevant sample, college lecturers of Government Universities of Delhi were approached. Therein, through them their students were collectively informed in a classroom about the study objectives. Students who were willing to participate in the study were recruited. In total, 236 participants (Females-161; Males-75) in the age range of 17-21, were recruited using the Convenience Sampling method. Data was collected in the classroom setting from eight colleges of different regions including South, West, Central, East, and North West Delhi. The whole process of seeking permission from the institutions and data collection of the first phase took around three months (Jan-March, 2018). Data was collected in the group setting, with each group taking around 45 minutes to complete the questionnaires. The number of participants in each group was unequivocally distributed in number and gender (Table 1).

Second Phase (Intervention): Selection of participants who indicated their involvement in risk-taking behaviors in the survey formed the second phase, on whom the intervention was to be administered. For this, faculty from the Psychology Department of a Government College located in South Delhi were approached. With their permission, nine female participants in the age range of 17-21, volunteered to participate in the study. Sample was kept deliberately small as Focus Group Discussion was the method of choice to have an exploratory study so as to understand the usefulness of Expressive Arts method in enhancing self-regulation. A schedule free from their classes was drawn and intervention sessions were held in seven sessions spread over a period of three weeks (1st Oct – 23rd Oct, 2018). Each session took around 45-90 minutes. At the end of the three weeks, participants were to answer a structured open-ended questionnaire for obtaining an insight into their experience and a feedback of the exercises.

Table 1: Socio-demographic profile of participants

		N%
<b>Gender</b>	Females	68%
	Males	32%
<b>Accomodation</b>	With parents	65.1 %
	At hostel/PG	31.4 %
	With relative (other than parents)	3.5 %



<b>Family size</b>	<4	44.3 %
	5-7	47.3 %
	>8	8.4 %
<b>Status of parents:</b>	Both alive	96.7 %
	One parent not alive	2.0 %
	Both parents not alive	0 %
<b>Parents' Education</b>	Father Literate	97.5 %
	Father Illiterate	2.0 %
	Mother Literate	91.6 %
	Mother Illiterate	6.8 %
<b>Working status of mother</b>	Home-maker	67.4 %
	Working	25.9 %
<b>Working for income after college</b>	Yes	18.7 %
	No	74.8 %

## 2.2 Measures

2.3.1 Youth Risk Behaviour Survey: The Youth Risk Behaviour Survey (YRBS, 2017) developed by the Centers for Disease Control and Prevention (CDC). It monitors six categories of health-related behaviours that contribute to the leading causes of death and disability among youth and adults and is widely used throughout the world, including India. This survey includes 95 questions, comprising topics about—

- Behaviors that contribute to unintentional injuries and violence
- Sexual behaviors related to unintended pregnancy and sexually transmitted diseases, including HIV infection
- Alcohol and other drug use
- Tobacco use
- Unhealthy dietary behaviors
- Inadequate physical activity

2.3.2 Smartphone Addiction Scale-SV (SAS-SV): Literature is suggestive of smartphone overuse in this age-group. Therefore, SAS-SV, a 10-item self-report Likert scale which assesses participants level of smartphone addiction (Kwon, Kim et al., 2013; Kwon, Lee et al., 2013) was used. It addresses the 5 areas, including 'daily-life disturbance', 'withdrawal', 'cyberspace-oriented relationship', 'overuse', and 'tolerance'. This scale is the shortened version of the original 40 items scale and the final 10 questions were chosen with regard to content



validity; the original SAS-SV showed content and concurrent validity and internal consistency (Cronbach's alpha: 0.91).

### 2.3.3 Techniques used in the Intervention:

A focus group discussion was led by the researcher during the administration of these two scales, YRBS and SAS-SV, which pointed towards a likely presence of underlying core issues related to the risk behaviours of the adolescents studied. Thus, based on the discussion and existing literature, following intervention exercises were selected (also mentioned in Table-2):

2.3.3.1 Body Image: Relevant literature was reviewed to identify activities for dealing with body-image issues of participants. However, no standardized technique was found regarding dealing with these concerns, henceforth the researcher designed the following activity:

(i) Participants were asked to write regarding – what they think about their body and appearance, on a sheet of paper. Purpose of this first step was to make participants delve into their self-perceptions of their body and appearance.

(ii) Next, the participants were asked to draw an outline of a human body on a half size cartridge sheet. They were asked to write any negative comments or messages from their parents, siblings, relatives, friends, teachers or even strangers that they ever received about any of their body part. This is based on the rationale given in the literature that points towards the possibility of 'body dissatisfaction' issues having roots in the childhood (Cramer &Steinwert, 1998; Musher-Eizenman, & others 2003), specifically from parents' expression of dissatisfaction with their children's body (Smolak, Levine, &Schermer, 1999; Striegel-Moore & Kearney-Cooke, 1994), and appearance-related teasing by peers (Smolak, 2004). Thus, through this step the participants were made to identify roots of their current body-image.

(iii) The participants were then asked to compare the first sheet (your view about your body and appearance) and the second sheet (others view about your body and appearance), and were asked to objectively note how their personal opinions about their body were influenced by others' opinions. Their attention was taken to how they are carrying the memory of others' negative comments to the extent that it now had become the dominant self-view.

(iv) Next, the group was asked to note the feeling, and colour each body part with the one which resonates most with the emotion they felt on hearing the critical comment on their body. In a landmark study done by Nummenmaa, Glereana, Harib& Hietanen (2013) identifying bodily maps of emotions, they mapped how certain words and stories could elicit sensations in different parts of the body. It was suggested that perception of these emotion-triggered bodily changes may play a key role in generating consciously felt emotions. Understanding of these conscious feelings could be used to therapeutically release heavy emotions from the body and voluntarily fine-tune behaviour to feel positively about body-related self and increase self-worth.

(v) Lastly, participants were asked to perform a "ritual for letting go" of all the past memories, pain and emotions they have been carrying for their body. This was done by "burning" the sheets where they had done the writing and the subsequent drawing activity. The rationale for the "burning" task comes from studies done by 'ritual studies scholars' which informs how personal rituals favours authentic, informal and spontaneous emotional expression and sense-making (Lofland, 1985; Walter, 1994; Wouters 2002). Specific benefits of performing rituals include movement towards integration, ventilation and channeling of feelings (Rando, 1985), and the experience of an emotional shift (Gillian, 1991; Wyrostok, 1995).

2.3.3.2 Building a Congruent self: Carl Rogers, one of the most influential humanistic theorist, distinguished between – the Real Self (how a person really is) and the Ideal Self (how a person would like to be). According to Rogers (1959), humans desire to feel, experience and behave in ways which are consistent to both – their Real Self and their Ideal self. The closer an individual's real and ideal self are, the more congruent and higher is sense of self-worth. He suggested that emotional issues can be reduced by reducing discrepancy between the real and the ideal self. To serve this purpose for the participants, an activity from the book – *You*



*can Heal your life* (1984) written by Lousie Hay, a renowned metaphysical lecturer, teacher and best-selling author – was taken, and modified to suit the study's objectives and conducted in the following way:

- (i) Firstly, participants were asked to make 5-6 sentences starting with “I should”. The term should was used here for uncovering the “ideal” self of participants. “Should” was considered appropriate for this purpose as it is “used to indicate obligation, duty, or correctness” (Oxford University Press, 2019).
- (ii) Next, participants were asked to write against each “I should..” statement - “Why I should” and “From where have I got this should?” This step was to help participants explore three aspects – why they have these particular expectations from themselves, when were these expectations created and to distinguish between their own expectations from the self and others’ expectations from them. Rogers’ (1959) asserted that ideal self is developed while growing up by taking influences from other people and is the result of values absorbed from other people of how they think things should be (Ismail & Tekke, 2015).
- (iii) Participants were then asked to rephrase the “I should” statement to “If I really wanted to, I could...”. Next, they were asked if “they really wanted to”, then “Why they haven’t done this till now?”. This step was to help them become self-aware of what they “really want to do” and of the discrepancy between their “real” desires and “ideal” obligations.
- (iv) 2.3.3.3 Career-related anxiety: For this exercise, first a focus group discussion was conducted with the participants. Major points which were identified in the discussion were:
  - The roots of anxiety for career were in the common belief that “future is uncertain” and because career is also a futuristic goal, it took the form of “career is uncertain”. So, the anxiety primarily was associated with “uncertainty”.
  - It was noted how during the discussion, the notion of “success” was confused with academic achievements including getting first rank in class/school/college, securing admission in a top rank college/university or getting a job placement from college. Since, seats for all these positions are limited in number, the notion of “success” was also conceived as “limited” and “reserved for few”.
  - Another issue which came forth during the discussion was related to anxiety felt during undertaking certain tasks because of past failures.

To address these issues, the guided imagery technique was used. Guided imagery was defined by Bresler and Rossman as a, "range of techniques from simple visualization and direct imagery-based suggestion through metaphor and storytelling" (2003). Nightningale (1998) suggested guided imagery's use in helping clients connect with their internal cognitive, affective, and somatic resources. There is ample literature on effectiveness of guided imagery for use in sports training, rehabilitative medicine, healthcare and psychotherapy. Specifically, its efficacy in goal setting (Thelwell and Greenless, 2003) and for unresolved grief reactions (Melges and DeMaso, 1980), provides support for its use in the present study. For the same purpose, the following two exercises were adopted and modified according to the study's purpose from the book “*Recharge your Life @ NLP*”, authored by Indian origin Neuro-linguistic programming expert, Ram Verma.

#### *Guided Imagery for Creating Career Goals*

Following instructions were given to the participants:

1. “Close your eyes and imagine that you are in this new world which is infinite in every way. There are stalls like the ones in a fete, and each stall is a career which assures you of infinite happiness, money and ability to contribute and grow each day. You have to just pick and choose. Which stall will you choose? Imagine in detail the kind of work you're performing in that stall.”



Each participant was then asked to share her visualization with the group. Subsequently a second visualization was done.

2. "Now visualize a golden colour pathway in front of you."
3. "Start walking on this pathway and you will see a milestone with 'Welcome 2020' written on it and it also carries your signature there. Touch this milestone, feel it on your fingers."
4. "Keeping in mind the dream career which you have just chosen for yourself, imagine what all you are doing in 2020. See what all you are achieving, how you are feeling on achieving it. How people are appreciating your work? Listen to those words. Feel them in your ears. Imagine what you are wearing: clothes, earring, neck-piece, footwear, your hairstyle, kind of purse you are carrying. Think of every small detail. Feel its reality."
5. "Now move ahead on the pathway and you see another milestone with 'Welcome 2025' written on it. It also carries your signature there. Touch this milestone, feel it on your fingers. Imagine what all you are doing in 2025. See what all you are achieving, how you are feeling on achieving it. How people are appreciating your work. Listen to those words. Feel them in your ears. Imagine what you are wearing: clothes, earring, neck-piece, footwear, your hairstyle, kind of purse you are carrying. Kind of house you are living in, car which you are driving. Think of every small detail. Feel its reality."
6. "Now move ahead and see yourself when you are 100 years old. Now imagine what all you are doing. See how you are feeling. How people are appreciating you even now. Listen to those words. Feel them from your ears. Imagine what you are wearing. Forget about the general conventions people have of 100 years old ladies. You create your own. Imagine your stylish clothes, earrings, neck-piece, footwear, your hairstyle, kind of house you are living in. Think of every small detail. Feel its reality."
7. "Now come back to 2025. Re-play all that you had imagined before. "
8. "Come back to 2020. Again re-play all that you had imagined before."
9. "Now come back here to the present moment. Take your hands to your heart. Feel the warmth."
10. "Tell yourself, your body, to each cell and every neuron of your body – I am achieving all this. I have achieved it all. Now when I say '3', raise your hands and say WOW loudly."

On the subsequent day, the next exercise was administered.

#### 2.3.3.4 Guided Imagery for Dealing with a past painful memory:

1. "Close your eyes and remember a painful memory where you faced "failure" or "rejection"."
2. "Rate the pain felt from this memory on a scale of 1-10."
3. "Now imagine a television set in front of you and see this memory playing as a video over the television screen."
4. "Hold a pen in your hand, symbolizing it as a remote. Now, using this remote saturate the colours of the movie until it becomes black and white. Then, start reducing its sound until it reaches zero."
5. "Now pause the movie to the scene which hurts you the most. Check if there are any colours or sounds in this scene and make it all to zero again."
6. "Now, destroy the scene using a visualization of falling rain or a fire."

Similarly, all painful memories mentioned by the participants were subjected to this exercise one by one.

2.3.4 Post-intervention questionnaire: Ten open-ended questions were constructed for understanding the participants' experience and usefulness of the workshops. Questions were mainly constructed around the themes: effects and learning about the self- the take-aways; their view about the content and pace of the workshops; the level of satisfaction and fulfilment of expectations with the workshops.





Guided Imagery (Two sessions)	Creating Career Goal	Group discussion activity focussing on: Fears related to future is uncertain belief, success is limited belief. Guided Visualization: Close your eyes and imagine that you are in this new world which is infinite in every way. There are stalls like the ones in Diwali mela, and each stall is a career which assures you of infinite happiness, money and ability to contribute and grow each day. You have to just pick and choose. Which stall will you choose? Imagine in detail what kind of work will you be doing. Write about it on a sheet of paper. Visualisation exercise: Visualising self in the future - 2years, 5 years and 100 years later.
Guided Imagery (One session)	Dealing with past painful memory	Imagine a painful memory where you faced “failure” or “rejection”. Now imagine a television set in front of you and see this memory playing as a video over there. Take a pen in your hand and imagine it as a remote. Now using this remote saturate the colours of the movie until it becomes black and white. Then, start reducing its sound until it reaches zero. Now pause the movie to the scene which hurts you the most. Check if there are any colours or sound in this scene and make it all to zero again. Now, destroy the scene using visualisation of rain or fire. Similarly, other painful memories were also released.

3. FINDINGS

For the analysis of data obtained from the survey, descriptive analysis was used. Participants’ responses were coded as “Yes” (Presence) or “No” (complete absence) for their engagement into 15 categories of behaviours as per their responses to YRBS and SAS-SV. The percentages were calculated for each of the 15 behaviours. This method of analyzing data is in line with the study done by Cacodcar&Colaco (2015). Rash driving was the behaviour most prevalent in the sample (58.5% participants), which not only includes people actually doing the driving but also includes other forms of risk-taking, such as, not wearing a seat belt or riding in a vehicle driven by someone who had been drinking alcohol or using marijuana & driving. Smartphone addiction, was the next most common behaviour (46.2%). This prevalence was estimated by using the cut-off point suggested by Kwon & colleagues’ (2013): total score of 31 and 33 (out of 60) for males and females, respectively. Sadness (> 2 weeks) was also reported by 44.5% participants, and suicidal ideation by 17.4%. YRBS addresses questions about participants being victims of some form of violence and sexual misconduct which includes questions like, being threatened by someone, physical violence in a dating relationship, forced to do sexual things, intercourse in a dating relationship or outside it. Though, these areas might or might not involve risk-taking on the part of the respondent, but since they provide information crucial to an adolescent’s life, their prevalence rates were also calculated in the present study. Around 42% participants reported being victim of some form of violence or sexual misconduct. Other behaviours included being bullied (19.1%), attempted suicide (2.1%), smoking tobacco (10.2%), consuming alcohol (15.7%), marijuana use (4.2%), sedentary behaviours (16.9%) (Table 3). Table



3 also presents rates of various risk-behaviours reported in previous studies, which will be discussed further in the discussion.

Table 3: Rates of various risk-behaviours in percentages of present & previous studies

Risk-behaviours	Present study	Previous Studies
Rash driving	58.5%	44.3-3.9 % (Cacodcar&Colaco, 2015) 12.5-40 % (Nagalingam& others, 2016)
Violent behaviours	0.8%	66.8% (Kishore & others, 1999) 36.4% (Cacodcar&Colaco, 2015) 43.8% (Das & others, 2015)
Victim of violence	23.7%	-
Victim of sexual misconduct	18.2%	-
Bullied	19.1%	1.4-2.5% (Cacodcar&Colaco, 2015) 20.4% (Das & others, 2015)
Sadness > 2 weeks	44.5%	9.4% (Cacodcar&Colaco, 2015)
Suicidal ideation	17.4%	2.2-1.2% (Cacodcar&Colaco, 2015) 15.8% (Sharma & Grover, 2008) 8.7% (Nagalingam& others, 2016)
Attempted suicide	2.1%	0.1% (Cacodcar&Colaco, 2015) 5.1% (Sharma & Grover, 2008) 1.60% (Nagalingam& others, 2016)
Currently smoking tobacco	10.2%	25.1% (Kishore & others, 1999) 0.5% (Cacodcar&Colaco, 2015) 22-5.5% (Nagalingam& others, 2016)
Current e-cig user	6.4%	
Currently consuming alcohol	15.7%	32.2 (Kishore & others, 1999) 4.7 (Cacodcar&Colaco, 2015) 19.7(Pala & others, 2015) 22.6 (Nagalingam& others, 2016)



Currently using marijuana	4.2%	11.5 (Kishore & others, 1999) 2.7 (Pala & others, 2015) 4.7 (Nagalingam& others, 2016)
Sexually active	15.3%	12.5 (Kishore & others, 1999)
Sedentary	16.9%	27.6 (Nagalingam& others, 2016)
Smartphone addiction	46.2%	8-34 (Krishnamurthy &Chetlapalli, 2015).

Recurring themes were identified from the responses of the participants to the Post-intervention questionnaire administered (Table 3). These themes were divided into three categories: effectiveness of the activities, unfavourable effects and suggestions for future workshops. Themes in favour of effectiveness includes, enjoyable, usefulness in dealing with the issue concerned, self-awareness, and skill-building. One unfavourable effect reported was – increased anxiety. Suggestions for future workshops included – use of group-setting as support, need for individualized focus and inclusion of Positive Youth Development concepts.

Table 4: Identified themes from the post-intervention questionnaire along with representative responses

Themes	Body-image	Rebuilding self-esteem	Making mindful career choices	Releasing past painful memories
Enjoyable	<p>“Art therapy was fun”</p> <p>“My experience was good. I enjoyed the zone I was in while drawing and letter writing.”</p>	<p>“It was fun”</p> <p>“It was a good learning experience.”</p>	<p>“This was the very vivid and enjoyable experience.”</p> <p>“Liked the exercise, it was insightful.”</p>	<p>“I really enjoyed this activity”</p>



<b>Helpful in dealing with the issue</b>	<p>“The activity was quite different from the previous activities as it at the end helped me overcome my body issues by burning it.”</p> <p>“It was enlightening and it truly helped me deal with certain body image issues. I particularly loved the burning part!”</p>	<p>“I came to know the roots of my problems and I could work on them.”</p> <p>“Although I did the same thing in my REBT workshop but this was more in depth and I could figure out the roots of my ‘Shoulds’. I realised most of them were related to my studies or my family which I never thought of.”</p>	<p>“This activity helped me reinforce the idea that the dreams or the goals that I have set for myself can be achieved in due time.”</p>	<p>“This activity really did help me erase the memory and reduces its intensity.”</p> <p>“This activity was very useful as there are a lot of memories from the past that keep troubling us time and again and it’s important to let them go and leave them behind so as to move forward and this exercise can help us do so.”</p>
<b>Self-awareness</b>	<p>“Realising how much negativity I have stored in me.”</p> <p>“It gave me an opportunity to look for things within myself and identify them.”</p>	<p>“I found some things about myself which I hadn’t noticed.”</p> <p>“This exercise made me conscious of all the things that I was burdening myself with and all the things that are important to me but should not govern or control how I should be or behave.</p>	<p>It made me realise that I don’t like meditation much, and I can make anything work (at least in my head)</p>	<p>“I realised that I could work on the problem which I have rather than suppressing them”</p> <p>“This activity brought to my awareness that how I can erase all the memories which might trouble me and so was helpful.”</p>



<b>Skill-building &amp; future use</b>	“Activity brought to my conscious of the comments or statements which people might say sometimes without thinking or without realising that how much impact it can cause on somebody else or how somebody else takes it. This activity made me realise that how important it is to wisely choose your words and to be very empathetic in what you say and to not call out somebody for what they are doing and rather first try to understand them than just making a statement about them which might just make them feel worse about themselves.”	“I learnt that I have many ‘shoulds’ in my life arising from different aspects of my life and that I can work on changing these ‘shoulds’ to a choice for my betterment.”		“I found this activity particularly very helpful and would even continue practising it in the future.”  “I feel this activity will radially help me.”
<b>Negative effect-increased anxiety</b>	“Not that effective for me since giving a physical form to all the comments I got for my body was not a very good experience and added little more anxiety about my body than before”			“Made me anxious that I should know about the future but I don’t.”



<p><b>Suggestions</b></p>	<p><b>Important to explain the rationale</b> through group discussion of the steps undertaken during the activity.</p> <p><b>Classroom setting was not liked:</b> “I believe that the prime improvement could be the environment. Something more natural or facilitative since routine classroom setting hinder delving deeper into ideas and thoughts.”</p> <p><b>Need for individualized focus</b> “The content of the workshops was done very well but all I have to that if they would’ve been more individual rather than group it would’ve had a better result.”</p> <p><b>Inclusion of Positive Youth Development concepts:</b> “I feel the content of the workshop is really great but I would like if the workshop also works on the positive aspects of youth like PYD and work on motivation, resilience, hope, etc.”</p> <p><b>Better use of group-setting:</b> Facilitator could have used the group setting for changing negative comments about body to positive ones.</p>
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#### 4. DISCUSSION

This study represents a preliminary effort of using Expressive Arts Techniques for managing risk-behaviors in adolescents by enhancing their self-regulation. For understanding the nature of risk-behaviors and identifying related developmental issues, if any, YRBS and SAS-SV scales and a focussed group discussion were used.

Rates of rash driving, bullying, suicidal ideation, attempted suicide, currently smoking tobacco, alcohol and marijuana use, were found in varying frequencies. These were similar to some of the findings of previous Indian studies (Das & others, 2015; Kishore & others, 1999; Nagalingam& others, 2016; Pala & others, 2015; Sharma & Grover, 2008). Also noted were the rates of violent behaviors, sadness (> 2 weeks), suicidal ideation, attempted suicide and smartphone addiction. Studies by Kishore & others (1999) Das & others (2015) and Cacodcar&Colaco (2015) reported rates of violent behaviors ranging from 36.4-66.8%, while in the present study only 0.8% participants reported engagement in violent behaviours. Differences in the sample characteristics could be the major reason for this difference, as in these previous studies (Cacodcar&Colaco, 2015; Das & others, 2015; Kishore & others, 1999) rural population was also included. Furthermore, social desirability factor cannot be overlooked while interpreting the differences in prevalence rates. Variations was noted in rates of sadness (> 2 weeks). In the present study, 44.5% respondents reported sadness (> 2 weeks), which was only 9.4% in the previous study by Cacodcar&Colaco (2015). But, rates found in present study are synonymous with the recent CSDS-KAS Report on ‘Attitudes, anxieties and aspirations of India’s youth: changing patterns’ (2017) survey, which reported 31% having high to moderate emotional distress and over 55% were found to be highly anxious. Rates of victims of violence, sexual misconduct and e-cigarette use could not be found in the previous literature.

During adolescence, the brain’s emotional network attains maturity by 15 years of age, and is significantly more active than the cognitive network. There is a need for emotional regulation so that the risky behaviors could be prevented from occurring or minimized. Expressive Arts therapy, which provides a safe environment for emotional expression using various forms of arts, is reported to have positive effects on self-regulation of individuals. Renowned art therapist Malchiodi (2016) describes how expressive arts improves self-regulation by processes of attunement (recognizing feelings of others using in the “bottom-up” pathway), anchoring (facilitating attention to present moment using cues), entrainment (rhythmic synchronization, which redirects attention to positive, self-empowering emotional states) and grounding (facilitate emotional or physical regulation by reinforcing here and now).



“Increased self-awareness” was one of the common themes appearing in responses to the post-intervention questionnaire. Self-awareness is closely related to self-regulation (Wicklund & Duval, 1971; Deci, Eghrari, Patrick & Leone, 1994; Ghaffari & Ahadi, 2007) and also with enhancement in skills of coping, decision-making, problem-solving, relationship skills, anger management, along with providing support in lowering depression, anxiety and drug abuse behaviours for fostering better overall mental health (Karami & Zakeie, 2010, Mohammadiary, Sarabi, & Shirazi, 2012; Kordnohabi & Pashasharefi, 2005; Ghaffari & Ahadi, 2007; Zareae, Khakbaz, & Khakbaz, 2010; Janaabadi, 2009). Therefore, an enhanced self-awareness is a crucial aspect in interventions aimed for adolescents, because of the developing ability to introspect or meta-cognition (which involves examining and having insight into our thoughts and emotions) during adolescence (Weil, et al. 2013).

In the first exercise for body image issues, participants were asked to remember the comments they have received while growing up. Studies have pointed towards the possibility of ‘body dissatisfaction’ issues having roots in the childhood, with cultural bias been observed in children as young as 5-year olds (Cramer & Steinwert, 1998; Musher-Eizenman & others, 2003). Body-image issues are common in adolescents (Ricciardelli & McCabe, 2001; Smolak & Levine, 2001), and so is their relationship with eating disorders and depression (Leon, Fulkerson, Perry, & Early-Zald, 1995; McKnight Investigators, 2003; Stice, 2002; Stice & Bearman, 2001; Stice, Hayward, Cameron, Killen, & Taylor, 2000; Wichstrom, 1999). Body-dissatisfaction issues also imply that the child has evaluated his/her body against an ideal at a nascent age when cognitive capacities to understand the appropriateness of an ideal model might have been deficient. Inability to include influences of culture and media could be a limitation of this intervention exercise, as appearance related cultural and media influences seem to be intense for girls’ (Levine & Smolak, 1996, 2010; McCabe & Ricciardelli, 2003).

The second intervention was focused on the theme of “aiding self-congruence” using the creative writing technique. Rogers (1961) investigated how emotional issues can be reduced by reducing the discrepancy between the actual and the ideal self. Literature from numerous other authors have also described and recognized the presence of internal conflicts arising due to inconsistencies between the different domains of self, which further induces negative affect and feelings of unworthiness or humiliation (Higgins & others, 1985; Allport, 1955; Cooley, 1902/1964; James, 1890/1948; Mead, 1934). This particular intervention lacked the “affective” component, which could be included in future interventions on the same theme with questions like “how does it make you feel when you think about this ‘I should..’ statement” and then asking “how this feeling change when you replace the “should” with “could”.

For the subsequent interventions “releasing career-related anxiety” and “releasing past painful memories” were intended to reduce the discrepancy between a career-goal and perceived competence to achieve that goal. In this group, it was observed during prior interventions that anxiety is felt not just because of this discrepancy but also because of a lack of a clear career goal. Thus, guided imagery was used for first creating a career goal and in that we used the “goal setting” approach, which has been found in studies to be useful for even dealing with depression (Street, 2003; Street & others, 2004). Then on the next day, the guided imagery technique was used for locating if the ‘perceived incompetency’ is due to any past experiences of “failures”. Researches have shown how failures can detrimentally affect subsequent performance (Mikulincer, 1994; Seligman, 1975), though, some researches have also shown motivational effects of past failures (Abramson, Seligman & Teasdale, 1978). In any context, generally, attributions or explanations which individuals give to past experiences does become factors in their future choices, investment, and persistence (Austin & Vispoel, 1998).

A major limitation of this study is lack of quantitative pre-post intervention assessments and the small sample size, which limits the generalization of these findings. Furthermore, as per the responses of the participants’ to post-intervention questions, it is



important to explore different settings for providing intervention other than the usual classroom or therapy room setting. Participants' indicated that classroom setting is not conducive for expressing, which is the major tenet of Expressive Arts. Open areas, such as parks, were suggested as a viable option for facilitating flow of expression. However, this intervention study brings to light the difficulty of maintaining an individualistic orientation in group-based therapeutic interventions, even though one-size-fits-all is questionable when issues are so varied. Incorporating the practice of taking feedback and discussing intervention's effects from every participant after an intervention could prove beneficial and will be helpful in identifying participants with the need for subsequent individual sessions.

This study has definite implications in the development of programs for dealing with the relevant issues of adolescents' mental health and risk-behaviours. We plan to further extend these interventions to include concepts of forgiveness, compassion, and gratitude for oneself and other people with the purpose of positive youth development. Having been induced into greater self-awareness through the present intervention, participants of the current study are inclined towards becoming peer-facilitators. We hope to create more such peer-facilitators with our continued research and efforts in this area to benefit a significantly larger populace of adolescents.

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## **ALCOHOLIC EXTRACT OF OCIMUM SANCTUM (LEAVES) TREATED AS CONTRACEPTIVE IN MALE ALBINO RATS**

**Sanjay Madan**

Head

Zoology Department, Bhakt Darshan Govt. ( PG) College, Jaiharikhal, Lansdowne  
(Pauri) Uttrakhand

### **ABSTRACT**

The administration of 50% ethanolic extract of *Ocimum sanctum* (leaves) at 50 mg/kg dose for 30 & 60 days. Various cell types in the Seminiferous Tubules were normal but Spermatogonia & Spermatocytes displayed a few changes in their Organization.

### **INTRODUCTION**

Medicinal herbs have been discovered & used in traditional medicine practices since prehistoric times. The *Ocimum sanctum* Linn have been recommended for the treatment of asthma, malaria, diarrhoea, dysentery, skin disease, chronic fever etc.

The *Ocimum sanctum* Linn has also been suggested to possess anticancer, antidiabetic, antifertility, antimicrobial, cardioprotective etc for the cure of human health.

In the present studies 50% ethanolic extract of *Ocimum sanctum* leaves at 50 mg/kg doses showed degenerative changes at higher doses and the effects were more pronounced after 60 days treatment. Spermatozoa & other cells were degenerated. Seminiferous tubules were deformed & shrunken.

*Ocimum sanctum* leaves have been reported by various scientists KEirtikar, deLaszlo, Chopra, R. N, Nadkaran, A.K. to Possess Abortifacient & Antifertility activity<sup>1-4</sup>.

The Genital Organ weights were reduced significantly at higher dose for longer period but body weight did not reduce significantly, Kashinathan et. al. (1972)<sup>5</sup> & Genital Organs weight reduction was also reported by Seth et. al. (1981)<sup>6</sup>. Khanna et. al. (1984)<sup>7</sup> also reported the similar results by long term feeding of *Ocimum sanctum* leaves to male albino rats, following the administration of *Ocimum sanctum* leaves extract at 200 mg/kg dose to male Albino Rats which was a similar study as the present study.

### **MATERIAL & METHODS**

Male Swiss Albino Rats were maintained under laboratory conditions providing them with standard diet and water ad libitum fresh leaves of *Ocimum sanctum* Linn were collected Shade dried, Powdered & Extracted using 50% Alcohol.

For Extraction we used Soxhlet apparatus. The extract was evaporated and dried under low temperature. The dried powder measured into doses of 50 mg/kg & this dose was macerated with 0.5% Gum Acacia Powder in distilled water. The volume was adjusted in such a way that 1 ml. of solution corresponded to 50 mg of the dose/kg body weight



fed orally to rats / day. The soft catheter tube fitted into syringe was used for feeding, thus three groups of treated Rats (viz gr I, gr II and gr III) group I treated Vehicle only, is Controlled group were made. (as shown in Table 1) group II, doses administered to Rats for 30 days and group III, doses administered to Rats for 60 days. (as shown in Table 2), Five Rats were used in each group.

The initial & final body weight of the Experimental and Control group Rats were recorded. The Rats from all groups of treated & Control were sacrificed after 24 hrs of last dose under light Chloroform Anesthesia and dissected quickly. Testes & Epididymis were taken out freed from adherent tissue and blood. The weight of both organs was recorded separately. The significance, difference of weight between the treated and control rats was assessed by student, unpaired 't' test taking  $P < 0.05$  as load of significance.

The Testes & Epididymis was fixed in Bowin's fluid, washed, dehydrated and embedded in Paraffin wax. The Tissues were sectioned at 6 micron and stained with Haemotoxylene, Eocin for Histological studies.

## RESULT & DISCUSSION

All Albino Rats control and treated groups showed slightly increase in body weight but Testes, Epididymis, Caput and Cauda showed decrease in weight of the treated Swiss albino rats to control ones.

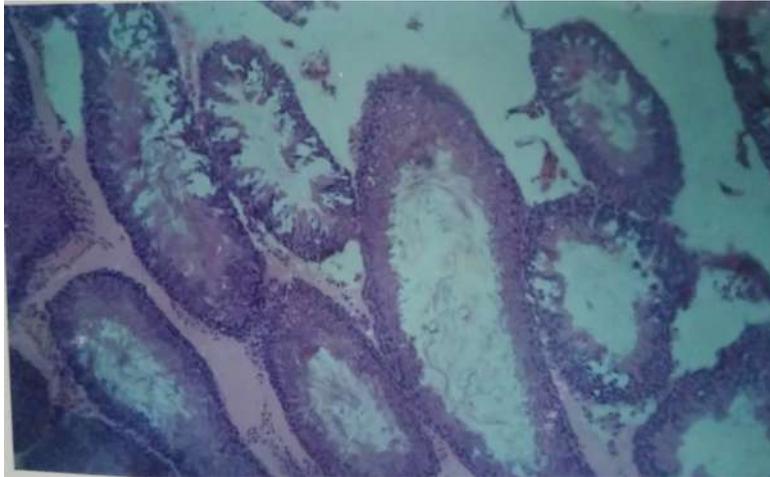
Effect of alcoholic extract of *Ocimum sanctum* leaves on body weight (gm) and genital organ weight (mg) of male albino rats administered for 30 & 60 days at 50 mg/kg doses (values are mean+ SE for animals in each group).

In the present studies 50%ethanolic extract of *Ocimum sanctum* leaves 50 mg/kg doses showed degenerative changes at higher doses. The spermatozoa & other cells were degenerated Seminiferous Tubules were deshaped& shrunken. At places, sloughing of cellular material into lumen was evident. Leydig's cell aplasiya were also seen. Epididymal epithelium of Cauda and Caput regions was hypertrophied. Only degenerated spermatozoa were present in ductule of Epididymis.

Similar observations were made by Malini & Vinithakumari,<sup>8</sup>(1991) after administration of beta - sito - sterol in male Albino Rats. Sperm concentration was reduced at high dose. There was also reduction in the weights of Testes and accessory Reproductive Organs. In support of the results obtained by *Ocimum sanctum* (leaves) administration.

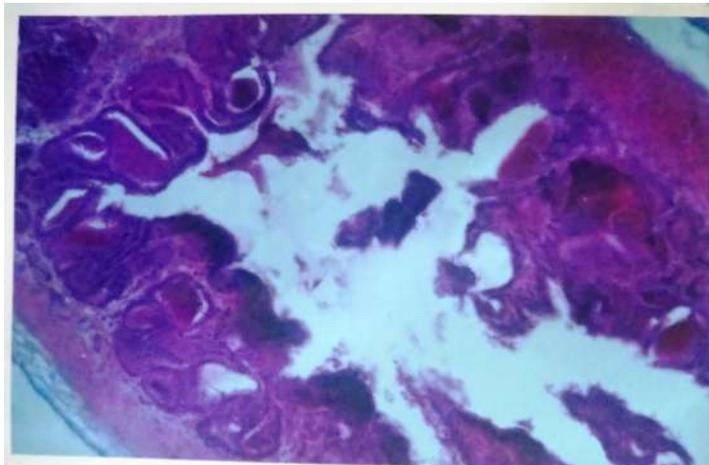
## PHOTOMICROGRAPHS WITH EXPLANATION

**Fig 1** :- T. S. of Testis of Albino rat of treated group with *Ocimum sanctum* leaves alcoholic extract at 50 mg/kg dose for 30 & 60 days evoked damage to the germinal epithelium and degeneration of Spermatogonia, Spermatocytes, spermatds and spermatozoa, shrinkage of Seminiferous tubules and atrophied Leydig's cells also noted with less vascular items. X250.



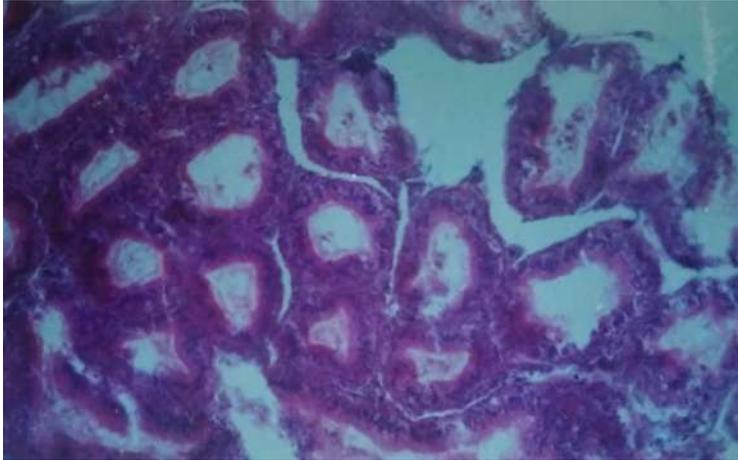
**Fig 1**

**Fig 2** :- T. S. of Seminal vesicle of albino rat of treated group with *Ocimum sanctum* leaves alcoholic extract at 50 mg/kg dose for 30 & 60 days showed reduced mucosal crypts and changed epithelial cells, lumen without secretions and muscle layers also reduced. X400.



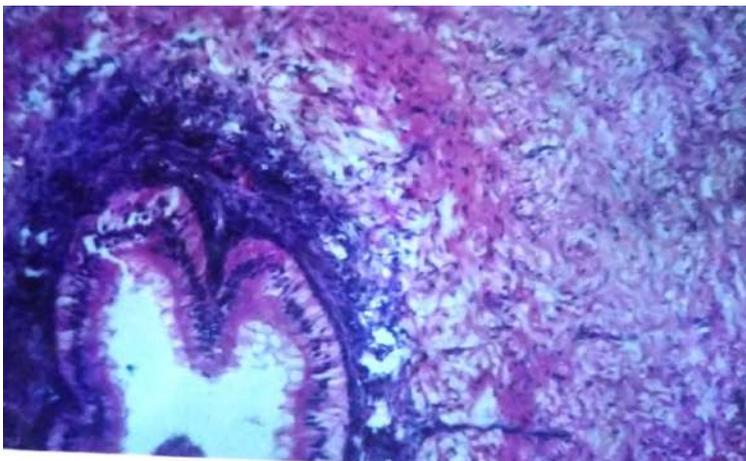
**Fig 2**

**Fig 3** :- T. S. of Epididymis of albino rat of treated group with *Ocimum sanctum* leaves alcoholic extract at 50 mg/kg dose for 30 & 60 days caused reduction of tubules with intertubular fibrosis, no Spermatozoa in the lumen and Stereocilia fused together, lumen filled with cellular debris. X250.



**Fig 3**

**Fig 4** :- T. S. of Vas deference of albino rat of treated group with *Ocimum sanctum* leaves alcoholic extract at 50 mg/kg dose for 30 & 60 days showed alteration in histology including nuclear pyknosis in luminal epithelium, muscle layer disturbed, Stereocilia clumped and lumen with cellular debris without spermatozoa. X250.



**Fig 4**



TABLE 1

Name of Treatment	Dose mg/kg	Body weight in gms		Organ weight in mg.		
		Initial weight	Final weight	Testis	Epididymis	Seminal Vesicles
Group 1 <sup>st</sup> Control (30 & 60 Days)	Vehicle Only	126.00 ±4.30	171.00±6.59	2248.80 ±3,73	935.40 ±5.74	971.90±8.99

TABLE 2

Group 2 <sup>nd</sup> Alcoholic Extract (30 Days)	50 mg / kg	129.00 ±5.83	136.00 ±4.30	1732.00±2.53*	892.00±5.61 *	872.40±2.50*
Group 3 <sup>rd</sup> Alcoholic Extract (60 days)	50 mg / kg	132.00±5.30	161.00±4.84	1823.00±3.34*	827.26±5.17*	669.00±4.30*

\*P<0.05

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## THE ADOPTION OF POLYETHYLENE TEREPHTHALATE IN ASPHALT MIXES: A SYSTEMATIC LITERATURE REVIEW

Sandeep Chauhan<sup>1</sup> and Magandeeep<sup>2</sup>  
Research Scholar<sup>1</sup>, Assistant Professor<sup>2</sup>

Department of Civil Engineering, OITM, Hisar, Haryana, India

### Abstract:-

Recently plastics became more popular in packaging over conventional packaging because of its virtue of its preeminence. The increase of plastic use in packaging material increases serious environmental issues by post-consumer plastic wastes. Therefore, it is a compulsory need for implementation of environmentally friendly techniques like economic reutilizing, incorporation of biodegradable plastics, plastics waste in pavement construction, etc. The use of PET and conversation of plastic wastes into value-added products and fuel are also economical technologies to be considered. This review paper summarizes the current picture of plastic waste management with various technologies, which may lead to an alternate solution to plastic waste problems.

**Keywords:** Biodegradable plastics, Packaging materials, Polyethylene Terephthalate, Pavement, Construction.

### Introduction:-

Increasing urbanization and industrialization have contributed to increased plastic generation. Safe disposal of waste plastic is a serious environmental problem. They pose a threat to the environment essentially due to the lack of an efficient collection and disposal system, as they are non-biodegradable. Plastics are most commonly used in the form of carrying bags, packaging material, containers, etc. Due to the accumulation of plastic wastes, as they are non-biodegradable, some of them are non-recyclable pose a serious threat to the environment. The best way of disposal of waste plastic is its recycling to the maximum extent and many developed countries have recycled waste plastics to manufacture various products. Studies have revealed that waste plastics have great potential for use in bituminous construction as its addition in small doses, about 5-10%, by weight of bitumen helps in substantially improving the Marshall stability, strength, fatigue life and other desirable properties of bituminous mix, leading to improved longevity and pavement performance. The use of waste plastic thus contributes to the construction of green roads.

**Table 1:** Introduction of Innovative Recycled Materials and Application.

Recycled waste material	Recycled materials in Civil Engineering				
	Asphalt Binder	Pavement Sealant	Asphalt Concrete Mix Agent	Hot Mix Asphalt	Base Course
Slag			1		1
Glass			1		
Plastic				1	
Carpet			1	1	
Crumb rubber		1	1	1	1
Asphalt Pavement			1	1	1
Swine Manure	1	1			
Flounder Sand			1	1	1

**Plastic waste:-**Among plastics, Polyethene forms the largest portion followed by Polyethylene Terephthalate (PET). It is obtained in massive quantities from bottles most commonly used for the packaging of beverages and drinking water. India approximately produces 40 million tons of solid waste of which 12.3% is plastic which is discarded mainly in form of water bottles. Depending on their physical properties, they may be classified as thermoplastic and thermosetting materials.

Thermoplastic materials can be formed into desired shapes under heat and pressure and become solids on cooling. On subjected to the same conditions of heat and pressure, they can be remolded. Thermosetting materials which once shaped cannot be softened/remolded by the application of heat. The examples of some typical Thermoplastic and Thermosetting materials are tabulated in Table 2. Thermosetting materials are not used in pavement construction. India has among the lowest per capita consumption of plastics and consequently the plastic waste generation. India has among the lowest per capita consumption of plastics and consequently the plastic waste generation. Table 3 indicates the various sources of waste plastic generation.



**Figure 1:** Plastic waste for the road design



Table 2: Typical Thermoplastics and Thermosetting Resins

S. No.	Thermoplastics	Thermosetting
1	Polyethylene Terephthalate (PET)	Bakelite
2	Polypropylene (PP)	Epoxy
3	Poly Vinyl Acetate (PVA)	Melamine
4	Poly Vinyl Chloride (PVC)	Polyester
5	Polystyrene (PS)	Polyurethane
6	Low-Density Polyethylene(LDPE)	Urea-Formaldehyde

Table 3: Sources of Waste Plastic

Waste Plastic	Origin
Low-Density Polyethylene (LDPE)	Carry bags, sacks, milk pouches, bin lining, cosmetic, and detergent bottles.
High-Density Polyethylene (HDPE)	Carry bags, bottle caps, household articles, etc.
Polyethylene Terephthalate (PET)	Drinking water bottles etc.
Polypropylene (PP)	Bottle caps and closures, wrappers of detergent, biscuit, wafer packets, microwave trays for a readymade meal, etc.,
Polystyrene (PS)	Yogurt pots, clear egg packs, bottle caps. Foamed Polystyrene: food trays, egg boxes, disposable cups, protective packaging etc.
Polyvinyl Chloride (PVC)	Mineral water bottles, credit cards, toys, pipes and gutters; electrical fittings, furniture, folders, and pens, medical disposables etc.

**Research on waste plastics use in road construction:-**Vasudevan et al., (2010) utilized polythene/polypropylene Bags for integrated development of Rural and Arterial road network for socio-economic Growth. He studied both dry and wet mixing process by adding polymer concerning the weight of bitumen used. The author reported that polymer bitumen blend is a better binder compared to plain bitumen resulting in higher Marshall Stability and decreasing the possibilities of pot-holes formation.

Verma et al., (2008) studied that plastic increases the melting point of the bitumen and makes the road flexible during winters resulting in its long life. According to the author, while a normal “highway quality” road lasts four to five years, plastic-bitumen roads can last up to 10 years and it would be a boon for India’s hot and extremely humid climate, where temperatures frequently cross 50°C and torrential rains create havoc, leaving most of the roads with big potholes.

Sabina et al.,(2009) evaluated the performance of waste plastic/polymer modified bituminous mix and observed that the results of marshal stability and retained stability of polythene modified bituminous concrete mix increases 1.21 and 1.18 times higher than that of a conventional mix by using 8% and 15% (by weight of bitumen) polythene concerning 60/70 penetration grade of bitumen. But modified mix with 15% polyethylene showed slightly decreased values for Marshall Stability than that of the mix with an 8% modifier in their results.



Bindu and Beena et al.,(2010) studied how Waste plastic acts as a stabilizing additive in Stone Mastic asphalt when the mixtures were subjected to performance tests including Marshall Stability, tensile strength, compressive strength tests, and tri-axial tests. Their results indicated that flexible pavement with high performance and durability can be obtained with 10% shredded plastic.

Habib et al. (2010) studied rheological properties of bitumen modified by thermoplastic namely linear low-density polyethylene (LLDPE), high-density polyethylene (HDPE) and polypropylene (PP) and its interaction with 80 penetration grades of bitumen through a penetration test, ring & ball softening point and viscosity test. It was observed that thermoplastic copolymer shows a profound effect on penetration rather than softening point. According to author Visco-elastic behavior of polymer modified bitumen depends on the concentration of polymer, mixing temperature, mixing technique, solvating power of base bitumen, and molecular structure of polymer used and PP offer better blend in comparison to HDPE and LDPE.

Punith and Veeraragavan, (2003) studied the Behavior of Asphalt Concrete Mixtures with reclaimed polyethylene as additive. The dynamic creep test (unconfined), indirect tensile test, resilient modulus test, and Hamburg wheel track tests were carried out in their investigation on the blend of PE (2.5, 5.0, 7.5, and 10% by weight of asphalt) with (80/100) paving grade asphalt and observed that the rutting potential and temperature susceptibility can be reduced by the inclusion of PE in the asphalt mixture.

Sui and Chen, (2011) studied the application and performance of polyethylene as modifying additive in asphalt mixture. They added polyethylene as an additive to hot mineral aggregate for a few minutes and then added the asphalt mixing which simplifies the construction process and reduces the cost of construction. They concluded that there is an improvement in high-temperature stability, low temperature cracking resistance, and water resistance on modification and evaluate polyethylene as an additive in the technical, economic, and environmental aspects.

Gawande et al. (2012) gave an overview of waste plastic utilization in the asphalt road by using both wet and dry methods. They said that use of modified bitumen with the addition of processed waste plastic of about 5-10% by weight of bitumen helps in improving the longevity and pavement performance with marginal saving in bitumen usage and according to the use of waste plastics in the manufacture of roads and laminated roofing also help to consume a large number of waste plastics. Thus, these processes are socially highly relevant, giving better infrastructure.

Khan and Gundaliya, (2012) stated that the process of modification of bitumen with waste polythene enhances resistance to cracking, pothole formation, and rutting by increasing softening point, hardness and reducing stripping due to water, thereby improving the general performance of roads over a long period. According to the waste polyethylene utilized in the mix forms a coating over aggregates of the mixture which reduces, porosity, and absorption of moisture and improves the binding property.

**Research on pet waste use in road construction:** - Niloofar et al. (2010) carried out various studies samples with and without PET waste .results suggested that PET mixes resulted in higher resistance ton rutting and permanent deformation, decrease the consistency. PET modified binders have a higher resistance to permanent deformation, rutting due to the higher softening point compared with conventional binders.



**Figure 2:** Polymer modified mortar

Ahmadinia et al. (2012) carried out experimental research on the application of waste plastic bottles (Polyethylene Terephthalate (PET)) as an additive in stone mastic asphalt (SMA). Wheel tracking, moisture susceptibility, resilient modulus and drain down tests were carried out in their study on the mixtures that included various percentages of waste PET as 0%, 2%, 4%, 6%, 8%, and 10% by weight of bitumen content. Their results show that the addition of waste PET into the mixture has a significant positive effect on the properties of SMA which could improve the mixture's resistance against permanent deformation (rutting), increase the stiffness of the mix, provide lower binder drain down and promotion of re-use and recycling of waste materials in a more environmentally and economical way.

Rahman and Wahab, (2011) used recycled polyethylene terephthalate (PET) as partial replacement of fine aggregate in modified asphalt in their investigation. In terms of economic value, it shows that this recycled PET could reduce the cost of road construction because this recycled material is cheaper than bitumen and easy to obtain, which also improves the level of performance and the service life of the road. It can be concluded from their study that the application of recycled PET modified asphalt gives more advantages compared to the conventional asphalt mixture especially in terms of permanent deformation.

**Conclusion:-**The use of waste plastic for road construction can save the environment, increase the service life of roads, reduce the consumption of petroleum products and serve the society with additional income for those associated with it. When compared with the control section, the stretches resurfaced using plastic-coated aggregates have shown improved functional performance in terms of better surface condition, delayed pothole and crack initiation and progression, desirable skid resistance, and surface texture.

In Dry process, the aggregate is modified by coating with polymers and producing a new modified raw material for flexible pavement. A patent has been obtained for this process. The coating of plastics over aggregate also improves the quality of the aggregate.

Dry Process helps us to use a higher percentage of plastics waste, Reduce the need for bitumen by around 10%., increase the strength and performance of the road, reduces the



cost, provide employment for rag pickers. In Wet Process, Waste plastic is ground and made into powder some % of plastic is mixed with the bitumen. Plastic increases the melting point of the bitumen and makes the road retain its flexibility during winters resulting in its long life. The use of shredded plastic waste acts as a strong “binding agent” for tar making the asphalt last long. By mixing plastic with bitumen the ability of the bitumen to withstand high-temperature increases. The plastic waste is melted and mixed with bitumen in a particular ratio.

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## DETECTION OF BRAIN TUMOR USING CONVOLUTIONAL NEURAL NETWORK IN MEDICAL IMAGING

<sup>1</sup>Shargunam S and <sup>2</sup>Dr.Gopika Rani N

<sup>1</sup>Department of Computer Science and Engineering, PSG College of Technology  
Coimbatore, Tamil Nadu, India

<sup>2</sup>Department of Computer Science and Engineering, PSG College of Technology  
Coimbatore, Tamil Nadu, India

**Abstract**—Medical image processing is the most challenging and emerging field. The processing of MRI images is one of the part of this field in which MRI is commonly used due to its superior image quality and the fact of relying on no ionizing radiation. Diagnosis of brain tumor is very difficult task for doctors to identify at early stage. MRI images are more prone to noise and other environmental interference. Therefore it becomes tough for doctors to spot the tumor and their causes. The goal is to identify the brain tumor from MRI images using Image processing techniques. Extraction and detection of tumor from MRI scan images of the brain has been done by using Google Colab platform. The proposed work includes Extraction to evaluating of tumor to be significant class that would be glioma, meningioma and pituitary. The brain tumor seriousness has been evaluated utilizing Convolutional Neural Network calculation which gives us precise outcomes by performing the hyperparameter tuning mechanisms. The performance is examined in term of accuracy, sensitivity and specificity.

**Keywords:** Brain Tumor, Convolutional Neural Network (CNN).

### Introduction

To create a transparent environment the medical staff and patients can work together to achieve better results. An abnormal cell growth within the brain or central spinal cord is referred to as a brain tumour. A number of tumours can be cancerous so they need to be diagnosed and treated in time. The cause of brain tumours is not clear, and no set of symptoms are known, so people can suffer without understanding the risk. Primary brain tumours can be either malignant (containing cancer cells) or benign (cancer cells are not present). The purpose of this work is to put some useful information in a simpler form before the users, especially for the medical staff of the patient. Magnetic Resonance Imaging (MRI) is mainly used and provides greater contrast images of the brain and cancerous tissues. Deep learning (DL) is a sub field of machine learning and recently showed a remarkable performance, especially in classification and segmentation problems.

Glioma is a type of tumor that occurs in the brain and spinal cord. Gliomas begin in the gluey supportive cells (glial cells) that surround nerve cells and help them function. Three types of glial cells can produce tumours. Gliomas are classified according to the type of glial cell involved in the tumor, as well as the tumours genetic features, which



can help predict how the tumor will behave over time and the treatments most likely to work. A meningioma is a tumor that forms on membranes that cover the brain and spinal cord just inside the skull. Specifically, the tumor forms on the three layers of membranes that are called meninges.

Pituitary tumours are abnormal growths that develop in your pituitary gland. Some pituitary tumours result in too many of the hormones that regulate important functions of your body. Some pituitary tumours can cause your pituitary gland to produce lower levels of hormones. Most pituitary tumours are noncancerous (benign) growths (adenomas). Adenomas remain in your pituitary gland or surrounding tissues and don't spread to other parts of your body. This paper focuses on the DL model based on a Convolutional Neural Network to classify different brain tumor types into meningioma, glioma, and pituitary tumor.

### **Related Work**

Mohsen et.al [5] discussed about the deep learning concept in which brain tumor classification has been implemented using brain MRI images and performance has been measured. The proposed methodology uses a set of features extracted from the segmented brain MRI images by the discrete wavelet transformation (DWT) technique for the classification of brain by using DNN classifier. The performance evaluation has been estimated as far as normal classification rate, normal accuracy rate, normal F-measure and normal zone under the ROC bend everything being equal and contrasted and execution of different classifiers.

Shelke [6] talked about the self-loader division strategy utilizing neural system has been executed to portion mind tumours by expanding the right rate and limiting the blunder rate. This shows the vigor of brain tumor division and gives a superior result for cerebrum tumor classification from cerebrum MRI than KNN classifier. The strategy is portioned for fix extraction, and GLCM is utilized in MATLAB to expel usefulness. The determined parameters of Test MRI pictures are featured as right rate, blunder rate, affectability and specificity.

Shree et.al [7] concentrated on noise reduction techniques where discrete wavelet change was utilized to distinguish cerebrum tumours to diminish complexity nature and lift efficacy. This was trailed by morphological filtering, taking out the noise that can be created following division. In mind MRI pictures the neural system classifier was utilized to prepare and check the exactness of the yield in tumor position location. The assessed presentation factors likewise show that it results better by improving parameters for PSNR and MSE.

Reddy et.al [8] talked about the two-advance mind tumor recognition strategy utilizing k-means grouping calculation followed by level division and K-means clustering. The bunched picture, skull expulsion was performed utilizing morphological activities for simple identification of tumor cells. Execution grids, for example, true positive (TP), true negative (TN), false positives (FP), false negatives (FN), exactness and review are likewise tried to compute the nature of our presentation.



Abdalla et.al [9] depicts the first phase of pre-processing and post-handling of MRI pictures to refine them and render them increasingly fitting for examination, at that point utilizing the MRI picture division edge utilizing the mean dark level technique applied. In the second stage the measurable component examination was utilized to extricate picture highlights; highlights got from the highlights conditions of Haralick dependent on the dark level spatial reliance grid (SGLD) of the picture. At that point, the right and best highlights were picked to identify the area of the tumor. The ANN has been created in the third stage; the feed forward neural proliferation coordinate with regulated learning was executed as a computerized strategy for ordering the pictures under scrutiny into tumor or none tumor.

Virupakshappa et.al [11] talked about viable tumor division model was examined utilizing Fuzzy-C-Mean (FCM) bunching, various element extraction utilizing Gabor Wavelets, and artificial neural system classification. Model is built using MATLAB. For textures the statistical and Gabor characteristics of the segmented tumor area are obtained. Such characteristics are transferred to the classification section of ANN to identify the tumor stage. In the respective disease stage ANN will classify the input image based on similarities between the eligible characteristics. For each image in the database the classification parameters including Precision, Recall, and Accuracy are calculated.

Shubhangi et.al [10] talked about the cerebrum tumor look into where picture preparing gadget has been utilized for tumor discovery. Cerebrum tumor identification is accomplished utilizing MLP (Multilayer Perceptron). MLP looked into those MRIs information and classified them into Benign or Malignant tumor gatherings. The contribution of these MRIs was verified by MLP and classified into tumor classes Benign or Malignant. Here MLP was planned with various covered up and yield layers having distinctive exchange capacities and learning rules alongside various rates of preparing and test information.

### **Proposed System**

The detailed study made in the literature survey has been used to analyse the existing methods and then determine the detection of brain tumor using a classification technique which is shown in the Figure 1.

### **Preprocessing**

Prior to taking care of the images into the proposed structure, a pre-processing step is performed. The principal procedure is to scale back the original image from  $512 * 512 * 1$  pixels into  $128 * 128 * 1$  pixels so as to diminish dimensionality, calculations and help the system to show a superior performance in lower time and progressively clear counts. At that point, data is shuffled before parting them to maintain the framework to prepare on unsorted information and forestall concentrating on a limited band of the whole dataset. Data is partitioned into three areas; training, validation, and test sets all with their individual target labels.

### Data augmentation

At long last, expanding the pictures of tumor assists with recognizing them as new ones, and that is typically used to abstain from overfitting and increment model heartiness. In addition to this geometric expansion, a grayscale distortion (salt noise) is added to the images. The progressions incorporate flipping around the x-axis, right/left reflecting, including salt noise and image turn by 45 degrees for the dataset. By doing this expansion procedure, the images in the dataset has been expanded from the original image by a factor of 5, so the last dataset has progressively number of images.

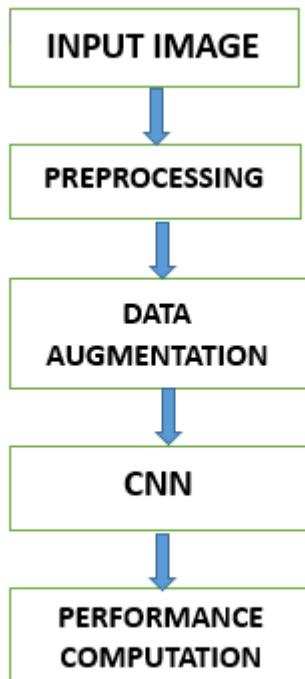


Fig. 1. Flowchart of the system

### Convolution Neural Network

CNN is a feed forward neural system and has been broadly utilized for image recognition. This is comprised of neuron with learnable weights and biases. Every neuron receives several inputs, takes a weighed sum over them, pass it through activation function and responds with the output. CNN works over volumes like neural systems where the input is a vector yet if there should be an occurrence of CNN the information is a multi-channelled image. CNN has overcome image segmentation challenges via naturally learning a chain of command of progressively complex features directly from data. The CNN essentially has been utilized in convolving the image with



the kernels for the process of obtaining the feature maps. The weights in the kernel help in interfacing every unit of the feature map to the past layers. These weights of the kernels are used during preparing of the datasets for improving the characteristics of the information.

- Initialization is the most critical advance for achieving convergence. This procedure helps in keeping up the gradients at the necessary levels else there will be an opportunity explosion of the gradients that are back propagated.
- The activation function is responsible for the information change in a nonlinear way. There are different sorts of activation function of which the modified Rectifier linear units (ReLU) has been used.
- In the feature maps, the way toward pooling combines the feature that is close by spatially. This arrangement of redundant features helps in making the representation invariant on account of small changes and furthermore progressively minimized. The calculation load for the progressive stages is likewise decreased.
- The overfitting is diminished with the assistance of regularization. In each progression of preparing, it will eliminate the nodes of the network. In this way, all the nodes in the Fully Connected layer are compelled to learn better representations and also prevent the co-adaptation of nodes.

The proposed CNN structure incorporates seven layers beginning from the input layer which hold the augmented images from the previous pre-processing step going through the convolution layers and their activation functions. To prevent overfitting, a dropout layer has been utilized and followed by, a fully connected layer and a Softmax layer to predict the output and finally a classification layer that produces the predicted class. The depiction of each layer is as per the following;

To begin with, the input layer has been utilized to affirm the size of input images and applying a data normalization. A 2D convolutional layer applies sliding  $K$  convolutional channels (kernels) of size  $(M * N)$  over the input images by moving the channels along the input and process the dot product of the weights (kernels weights) and the input. The channels slide over the image with vertical and horizontal steps called stride ( $S$ ). Padding ( $P$ ) of the original images may occur before sliding the channels so as to keep up data at the edges. These kernels are utilized as features identifiers; to such an extent that kernel in the early layers distinguish just low-level features like (edges, lines and masses), while advanced ones are utilized to identify an ever increasing number of complex features. Each convolutional layer is followed by a non-saturated activation function called ReLU that is primarily used to diminish the training time drastically contrasting with other activation functions. As for maximum Pooling layer, it is a method for down sampling used to accomplish spatial invariance by parting the entire image into small rectangles that are moving over the image with a determined and then consider only the maximum value of the four elements. The pooling layer is utilized to decrease quantities of parameters and subsequently calculations in the system. One of the most widely recognized strategies to lessen overfitting is to utilize a dropout layer. In this layer, some activations (nodes) are dropped out randomly which essentially helps



additionally in accelerating the preparation stage. At long last, Fully Connected layer (FC) has been utilized, softmax layer and classification layer. The previous one has been utilized to interface each neuron in a layer to each neuron in another the yield of this layer is three classes.

### **Hyperparameter Optimization**

To increase the accuracy, Hyperparameter Optimization has been implemented in the proposed system. Hyperparameters are important because they influence the training algorithm's actions directly, having significant impact on the model's output under training. Given the effect on the trained model, choosing suitable hyperparameters plays a key role in the performance of neural network architectures. Choosing good hyperparameters provides two major advantages:

- Efficient search across the space of possible hyperparameters; and
  - Easier management of a large set of experiments for hyperparameter tuning.
- 1) Learning rate: The rate of learning determines how quickly a network updates its parameters. Small levels of learning slow the learning process but converge smoothly. Larger learning rates accelerate the learning process but may not converge.
  - 2) Batch size: Mini batch size is the number of sub-samples the network receives in which parameter update occurs. A strong default could be 32 for batch size. It can be 32, 64, 128, 256 etc.
  - 3) Number of Epochs: Number of epochs is the amount of times the entire training data is transmitted to the network during training. Increasing the number of epochs before the validation accuracy starts to decrease even as training accuracy (overfitting) increases. To choose the right number of epochs for the training step, the metric we should pay attention to is the Validation Error.
  - 4) Number of hidden units: The number of hidden units is the principal measure of the learning ability of the model. Neural networks are a universal approximator of functions, and for networks to learn to approximate a function (or a predictive task) they need to have enough 'capacity' to learn the function.
  - 5) First hidden layer: Another heuristic that concerns the first hidden layer is that, according to empirical evidence, setting the number of hidden units greater than the number of inputs appears to allow for better results in the number of tasks.
  - 6) Number of layers: It is often the case that 3-layer Neural Net will outperform a 2-layer one. Convolutional Neural Networks, where the deeper they are, the better they perform.

### **Hyperparameter Tuning**

In the proposed system hyperparameters are tuned for improving the accuracy. The hyperparameter that has been taken for tuning are Batch size and Optimizers using grid search mechanism. Grid search is an approach to hyperparameter tuning that will methodically build and evaluate a model for each combination of algorithm parameters specified in a grid. Grid search is essentially an optimization algorithm which lets you



select the best parameters for your optimization problem from a list of parameter options that you provide, hence automating the 'trial-and-error' method.

1. **Stochastic Gradient Descent:** It is one of the simplest optimization algorithms. It uses just one static learning rate for all parameters during the entire training phase. The static learning rate does not imply an equal update after every minibatch. As the optimizers approach an (sub) optimal value, their gradients start to decrease.
2. **RMSProp:** It is Root Mean Square Propagation which tries to resolve Adagrad's radically diminishing learning rates by using a moving average of the squared gradient. It utilizes the magnitude of the recent gradient descents to normalize the gradient. The learning rate gets adjusted automatically and it chooses a different learning rate for each parameter and divides the learning rate by the average of the exponential decay of squared gradients.
3. **Adam:** It is Adaptive Moment Estimation that calculates the individual adaptive learning rate for each parameter from estimates of first and second moments of the gradients. It is computationally efficient and has very little memory requirement.

## **IMPLEMENTATION**

### **Dataset Description**

The dataset was collected from The Cancer Imaging Database (TCIA), a public access collection that contains T1-weighted contrast-enhanced images from 233 patients with three types of brain tumours that are meningioma, glioma, and pituitary tumour. It consists of the original picture of the respective disease and its corresponding mask area called the region of interest with three types of brain tumours which are meningioma, glioma, and pituitary tumor.

### **Convolutional Neural Network**

#### **a) Building the model**

Two "Conv2D" or 2-dimensional convolutional layers, has been created with activation functions which is ReLU. The first layer uses 32 nodes with kernel size of 3 x 3, while the second uses 64 with 'kernel' or filter size is 5 x 5 a 2x2 window in the pooling layer. First layer takes an input shape of image, 256, 256, 1 with the 1 signifying that the images are greyscale. In between the Conv2D layers and the dense layer, there is a 'Flatten' layer. Flatten serves as a connection between the convolution and dense layers. A "flatten" layer that turns the inputs into a vector. 'Dense' is the layer type which is used for output layer. Dense is a standard layer type that is used in many cases for neural networks.

#### **b) Compiling the model**

Compiling the model takes three parameters: optimizer, loss and metrics. The learning rate determines how fast the optimal weights for the model are calculated. A smaller learning rate may lead to more accurate weights. The 'accuracy' metric has been

used to get an accuracy score when the model runs on the validation set. For Loss function 'categorical\_crossentropy' loss function has been used for classification.

c) Training the model

To train, we will use the 'fit ()' function on our model with the following parameters: training data, target data, validation data, and the number of epochs.

d) Hyperparameter tuning

In the proposed system, Hyperparameters are tuned for improving the accuracy. The Hyperparameter that has been taken for tuning are Batch size and the Optimizers. The optimizers like Stochastic gradient descent, RMSProp and Adam are compared with batch size of 16 and 32.

### Results and Discussion

Using Google Colab, the experimental result of brain tumor detection using Convolutional neural network has been carried out. The calculation has been executed for classification accuracy which prompts information based information picture. The test input image is checked for tumor acknowledgment, for example non-tumor and tumor image, from the chosen database. It analyses the result by comparing the accuracy of three Optimizers with Batch size for Hyperparameter tuning. The three optimizers were tested on brain tumor dataset obtained from TCIA. The accuracy for brain tumor identification using RMSProp optimizer is approximately 71.80%, and 79.40% of the Adam optimizer is shown in Figure 3 and Table I. The calculated parameters of test MRI brain image are highlighted as Accuracy.

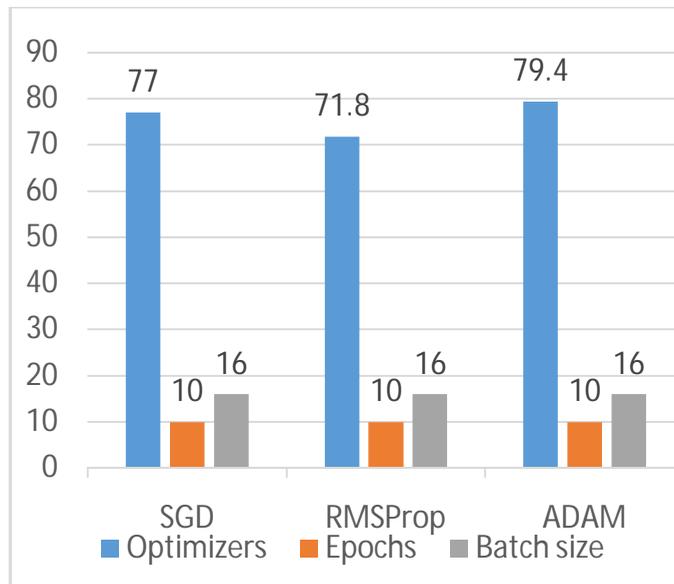


Fig. 2. Accuracy for brain tumour classification



## Conclusion

Using MRI image, the identification of brain tumor was implemented by using Convolutional Neural Network to a significant class that would be glioma, meningioma and pituitary, giving us precise results by performing the tuning mechanisms of the hyperparameter. The hyperparameter such as optimizers and batch size was taken and compared to give the right one to improve the accuracy. From the observations it is inferred that in order to improve the performance, the best hyper parameter for the dataset was found by tuning method.

TABLE I. TUNING ACCURACY

HYPER PARAMETER		ACCURACY
Optimizer	Batch Size	
RMSProp	16	71.80%
SGD	16	77.0%
Adam	16	79.40%

## Future work

To increase the accuracy , Convolutional neural network can be utilized for characterizing the particular sort of cerebrum tumor distinguishing proof with assistance of consolidating increasingly productive division calculations and highlight extraction strategies in a conveyed situation without a doubt and clinical-based cases.

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## SIMULTANEOUS ESTIMATION OF CLOPIDOGREL BESYLATE, ATORVASTATIN, AND ACETYLSALICYLIC ACID FROM THE DISSOLUTION DATA OF MINI TABLETS FILLED CAPSULES USING A REVERSE PHASE HIGH-PERFORMANCE LIQUID CHROMATOGRAPHY

S.B. Thirumalesh Naik<sup>1</sup>, Munuswamy Purushothaman<sup>2</sup>,  
Kothapalli Banooth Chandra Sekhar<sup>3</sup>

<sup>1</sup>Department of Pharmaceutics, Research Scholar, JNTUA, Ananthapuramu,  
Andhra Pradesh, India

<sup>2</sup>Professor & Principal, Scientist Institute of Pharmacy, Hyderabad, Telangana, India

<sup>3</sup>Vice Chancellor and Professor in Chemistry, Krishna University Machilipatnam, AP, India

### Abstract

The work aimed for simultaneous estimation of Clopidogrel besylate (CB), Atorvastatin (ATN), and Acetylsalicylic Acid (ASA) from the dissolution data of mini-tablets filled capsules using a reverse-phase high-performance liquid chromatography (RP-HPLC). The method was developed and the parting was achieved by the C18 column of 250x4.6 mm and 5 $\mu$  size. Acetonitrile: Water (pH 3.0) 0.1% Orthophosphoric acid (60:40, v/v) was used as an eluent, at a flow rate of 1 ml/min and the detection was carried out at 230 nm. Mini tablets (MTs) of CB, ATN, and ASA were set by direct compression. Later the MTs of ASA were given enteric coating. The filled capsules (containing each of these MTs) were tested for dissolution in acidic media (for 2h) and alkaline media (for 60 min). The dissolution data revealed that CB and ATN release in both acidic and alkaline media, whereas, ASA resist to dissolve in acidic media, and good release in alkaline media. The developed method was found to be accurate and precise for the simultaneous estimation of CB, ATN, and ASA from the prepared MTs filled capsules.

**Keywords:** Clopidogrelbesylate, Atorvastatin, and Acetylsalicylic Acid, uncoated, enteric coated, estimations,

### 1. Introduction

Clopidogrel besylate (CB) is chemically benzenesulfonic acid; methyl (2S)-2-(2-chlorophenyl)-2-(6,7-dihydro-4H-thieno[3,2-c]pyridin-5-yl)acetate, is an oral antiplatelet drug, prescribed for the acute coronary syndrome, recent myocardial infarction, and recently for preventing recurrent stroke in post bypass surgery patients. CB is a prodrug, which gets in to active in the liver. 85-90% of absorbed CB is hydrolyzed by carboxylase to an inactive metabolite, and remaining metabolized by cytochrome P450 (CYP 450) in the liver<sup>1,2</sup>.

Atorvastatin (ATN) is (3R,5R)-7-[2-(4-fluorophenyl)-3-phenyl-4-(phenylcarbamoyl)-5-(propan-2-yl)-1H-pyrrol-1-yl]-3,5-dihydroxyheptanoic acid, prescribed for the protection of major heart events than normal<sup>3,4</sup>. ATN acts by inhibiting HMG-CoA. ATN metabolized by CYP 3A4.



Acetylsalicylic acid (ASA) is chemically 2-(acetyloxy)benzoic acid, prescribed for patients with unstable angina. ASA is hydrolyzed to salicylic acid in the body. Additionally, ASA has antiplatelet activity at a lower dose<sup>5,6</sup>.

Mini tablets (MTs) are small tablets with uniform shapes, sizes, and weights. These can be easily filled in capsules for achieving the desired effects<sup>7</sup>.

Few attempts were made in the simultaneous determination of CB, ATN, and ASA in a mixture<sup>8,9</sup>. But, no attempts were made in estimating them from the prepared MTs filled capsules. The study has been made to develop a simple, accurate, rapid, and reproducible reverse phase HPLC method for simultaneous determination of CB, ATN, and ASA in MTs filled in capsules and validating it.

## 2. Materials and Methods

Pharmaceutical grade of CB and ATN were procured from USV Pvt. Ltd, Mumbai, whereas Acetylsalicylic acid from Waksman Selman pharmaceutical Pvt Ltd Anantapur. MTs of CB and ATN (uncoated) and ASA (enteric-coated) were prepared and filled in capsules, they contain 10 mg of ATN, 75 mg CB, and ASA were used in this work. All chemicals and reagents were of HPLC grade and were procured from Merck Chemicals, India.

### Formulation details

The MTs were prepared by direct compression<sup>10</sup> (Table 1).

**Table 1. Composition of various mini tablets**

Ingredient (mg)	Formulations		
	CBMT	ATMT	ASMT
Clopidogrel besylate	75	-	-
Atorvastatin	-	10	-
Acetylsalicylic Acid	-	-	75
MCC	72	37	72
Lactose	10	10	10
<i>Plantago ovate</i> seed mucilage	40	40	40
Magnesium stearate	2	2	2
Talc	1	1	1
Weight of the tablet	200	100	200

The above MTs of ASA were sub coated with ethyl cellulose (2%w/v) in Isopropyl alcohol

Dichloromethane. Later the MTs were enteric-coated with HPMC phthalate-55.

### *In-vitro* Dissolution Studies

The dissolution conditions for MTs filled capsules was as explained<sup>11</sup> (Table 2)



**Table 2. Dissolution conditions for Mini tablets**

Description	CB	ATN	ASA
Apparatus	Dissolution Apparatus USP Type II (Paddle)		
Medium	0.1 M HCl	0.1 M HCl	0.1N HCl for 2h, and then Phosphate buffer (pH 6.8) for next 45 min
Medium Volume (ml)	900	900	900
Speed (rpm)	50	100	100
Sampling intervals	5, 10, 20, 30, 45, and 60 min	5, 10, 20, 30, 45, and 60 min	30 min. 1 and 2h (in 0.1m HCl); 5, 10, 20, 30, 45, and 60 min (6.8 buffer)
Temperature	37 ± 0.5	37 ± 0.5°C	37 ± 0.5°C

**Chromatographic system and conditions**

The chromatographic conditions for the determination of CB, ATN, and ASA were illustrated in table 3.

**Table 3. Chromatographic conditions for estimating drugs**

Instrument	HPLC Shimadzu
Chemstation/ Software	LC Solutions
Column	Phenomenex Luna C18 (250x4.6 mm; 5µ)
Mobile phase	Acetonitrile : Water (pH 3.0) 0.1% Orthophosphoric acid (60:40, v/v)
Wavelength (nm)	230
Flow rate (ml/min)	1.0
Run time (min)	10.0
Temperature	Ambient

**Preparation of standard solution**

Standard stock solutions of Aspirin (ASA), Atorvastatin (ATN), and Clopidogrel (CB) (1 mg/ml) were transferred to 100 ml volumetric flasks, dissolved and diluted to the mark with the mobile phase. Dilute the above solution with the mobile phase during the analysis time. Calibration curves obtained within the range of 15 – 90 µg/ml for ASA, CB, and 2 – 12 µg/ml for ATN. The standard solution prepared for the optimization procedure constituted 60 µg/mL of ASA, CB, and ATN for 8 µg/ml, respectively<sup>12, 13, 14</sup>.

**Sample preparation**

Powder of 20 capsules, each containing 75 mg Aspirin (ASA), 75 mg Clopidogrel (CB) and 10 mg Atorvastatin (ATN), were weighed and analyzed: quantity of powder equivalent to 1 mg/ml was transferred into 10 ml volumetric flask and the contents are dissolved with the mobile phase. The mixture was subjected to sonication for 15 min and the volume made to require with the mobile phase. From the sample stock solution various aliquot of the solution were transferred to a 10 ml volumetric flask, and diluted to the mark with mobile phase to obtain a working sample solution of ASA (60 µg/ml), CB (60 µg/ml) and ATN (8 µg/ml)<sup>15, 16</sup>.



### 3. Results and Discussion

#### Release of drug

The standard calibration curve of CB and ASA were obtained with a solution concentration range of 15 – 90µg/ml, whereas ASA was obtained with 2–12µg/ml. The Correlation coefficient was 0.9993, 0.9990, and 0.9997 for CB, ATN, and ASA respectively (Table 4). The slope values were 36.454, 123.18, and 29.483 for CB (fig.1), ATN (fig.2), and ASA (fig.3). All were found to be linear.

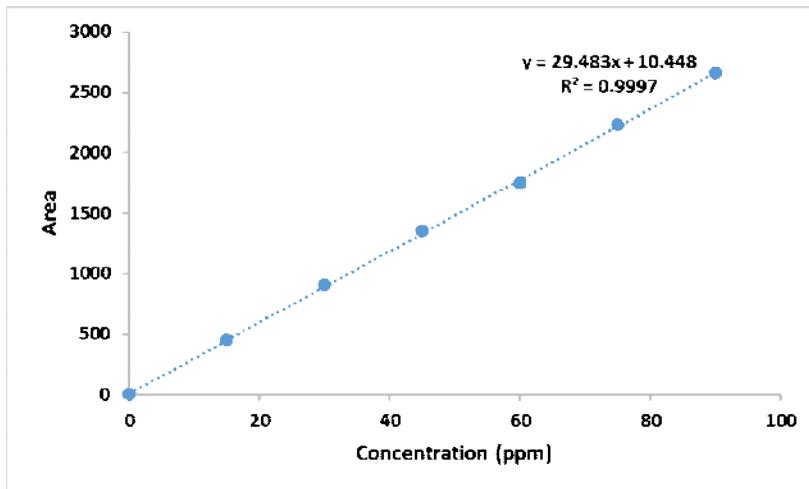


Fig. 1. Calibration curve od CB

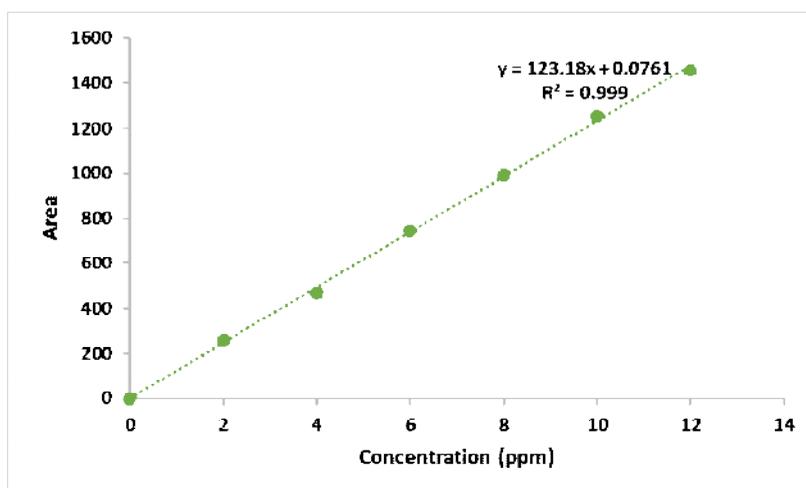


Fig.2. Calibration curve od ATN

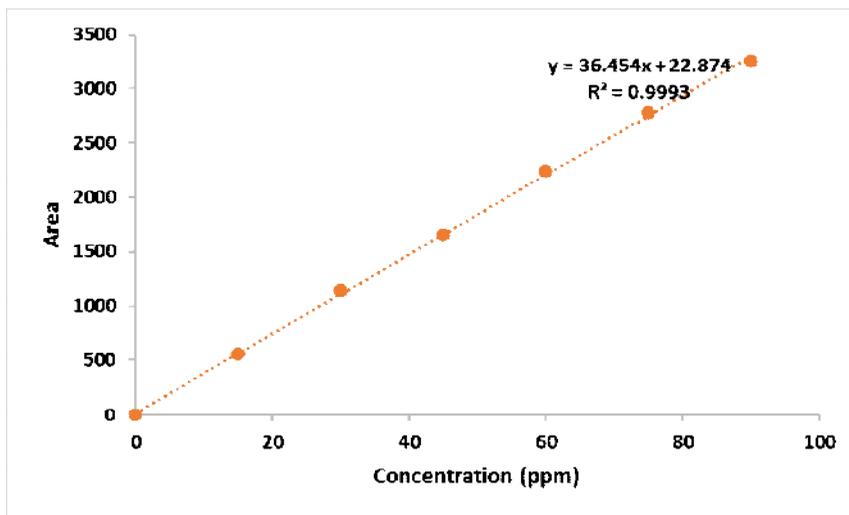


Fig.3. Calibration curve of ASA

Table 4. The regression and statistical data

Parameters	Aspirin	Atorvastatin	Clopidogrel
Linearity ( $\mu\text{g/ml}$ )	15 – 90	2 – 12	15 – 90
Regression equation	$36.454x + 22.874$	$123.18x + 0.0761$	$29.483x + 10.448$
Correlation coefficient	0.9993	0.9990	0.9997
Slope	36.454	123.18	29.483
Intercept	22.874	0.0761	10.448
Limit of Detection ( $\mu\text{g/ml}$ )	1.55	0.38	1.86
Limit of Quantification ( $\mu\text{g/ml}$ )	4.71	1.16	5.66

When the dissolution medium was estimated for dissolved drugs at the first hour (fig. 4) showed no evidence of ASA release (as it is enteric coated). The retention time and peak area of peaks were observed to be 4.38 min and 68184 for ATN; and 7.45 min and 71581 for CB (Table 5).

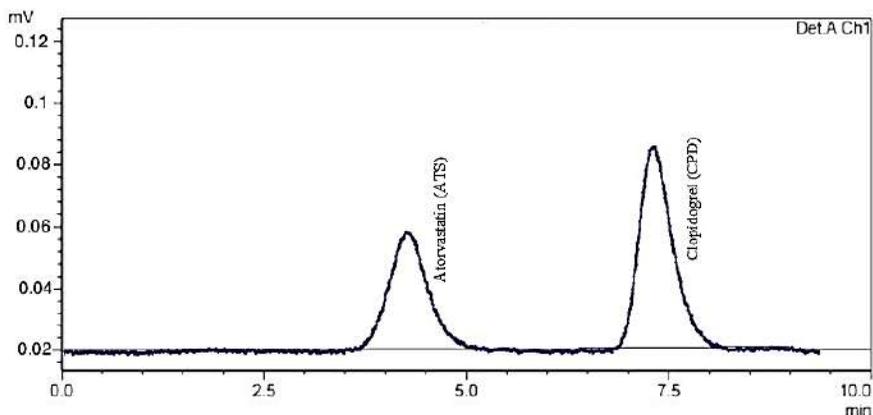


Fig.4. Chromatogram of dissolution media at the first hour

Table 5. System suitability parameters at first hour

S.No	Name	Retention (min)	Time	Peak Area (n = 3)	Asymmetric factor
1	Aspirin	0.00		0	0
2	Atorvastatin	4.38		68184	1.55
3	Clopidogrel	7.45		71581	1.58

When the dissolution medium was estimated for dissolved drugs at the second hour (figure 5) showed no evidence of ASA release (as the enteric coat is intact). The retention time and peak area of peaks were observed to be 4.41 min and 60051 for ATN; and 7.47 min and 72497 for CB (Table 6).

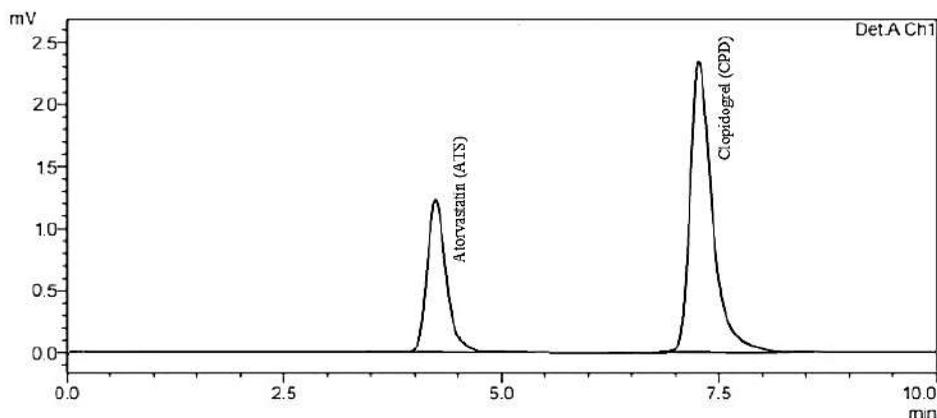
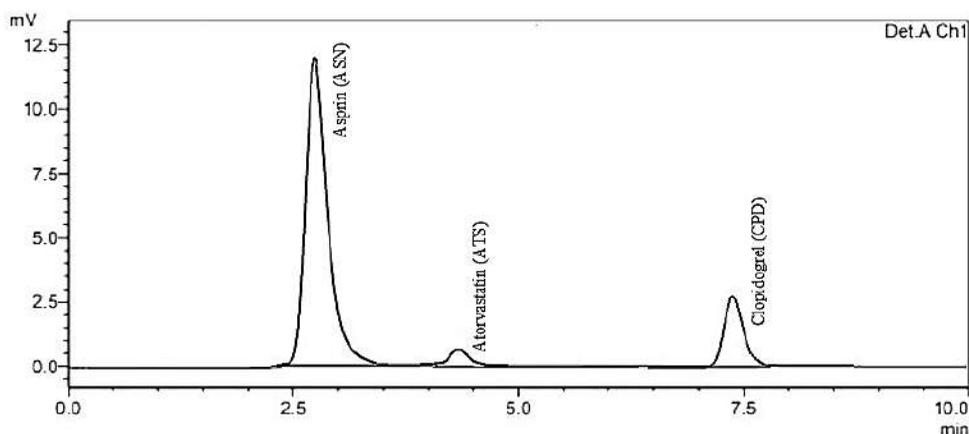


Fig.5. Chromatogram of dissolution media at the second hour

**Table6. System suitability parameters at second hour**

S.No	Name	Retention Time (min)	Peak Area (n = 3)	Asymmetric factor
1	Aspirin	0.00	0	0
2	Atorvastatin	4.41	60051	1.52
3	Clopidogrel	7.47	72467	1.53

When the dissolution medium was estimated for dissolved drugs at the third hour (figure 6) showed a characteristic peak of ASA (as the enteric coat dissolved in alkaline medium). The retention time and peak area of peaks were observed to be 2.74 min and 863501 for ASA; 4.37 min and 32057 for ATN; and 7.42 min and 50985 for CB (Table 7).



**Fig.6. Chromatogram of dissolution media at the third hour**

**Table 7. System suitability parameters at third hour**

S.No	Name	Retention Time (min)	Peak Area (n = 3)	Asymmetric factor
1	Aspirin	2.74	863501	1.45
2	Atorvastatin	4.37	32057	1.55
3	Clopidogrel	7.42	50985	1.58

#### 4. Conclusion

The study summarized that Clopidogrel besylate (CB), Atorvastatin (ATN), and Acetylsalicylic Acid (ASA) can be determined from the dissolution data of mini-tablets



filled capsules using reverse-phase high-performance liquid chromatography (RP-HPLC).

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## Design Consideration and Calculations of Portable Sugarcane Planter

S.S. Tambade<sup>1</sup>, Ashitosh Jadhav<sup>2</sup>, Aishwarya Mishra<sup>3</sup>, Suraj Kahate<sup>4</sup>, Tejshri Gavhane<sup>5</sup>

<sup>1</sup> Assistant Professor, Mechanical Department, Bharati Vidyapeeth's College of Engineering Lavale, Pune, Maharashtra

<sup>2,3,4,5</sup> Student, Mechanical Department, Bharati Vidyapeeth's College of Engineering Lavale, Pune, Maharashtra

**Abstract** – Today's agriculture world is influenced by the invention of modern machineries. Generally, sugarcane planting machines are run by using tractors or heavy machineries. But, these machineries require high initial cost as well as high running cost which is unaffordable for the small scale farmers. Also, these machineries run on conventional fuels like petrol, diesel, etc. which creates pollution. In last few decades, environmental impact of petroleum based machines is increased. Due to large size of these machineries, it is difficult to use them for small scale farms. Manual planting is also difficult for all farmers in India due to shortage of labour. Day by day, labour wages are increasing and at the same time, demands of agricultural products are also increasing. This project aims to design and fabricate small scale sugarcane planter which is small in size and do not use conventional fuels like petrol, diesel, etc., to reduce the farmer's effort for planting without affecting the production rate of sugarcane and eliminate the pollution impact.

developed world.

Early lightweight vehicle design concepts were attempting to reduce vehicle weight by substituting some of the cast iron

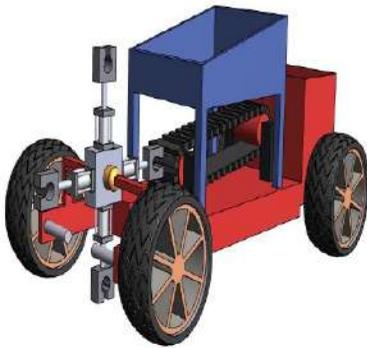
**Key Words:** Modern machineries, Petroleum fuels, Pollution, Sugarcane Planter

### 1. INTRODUCTION

In India, agriculture is facing serious challenges due to less availability of agriculture vehicle. Current planting machines require more labour and petroleum fuel which increase running cost of the machine. In this era of pollution and depletion of natural resources, electricity is the future as a main fuel in machines. So, as a matter of fact, the research on which we as a team are working is to design and fabricate small size battery operated sugarcane planter, which is run on lithium-ion rechargeable battery.

In response to the awareness of global warming and environmental changes in the past decades, many countries have already shifted towards more sustainable and environmental friendly solutions; such as adopting cleaner energy sources and zero-emission vehicles (ZEV elsewhere). Such environmental initiatives are spread across many sectors with the transportation and the manufacturing sectors being the major sectors of concern as they are the main contributors to the large amount of green-house gas (GHG) emissions and energy consumptions in the

and steels used in vehicles with lighter material like magnesium or aluminum. Recently, high strength steel and plastic composite materials emerge as lighter weight alternatives with more acceptance due to the reducing trend in their prices and the new developments in their manufacturing. The paper is designed based on the principle of farmer's view and the system is automatic type. By using automation, the productivity of the farming can be increased.



**Fig:- CAD MODEL**

## **2. PROBLEM STATEMENT**

In India, there are a lot of problems regarding cost and efficiency of agricultural instruments as well as the machines which are currently used produce lots of environmental pollution. To overcome these problems, we require equally efficient battery operated sugarcane planters.

## **3. OBJECTIVE**

1. To minimize the weight of the existing machine
2. To eliminate environmental pollution
3. To reduce cost of labour and minimize human intervention
4. To develop an automated machine
5. To decrease the time consumption rate of planting
6. To provide a better option to the farmers which is economical and easy to operate



#### 4. LITERATURE REVIEW

- 1 Indian Institute of Sugarcane Research (IISR), Lucknow has developed various types of sugarcane planters like Sugarcane cutter planter which weighs about 347 kg and is a tractor mounted arrangement which can be drawn by 26 kW tractor and is a three row planter and need 5 persons to operate this machine. It operates for the average length of setts being 34.5 cm. The total cost of planting is 708Rs/Hectare with a speed of 2.3 km/hr.
- 2 Sompot Khomkaew, Pracha Bunyawanihakul, Isara Chaorakam (2014-15) carried out an experiment on sugarcane planter in a field of 20 x 100 m<sup>2</sup> area. It was discovered that the fuel consumption rate of the sugarcane planter was at 125 m/l at a tractor speed of 3.2616 km/hr with a revolution of 3200 rpm.
- 3 S. M. Nalawade, A. K. Mehta, Nikhil Sane, Nikhil Joshi (2019) developed a faster sugarcane planter for covering maximum area under drastic condition. It uses BLDC electric motor of 400W. This machine is capable of singulation of setts as well as laying them in furrows.
- 4 Umesh S. Patkar, Rajesh W. Lanjewar, DMS Group, CMERI, Durgapur, India has studied various sugarcane planters. One of which is a tractor operated two row ridger type sugarcane cutter planter which is hydraulically controlled and the power is derived through tractor PTO for sett cutting and fertilizer metering.
- 5 Mr. Rohit J. Masute, Dr. Sharad S. Chaudhari, Prof. S. Khedkar, developed a machine which aims to benefit small scale farmers for sugarcane harvesting by reducing farmer's effort and to increase production of agricultural products. It is a petrol engine driven, manually operated machine and can cut canes at a fast rate.
- 6 Abrar Ahmed Choudhary, D. Mohan Kumar, K. Prithviraj, Reuban David, have designed a four wheel electric vehicle. It runs fully on electricity having a capacity to carry 5 passengers + 1 driver i.e. load carrying capacity is approximately 360 to 370 kg.
- 7 Srinivasa Kannan J. and Sudarshan V. developed a self-charging electric vehicle which generates the electric power required to drive the vehicle during the running condition by means of two auxiliary power sources. It is better than the existing electric vehicle in such a way that it is a self-charging vehicle which uses a current regulator to charge the battery simultaneously.
- 8 Chaithanya B. V, Siva Subba Rao Patange, Sowmia Devi M, Panbarasu K. and Joyti B. prepared this paper which aims in demonstrating the importance of material selection in engineering design in all aspects. This testing i.e. tensile testing of aluminium is performed to ensure that the material will remain stable throughout the life of the product. Tensile testing is one of the simplest and most widely used mechanical test.
- 9 Ranjan Kumar, Munna Kumar, Pradyumn Sah, Mustaim Alam Prof. Dr.M. Asok Raj Kumar, prepared this review paper taking into account the hazardous emissions from vehicles causing environmental pollution this vehicle is designed so as to reduce the use of more fuel consuming vehicles and to attract the people towards its alternatives i.e. Electric Bicycles. This project aims to design a battery operated cycle which would run on an alternative source also reduces human efforts. It contains a strong motor and enough battery power that just needs charging to help in hill climbing and provide completely free electric transportation.
- 10 Wakchaure Prashant, Aher Shriram, Raut Vikas, Datir Swapnil, Bhakare Onkar, Parasur Atish designed a potato seed planter including one or more planting units and an endless conveyor. There are number of cups attached to the conveyor each cup collects a potato seed as the conveyor moves upward between the upper and lower sprocket the model calculates the time interval between two successive potatoes touching the ground the machine is implemented for single row and the machine can only support for a single operation.
- 11 Anil A. Sequeira, Saif Mohammed, Avinash A. Kumar, Muhammed Sameer, Yousef A. Kareem, Krishnamurthy H. Sachidananda designed a battery operated fork lift which is an improved version of lifting and carrying the load which is to be transferred from one place to another this kind of advanced technology is most commonly used in heavy engineering components. This design forklift uses a rechargeable battery and it works continuously for 8-10 hours once it is fully charged and the machine is capable of lifting a load of 100kg. This forklift is economical, reliable and environmental friendly.

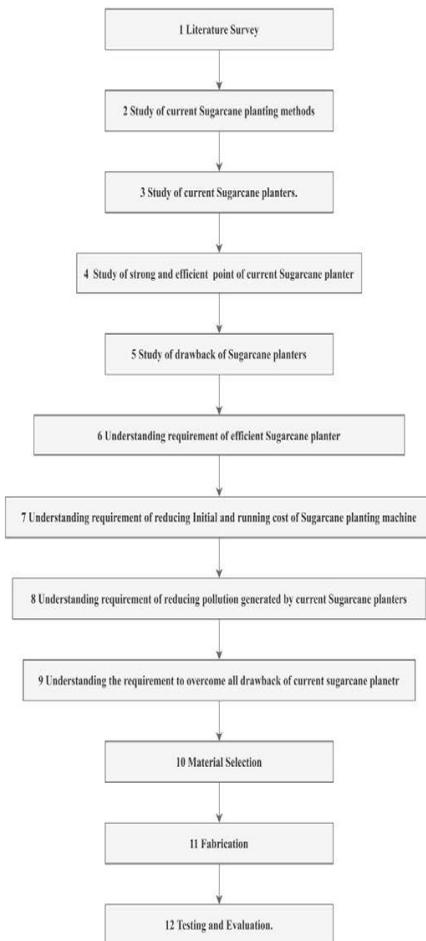
### 5. METHODOLOGY

The design and fabrication work of sugarcane planter was done with the study of current available sugarcane planter and collection of data regarding the need for efficient sugarcane planter which operates with less human interference, is more efficient with low initial and final cost.

The flow chart depicts the actual action plan carried out in order to design and fabricate the sugarcane planter.

After which, literature survey and data collection session was conducted to decide a possible improvement and solution on the drawbacks present in current sugarcane planters.

### 6.



### MATERIAL

The design of Sugarcane planter is based on important factors affecting the planting process of previous planter. The mechanism is designed for planting sugarcane with less human interference without affecting its performance.

The previous planters are having heavy planting setup due to use of tractors. To overcome this problem, we need a lightweight planting setup.

Early lightweight vehicle design concepts were attempting to reduce vehicle weight by substituting some of the cast iron and steels used in vehicles with lighter material like magnesium or aluminium. Recently, high strength steel and plastic composite materials emerge as lighter weight alternatives with more acceptance due to the reducing trend in their prices and the new developments in their manufacturing.

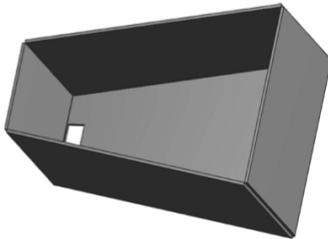
The physical properties of sugarcane set viz. length, diameter, weight and bulk-density are important for determining size and shape of machine components. Static coefficient of friction as well as dynamic coefficient of friction between sets and the material of construction of mechanism are important for choosing material, shape and slopes of stationary surfaces and also for calculating the driving forces for operation of mechanism.

We are using a material which can withstand a drastic situation such that in wet soil as well as hot climate. By considering all the suitable factors for design of sugarcane planter, we select the material with light weight with minimum cost which can sustain in all environmental conditions.

## 7. COMPONENTS

### 7.1 Hopper

Hopper is a storage tank-like structure which is used to store setts during planting operation. The hopper is inclined at 30° to achieve uniform flow of sugarcane setts under gravity. The slope was decided on the basis of maximum angle at which sett starts sliding.



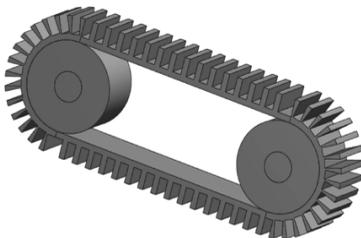
The final dimensions of hopper are 610 X 915 X 458 mm. The slot of 100 X 60 mm is provided on the base to create a proper path for the setts to drop on the conveyor.

The hopper is made up of polycarbonate sheet having thickness of 6 mm and 8 mm sheet for base of hopper having properties like high strength, high thermal stability, high impact resistance, corrosion resistance, etc.

The hopper was supported by frame of 610 X 915 mm. Height of front side of frame is 408 mm and that of rear side is 458 mm. Mild steel is used for frame which is having high strength for sustaining the load and high corrosion resistance.

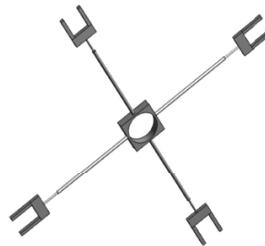
### 7.2 Conveyor

The material handling system to transfer the setts from the base of the hopper to the gripper mechanism is in the form of a conveyor belt. It is a rectangular shaped belt inclined at 21°, having a length of 609.6 mm and 100 mm wide. The thickness of the belt being 10 mm.



It is made of rubber. Baffle plate of 5 mm thickness made of steel are mounted along the length of the conveyor so that the sugarcane setts will easily fit within the spaces in order to prevent mixing of the setts and to maintain the proper flow of setts through the conveyor to the gripper mechanism. The inclination of the conveyor has been maintained to its minimum angle to prevent the setts from falling off the conveyor. Two pulleys are used, one being a drive pulley and other is the take up pulley to run the conveyor. One motor is used to run the drive pulley, shaft is used to transfer the power from motor to drive pulley. The conveyor having properties like plasticity, length 1280 mm and 10 mm gap between baffle plates. We are using brushless DC motors for rotary motion as speed control is needed. The various materials used to make conveyor belt are thermoplastics, metal, rubber, fabric and leather. Plastics include polyester, PVC, silicone, polyethylene. The metals are stainless steel and carbon steel and the fabric material include canvas and cotton.

### 7.3 Gripper Mechanism



The gripper or end effector is used for grabbing the object with its mechanically operated fingers. The easier way to describe a gripper is to compare it with that of a human hand. A gripper performs the same function as done by a human hand. It enables holding, tightening, handling and releasing of an object. It is an important component of any automated system. Grippers are available in many styles and sizes depending on the selected application. The various gripper materials are aluminium, steel, stainless steel and thermoplastic.

In this machine, in order to achieve a linear motion, the gripper is mounted with an attachment to the pneumatic cylinder, the material being thermoplastic. Here, four grippers are attached in a manner such that they are perpendicular to each other, each of them are of same dimensions which are mounted on a shaft through bearing to achieve rotational motion to the attachment. A 10 bar mini DC air compressor is used to provide pressure to pneumatic cylinder in order to ensure pick and place action of gripper.

### 7.4 Electric Vehicle

Energy and environmental issues are major problems in today's world. It is believed that adoption of electric vehicles may reduce the impact of four concerns. Gasoline engines are creating high pollution levels and to reduce these levels in the cities, idea of replacement of conventional vehicles with electric vehicles is employed. The main objective is to use environmental friendly vehicle while remaining competitive in terms of performance, reliability, running cost and customers' expectations.

In this project, the idea is to develop the mechanization of small scale sugarcane planter. The machine components are mounted on a strong chassis. The chassis is made of mild steel angle bar of dimensions 50 X 50 X 3 mm, the dimensions of chassis frame is 1220 X 915 mm, 16 inch wheels are attached to the chassis. A lithium Ion battery of 12V 20Amp is mounted on the chassis to provide power to the driver motor. This battery also provides the power to run the compressor which provides pressure to the actuator. Motor specifications are decided on the power required to drive the vehicle. Four pneumatic arms are mounted on a shaft which is attached to the front side of the vehicle. Hopper is mounted on the vehicle with the help of support frame and conveyor is provided to supply sugarcane to the actuator.

### Controls

1. DC motors:-  
DC motor is commonly used as they can be powered from present direct current lightning power distribution system. A DC motor can be controlled over an extensive range using either variable supply voltage or by changing the strength of the current in field winding. Lightweight motors are used for convenient power tools and applications. The arrival of power electronics has made replacement of Dc motors with AC motors possible in many applications. A motor is an electrical machine which convert electrical energy into mechanical energy. The function of DC motor is that whenever a current carrying conductor is placed in magnetic field, it experience a mechanical force.
  2. Speed Control  
Controlling the speed of a vehicle is very important factor in sugarcane planting operation. The speed controller is an electric circuit that not only control the speed of an electric motor but also serves as a dynamic brake. That's why controller is a core component.
  3. Battery  
Alithium Ion rechargeable battery of 12V 20Amp is used for power supply. It stores the electrical energy generated and utilize it to run the motor. Rechargeable batteries can be recharged multiple times.
- 8.

### CALCULATIONS

We know,  
 $\omega = v/r$  .....Eq(1)

where,  
 $\omega$  = Angular Velocity  
 $v$  = Linear Velocity  
 $r$  = Radius of wheel

Also,  $V$  = maximum linear velocity for 1 Acre  
Implies  $v = 4 \text{ km/hr} = 4 \times 5/18 \text{ m/s}$   
 $V = 1.111 \text{ m/s}$

Again,  
Wheel Diameter,  $d = 16 \text{ Inch}$   
 $d = 16 \times 0.0254 \text{ m}$   
 $d = 0.4064 \text{ m}$

[Since, 1 inch = 0.0254m]  
Therefore wheel radius,  $r = 0.4064/2 = 0.2032 \text{ m}$

Now, From eq(1) we have,  
 $\omega = v/r$   
 $\omega = 1.111/0.2032 \text{ m}_2/\text{s}$   
 $\omega = 5.468 \text{ m}_2/\text{s}$

Again,  
 $\omega = 2\pi N/60$  .....Eq(2)

Where,  $N$  = speed of wheel in rpm  
From eq(2),  
 $5.468 = 2\pi N/60$   
 $N = 52.242 \text{ rpm}$

Now, From Newton's Second Law of motion i.e. force is equal to the change in momentum per change in time,  
i.e.  $F = m \times X$  .....Eq(3)

Where,  $m$  = Total mass of the vehicle including seats  
 $m = 60 \text{ kg}$   
Therefore, Eq(3) becomes,  
 $F = 60 \times 9.81$   
 $N F = 588.6$   
 $N$

We know that a twisting force is required which tend to cause rotation.  
Therefore the Twisting Force or Torque is given by  
 $T = F \times r$  .....Eq(4)

Where,  $F$  = Force in Newton  
 $r$  = Radius of wheel in meter  
From eq(4) we get,  
 $T = 588.6 \times 0.2032 \text{ Nm}$   
 $T = 119.60 \text{ Nm}$

Also we require input power to run the system which is given by,  
 $P = 2\pi N T / 60$  Eq(5)

$P = 2\pi \times 52.242 \times 119.60 / 60$   
 $P = 653.97 \text{ W}$

**Based on these calculations, the motor and battery with required specifications are selected**



**9.MATERIAL PROPERTIES**

Sr. No.	Components	Material Used	Properties
1	Hopper	Polycarbonate Sheet	High impact strength, high heat resistance, high durability, high strength, high corrosion resistance, good abrasion resistance, low weight, economical.
2	Hopper Support	Mild Steel	High impact strength, good weldability, good machinability.
3	Conveyor	Rubber	High elasticity, toughness, adhesiveness, corrosion resistance, electrical resistance.
4	Actuator	Aluminum	Light weight, corrosion resistance, non-magnetic, good sound and shock absorption, non-sparking.
5	Gripper	Fibre Plastic	Light weight, corrosion resistance, incredibly strong, good fatigue impact and compression properties.
6	Vehicle Frame	Mild Steel	High impact strength, good weldability, good machinability.

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**11. CONCLUSION**

After the observation of performance of different types of sugarcane cutter planter, we observed that all currently available sugarcane planters require high power tractors to run. These high power tractors run on conventional fuel which produce high amount of pollution. Due to increasing cost of fuel, running cost of machine increases. These machines also have high initial cost. To overcome these drawbacks, we need a machine which runs on electrical vehicle and also have less initial and running cost.

The main objective of our proposed research is to design a sugarcane planter which gives result in terms of high productivity, low energy consumption and also has low running and initial cost. Appropriate machinery has been developed, but commercialization and wider adoption is required to capitalize the potential benefits to achieve it with less initial cost, small size and easy operation. This is very important in our country as majority of the farmers are small landholders.

The small scale battery operated sugarcane planting machine is designed and fabricated which makes the process faster and accurate hence, reduces labour required to operate the machine and in turn, reduces the labour cost. This machine will help farmers to overcome labour crisis in sugarcane planting. In addition to this, the machine reduces fuel cost along with maintaining the same productivity.



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## GOODS AND SERVICES TAX (GST) - RETAILERS' AWARENESS AND PERCEPTION IN OTTAPALAM CITY

**Rema K**

Assistant Professor in Commerce

Department of Commerce And Management Studies

Sree Neelakanta Government Sanskrit College, Pattambi, Palakkad, District, Kerala

### ABSTRACT

India's tax regime relied heavily on indirect tax in the traditional periods. Revenue from indirect taxes was the most supply of government income until tax reforms were undertaken throughout nineties. The key argument place forth for heavy reliance on indirect taxes was that the India's majority of population was poor and therefore widening base of direct taxes had inherent drawbacks. However, the Indian system of indirect taxation is characterised by cascading, distorting tax on production of products and services that results in hampering productivity and slower economic development. There are endless taxes in present system levied by central and state government that causes multiplicity of taxes. To scale back that tax burden an easy tax is needed, that is Goods and Services Tax (GST). Now, India has been viewed as an attractive and dynamic investment destination and has witnessed a wide presence of Multi National Enterprises (MNEs) and a consequential increase in cross-border trade. This has created several opportunities to the government for restructuring tax system of the country. The awareness regarding GST is important for each individual in order that they will perceive how the amount charged on various products and services they availed. The empirical study aims to know the level of awareness and perception of 100 retailers from Ottapalam city in Palakkad District of Kerala State, towards the Goods and Service Tax. Tables with Percentage analysis and chi-square test were used for the analysis. The study made positive attitude in the retailers regarding GST and it will be informative to researchers to conduct further detailed study in the field.

**Keywords:** Cascading, Goods and Services Tax, Indirect Tax, Tax Reforms.

### INTRODUCTION

Goods and Services Tax can be defined as the big indirect tax structure designed to support and enhance the economic progress of a country. It levies on production, sale and consumption of products and services at a national level. So, it affects all category of people who are producing, selling and consuming the various products and services. GST can be an indirect tax at all the stages of production to bring about uniformity in the system. While bringing GST into practice, there would be amalgamation of Central and State taxes into a single payment. IT would be also enhancing the position of India in both, domestic as well as international market. At the consumer level, GST would reduce the overall tax burden, which is currently estimated at 25 to 30%



Under this system, the buyer pays the final tax but an efficient input tax credit system ensures that there is no cascading of taxes-tax on tax paid on inputs that go into manufacture of goods. So as to avoid the payment of multiple taxes such as excise duty and service tax at Central level and VAT at the State level, GST would unify these taxes and build a uniform market throughout the country. Integration of various taxes into a GST system can originate a good cross-utilization of credits. The GST is expected to change the complete situation of current Indirect Tax. GST will merge all Indirect Taxes under an umbrella and can facilitate in creation of smooth market.

As per professional opinion, GST enables to the economic progress of the country. It is estimated that GST can facilitate in creation of single, uniform market that will benefit both corporate sector and the Indian economy. The Central and State Government will levy GST on most of the goods and services manufactured in India or imported into the country. Direct taxes like income tax, capital gains tax and the corporate tax will not be affected by GST. GST will replace different indirect tax levies namely Sales Tax, Service Tax, , Countervailing Additional Duty, Special Additional Duty, VAT, Excise Duty, Customs Duty Securities' Transaction Tax, Stamp Duty, Local Body Taxes, Property Tax, Entry Tax, Tax and Duties on Electricity, Entertainment Tax, Anti-Dumping Duty, Tax on Goods and Passengers and Compliance cost will fall which will lead in getting life simpler.

Government has promised that GST will scale down the compliance burdens at present. One amongst aims of introducing GST is to reduce the cascading effects of taxes which are primary focus of VAT, however VAT system is not comprehensive enough to do so. It might be applicable to all transactions of goods and services. It is to be paid to the accounts of the Central and the States individually. Cross utilisation of input tax credit between the Central GST (CGST) and the State GST (SGST) would not be allowed except in case of inter-state supply of goods.

## REVIEW OF LITERATURE

There are several studies conducted on Goods and Services Tax. Some important among them are as follows:

**Nishita Gupta (2014)**<sup>1</sup> in their study mentioned that implementation of GST will result to commercial benefits which will bring economic development in India. **Jaiprakash (2014)**<sup>2</sup> revealed that both the Central and State level GST are likely to give enough relief to agriculture, trade, industry, and consumers through a comprehensive and wider coverage of input tax set-off and service tax set-off. **Nasir (2015)**<sup>3</sup> found that tax morale is the most influencing factor to tax awareness which means government need intense focus on public's knowledge and attitude towards the implementation of GST. **Srinivas KR (2016)**<sup>4</sup> stated that GST provides wide coverage of input tax credit set-off, service tax set-off and efficient formulation of GST can lead to expansion of business for central and state governments. **Poonam (2017)**<sup>5</sup> study viewed that the main problem in Indian tax system like cascading effect and tax evasion, distortion can be scale down by implementing GST. A single rate would help to maintain simplicity and transparency by treating all products and services at equal without giving special treatment to some 'special' products and/or services. **Laveena Mehta and Baljinder Kaur (2018)**<sup>6</sup> noted that people consider GST is good tax reform



but in the short run, it is not beneficial. More than that it will increase legal compliances, price of products and tax burden. It suggested that proper awareness programme should be arranged for the taxpayers to make them more aware about all the regulations and guidelines. **Kaur Harjinder (2019)**<sup>7</sup> said that most of the public are unaware about the concept of GST. So, both the Central and State Government should take initiatives to conduct seminars to make the public understand the various terms and regulations of GST. **Yadav Radha, Yadav Sagar (2020)**<sup>8</sup> highlighted the concept and purpose of GST with various amendments and the challenges faced by the stakeholders.

### **RESEARCH PROBLEM**

GST is one of the most important tax reforms brought in India which has been long awaiting decision. It is a comprehensive tax system that will subsume all indirect taxes of state and Central Governments and whole economy into seamless national in national market. As it has many advantages, it cannot escape from limitations too. A lot of misconceptions are in the minds of people. Some believes that it is favourable but some believes that GST consumes more tax amount than prevailing tax system. Still many more notifications are coming regarding with the terms and conditions of GST for simplification of the Act by the government.

### **OBJECTIVES**

The objectives of the study are:

1. To know the level of awareness of retailers about GST.
2. To know the level of perception of retailers towards GST.

### **HYPOTHESES OF THE STUDY**

Based on the objectives of the study, the following hypotheses are laid down:

- H01: There is no significant association between gender and awareness towards the GST norms.
- H02: There is no significant association between retailers dealing with goods or services and awareness towards the GST norms.

### **SCOPE OF THE STUDY**

The retailers are selected from Ottapalam city in the Palakkad District of Kerala State. The retailers are dealing with products or services.

### **RESEARCH METHODOLOGY**

The research design used in this study is both descriptive and analytical. Purposive sampling under non random sampling is used. 100 retailers are selected from the area as sample size. Secondary data and primary data were used here. Questionnaires were used for primary data collection. Secondary data were collected from books, journals, published research records and web resources. For data presentation, tools such as Frequency tables, percentage analysis and chi-square test were used.

### **RESULTS AND DISCUSSIONS**

Analysis part of the study based on important variables is given below:



**Table 1. Gender of the respondents.**

gender	Frequency	Percentage
Female	24	24
Male	76	76
Total	100	100

(Source: primary data)

Interpretation: Females are only around 25% of the respondents.

**Table 2. Age of respondents.**

age	Frequency	Percentage
20 - 30	23	18
30 -50	55	55
Above 50	22	27
Total	100	100

(Source: primary data)

Interpretation: Most of the respondents are coming under the age group between 30 and 50.

**Table 3. Type of business.**

Type of business	Frequency	Percentage
Sole proprietorship	29	29
Partnership	53	53
Family business	11	11
Company	7	7
Total	100	100

(Source: primary data)

Interpretation: Partnership form of business is more than others.

**Table 4. Educational qualification of respondents.**

Educational qualification	Frequency	Percentage
SSLC	32	32
+2/Pre-Degree	15	15
Degree	41	41
PG	12	12
Total	100	100

(Source: primary data)

Interpretation: Nearly half of the respondents are graduates.

**Table 5. Type of products retailers are dealing with.**

Type of products	Frequency	Percentage
Goods	65	65
Services	35	35
Total	100	100

(Source: primary data)

Interpretation: 65% of the retailers are dealing with goods compared to services.



**Table 6. Experience in retail sector.**

Experience	Frequency	Percentage
Below 1 year	11	11
1 – 5	20	20
5 – 10	28	28
Above 10 years	41	41
Total	100	100

(Source: primary data)

Interpretation: Nearly half of the respondents are having experience more than 10 years.

**Table 7. Awareness on GST norms applicable to their business.**

Awareness on GST Norms	Frequency	Percentage
Aware	77	77
Unaware	23	23
Total	100	100

(Source: primary data)

Interpretation: Almost all retailers are aware of GST norms applicable to their business.

**Table 8. Awareness of goods exempted from GST.**

Awareness about goods exempted from GST	Frequency	Percentage
Aware	84	84
Unaware	16	16
Total	100	100

(Source: primary data)

Interpretation: Most of the retailers are aware of goods exempted from GST.

**Table 9. Number of retailers having opinion- “GST affects the price of goods”.**

GST affects the price of goods	Frequency	Percentage
Yes	81	81
No	19	19
Total	100	100

(Source: primary data)

Interpretation: Almost all the retailers opined that GST affects the price of goods.

**Table 10. Sources of information about GST.**

Source of information on GST	Frequency	Percentage
Seminars	31	31
Media	13	13
Online Sources	11	11
Auditors/Chartered Accountants	45	45
Total	100	100

(Source: primary data)

Interpretation: Most of the retailers get information about GST from their auditors.



**Table 11. Showing the number of respondents who are monthly tax payers.**

Monthly tax payers	Frequency	Percentage
Yes	81	81
No	19	19
Total	100	100

(Source: primary data)

Interpretation: Almost all retailers are paying their tax monthly.

**Table 12. showing the awareness of different tax rates.**

Awareness about different tax rates	Frequency	Percentage
Aware	88	88
Unaware	12	12
	100	100

(Source: primary data)

Interpretation: All the retailers are aware of different tax rates except 12% retailers.

**Table 13. showing the opinion on fulfilment of the objective- one nation one tax.**

Fulfilment of objective-one nation one tax	Frequency	Percentage
Strongly agree	17	17
Agree	38	38
Neutral	15	15
Disagree	19	19
Strongly disagree	11	11
Total	100	Percentage

(Source: primary data)

Interpretation: Half of the retailers are agreed that the objective of GST, One Nation One Tax can be fulfilled.

**Table 14. Problems faced by respondents in filing returns.**

Problems of respondents at filing returns	Frequency	Percentage
Lack of knowledge	53	53
Technical problems	26	26
Lack of time	21	21
Total	100	100

(Source: primary data)

Interpretation: Most of the retailers depend auditors due to lack of knowledge and fear of technical problems.

**Table 15. Respondents having perception about the role of GST Council**

Level of Perception	Frequency	Percentage
Satisfactory	53	53
Neutral	16	16
Dissatisfactory	31	31
Total	100	100

(Source: primary data)



Interpretation: Around 50% of the respondents are dissatisfied in the perception about the role of GST Council.

**Table 16. Dependence of filing GST returns.**

Filing GST returns	Frequency	Percentage
self	12	12
GST practitioners	19	19
Chartered Accountants	54	54
Other tax practitioners	15	15
Total	100	100

(Source: primary data)

Interpretation: Most of the respondents depend Chartered Accountants for filing returns.

**Table 17. Opinion on the statement- ‘GST is beneficial to government as well as businessman.**

GST- beneficial to government and business	Frequency	Percentage
Strongly agree	18	18
Agree	29	29
Neutral	15	15
Disagree	24	24
Strongly disagree	14	14
Total	100	100

(Source: primary data)

Interpretation: Only some respondents are opined that GST is beneficial to government and businessman.

**Table 18. Opinion on the statement “GST has increased the tax burden of businessmen.**

GST- increases the tax burden of business	Frequency	Percentage
Strongly agree	49	49
Agree	19	19
Neutral	9	9
Disagree	14	14
Strongly disagree	9	9
Total	100	100

(Source: primary data)

Interpretation: Most of the retailers believe that increase of their tax burden is due to GST.

**Table 19. Opinion on the statement “GST helps in bringing transparency in business transaction”.**

<b>GST brings transparency in business</b>	<b>Frequency</b>	<b>Percentage</b>
Strongly agree	41	41
Agree	24	24
Neutral	13	13
Disagree	10	10
Strongly disagree	12	12
Total	100	100

(Source: primary data)

Interpretation: Around 65% of the respondents says that GST bring transparency in business transaction.

**Table 20. Opinion on the statement- “GST helps in the growth of Indian Economy”**

<b>GST helps growth of Indian Economy.</b>	<b>Frequency</b>	<b>Percentage</b>
Strongly agree	53	53
Agree	16	16
Neutral	12	12
Disagree	11	11
Strongly disagree	8	8
Total	100	100

(Source: primary data)

Interpretation: Around 70% respondents opine that GST helps in the growth of Indian Economy.

Analysis using Chi Square test is shown below:

<b>Sl. No.</b>	<b>Categories</b>	<b>Chi Square Value</b>	<b>Critical Value</b>	<b>Remarks</b>
1	Gender and awareness towards GST Norms	1.903	3.84	Insignificant
2	Type of products deals with retailers and awareness towards GST Norms.	1.043	3.84	Insignificant

Interpretation: Here, calculated value is less than the table value in both the case. Hence accept the null hypotheses that there is no significant association between gender and awareness of GST norms as well as type of products the retailers are dealing with and awareness of GST norms.

## **FINDINGS**

The major findings of the study are as follows: -

1. Female respondents are very less in this field.
2. Youngsters are less in number compared to middle aged people but most of them are highly experienced.
3. Partnership form of business are more than other forms of business. Most of them are dealing with goods than services.



4. More than  $\frac{3}{4}$  respondents are aware about norms applicable to their business and goods excepted from GST. They acquire these knowledges from Chartered Accountant/Auditors, Seminars, Media etc.
5. Only 19% of the respondents doesn't give tax.
6. Almost all respondents are having positive attitude towards GST but some are dissatisfied with the role of GST Council.
7. Around 90% respondents are depending outside agencies such as GST Practitioners as well as Chartered Accountants and Auditors because of lack of knowledge, technical problems and lack of time.
8. Most of the respondents expressed that GST brings transparency in the business transaction but it is not highly beneficial to the business because of increase in the tax burden.
9. Retailers agreed that it is highly beneficial the government so that the economic development of the country can be developed.

### SUGGESTIONS

1. Special assistances should be given to women to induce them to come into this field.
2. Awareness programmes should be arranged by the government departments for all the category of tax payers in their own regional languages to make the concept of GST clear.
3. Technical problems of the GST network should be minimised.
4. All the suspicion in the mind of retailers regarding with the concept, norms, and regulations of GST should be cleared by the legal authorities.
5. Policies should be framed by the GST Council to protect the interest of the retailers.

### CONCLUSION

All the people who are coming under the purview of Goods and Services tax. Everybody should know some of the basic concepts at least. In this study many of the retailers have suspicion about norms applicable to them, goods and services exempted from tax, tax rates applicable to various products and services etc. It is good practice to make available new changes regarding with GST to all retailers through seminars, classes, audio and video recordings, notices, individual messages etc by online and offline medias.

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## IMPACT OF NPA ON INDIAN ECONOMY: A CRITICAL STUDY

**Randhir Kumar**

L. N. Mithila University, Darbhanga, Bihar, India

### Abstract

In the last five years, non-performing assets (NPAs) of Indian banks have increased significantly in the amount of subordinated debt. With these non-performing assets, a sharp decline in investment growth has also been registered, as well as economic slowdown. India's banking sector is going through a very difficult situation. If we look at the ratio, more than 11 percent of the total loan given by banks has become NPA, which is at its peak. Until the NPA crisis was exposed, banks had contributed over 90% of the economy's commercial debt. As a result, the impact of any loss of banking will have a profound and long lasting impact on the economy. The present paper tries to analyse about the impact of NPA on Indian economy.

**Key-words:** Status of NPA; Impact of NPA; GST; Recapitalisation of Banks; Solutions.

### Background

The Indian economy is one of the fastest growing economies in the world irrespective of non conducive economic headwinds blowing globally. Indian economy did not suffer a free fall like various other high profile economies pursuant to recent global financial meltdown. Indian economy registered a faster than expected recovery from the slowdown in growth witnessed in the aftermath of the global financial crisis. The factor that support the prospects of sustained growth include the impact of expansionary policy stimulus, visible signs of strong industrial recovery along with the core infrastructure sector, significant upturn in the business confidence as per different business expectations surveys, revival in capital flows, revival in the stock market and improving overall global economic and financial conditions. This revival naturally would expect an equally stronger support from the financial sector. The Banking sector also has to get ready to be able to support adequately the higher economic growth as well as prepare itself for facing new challenges in the present scenario.

Financial sector has undergone a rapid transformation. The competitive and deregulatory forces have brought about a perceptible shift in the customers' expectations. With the advancement in ICT, the customers expect easy, fast, efficient and secure financial services at reasonable costs through single window servicing. In this changed business scenario, customers want to liberally exercise choices available to them. The traditional concept of loyalty built over a period of time pales into insignificance if the relationship is not nurtured afresh. Accordingly, in order to remain competitive and to meet rising expectations of the customers, banks are enhancing their role from the traditional one of accepting deposits and lending to that of becoming comprehensive Financial Services Providers. Banks are now offering a host of financial



products architected to meet the customer aspiration and increasing needs. It is the customer who is the direct beneficiary of this evolution. In this process apart from broadening their services portfolio, banks have been striving to lower the transaction costs as well.

Deregulation in the financial sector brought about new opportunities; which have also added to the risk profile of banks. The operating environment has become more dynamic and market more volatile. Banks face a variety of risks viz. Operational, Market and Credit Risk which include interest rate risk, portfolio risk, etc. besides reputational risk. Recognizing the quantum and implication of these risks, banks have implemented IT powered risk management systems.

Banks are the backbone for the Indian economy. In such a situation, the increasing non-performing assets (NPAs) of banks can create a big crisis. Banks' loans are included in the NPA when the outstanding interest and instalment of principal is not repaid within 90 days from the due date. Public sector banks have given maximum loans to five industrial sectors. These include textiles, aviation, mining, infrastructure and cement. Most of the NPAs have increased in these areas. However it is claimed that most of the loans given to primary sector like agriculture turn into NPAs. But, this is not the truth. Industry and big companies contribute the most to NPA. One aspect of NPA is quite important. This is related to the provision of adequate contingency planning of banks. According to some experts, banks do not properly assess the quality of assets even for fear of losing their credit.

### **Status of NPAs in banks**

The NPAs of 38 listed commercial banks in the country have crossed ₹ 8.41 lakh crore. 90% of these are in public sector banks, which represent 70% of the assets of the entire banking system. If the central bank officials and economic experts believe that no measures are taken in time, then this figure could reach Rs. 20 lakh crore.

The NPA in the third quarter of 2015 was Rs. 3.51 lakh crore. It more than doubled to Rs. 8.29 lakh crore in June 2017. Among the public sector banks, SBI has the highest NPA. It has exceeded 2 lakh crore rupees. PNB is at number two with Rs. 55,000 crore, Bank of India is at number three with Rs. 46,000 crore, IDBI Bank is at number four with ₹ 43,000 crore. Among non-government banks, ICICI Bank is at number one with Rs. 43,000 crore NPA, Axis Bank with ₹ Rs.20,000 crore is second and HDFC Bank with Rs. 7000 crore at number three.

### **Impact of NPA**

*Rising NPAs have three main effects on banks.*

Their ability to lend decreases, profit decreases. Their cash flow would have reduced. In 2008, Indian companies also had to suffer the recession. After coming out of



the recession, banks ignored their financial position and credit rating in lending to big companies. Due to this, the Indian economy started getting caught in the trap of NPAs.

The recent NPA crisis has been accompanied by a sharp decline in investment growth and a sharp economic slowdown. One of the key factors responsible for the crisis is the dominance of state-owned banks in the system. In India, government-owned banks or public sector banks (PSBs) account for 70% of the total loans given by banks. During the recent banking crisis, these banks were more affected than private and foreign banks and these banks accounted for 90% of the total NPAs. PSBs had to make provision for these submerged debts which have reduced their capital.

The government had to finance the banks. The government has invested a total of 3 trillion rupees (US \$ 42 billion) in PSBs since 2008-09. This figure is equivalent to 2% of India's GDP (GDP). For a government that is committed to improving revenue, it is a serious economic burden.

There are several institutional issues with these PSBs which came into existence as a result of bank nationalization in 1969. For the first 25 years, PSBs have enjoyed a monopoly in Indian banking, with a stake of over 90%. Apart from these, only those banks which were too small to nationalize were the old private banks and some other foreign banks.

During this period, PSBs under the ownership of government came into being. Human resource policies including management structure and compensation and governance were standardized. Banks have a pool of senior management that can be easily exchanged from one bank to another. At the end of this process, PSBs began to operate as a single unit with more than 25 different names.

In 1991, India started economic liberalization and privatization. New bank licenses were issued in the private sector under various liberalization ventures, which began functioning in the mid-1990s. By the early 2000s, he emerged as a reliable competitor for PSB. As new private banks began to challenge PSBs, weaknesses in PSBs came to the fore in three decades under government control. It was not easy for him to survive in the competition.

The administration of PSB is in bad condition. The boards of these banks are weak and provide very little oversight. Due to government ownership, banks come under the influence of politicians and bureaucrats. Political intervention takes place to provide loans to the close, which is a serious problem, especially in infrastructure projects where the borrowers have good relations with the government.

PSBs are also made a means of implementing government schemes and programs. This weakens the internal administration of banks. Over the years, the government has aggressively implemented two schemes - Jan Dhan Yojana and Mudra (Micro Units Development and Refinance Agency) scheme.



"There were already many problems that the government did not solve. Among them, the problems in the agricultural sector are important. But due to some steps of the Modi government, some problems have increased considerably. For example, banks have NPA problem. Government has Some steps have been taken to diagnose this problem, but the steps suggested by the RBI have not been fully implemented.

"Due to the problem of NPAs there is a fear in banks and bank employees that if they will issue a loan and the loanee company is unable to repay its loan then the CBI-CVC investigation will be started against the lenders. Due to this, officers do not issue loans at all.

"Even where some companies are in a position to repay the loan, the authorities do not give loans due to fear of NPAs. They show interest rates so high that even the merchants doing business are not able to take loans." All the committees have given their report regarding the diagnosis of this problem, but the steps mentioned in it have not been fully implemented. "

Apart from the NPA, a kind of fury has emerged in the business class about many other policies of the government. Among these, demonetisation and GST are prominent.

### **Problems in the implementation of GST**

"The Modi government has taken many direct steps. GST is the chief among them which has created more problems rather than improving the economy. Small businesses did not have to do the paper work earlier which now has to do with GST."

"After filling GST, companies get refunds. But the process of getting refunds is so complicated that companies have to pay GST by taking loans. In many cases it has been seen that if there was a delay of 15 days in filling GST. If the bank accounts of the companies are frozen, due to this, the money of the companies is stuck in GST because on the one hand there is a delay in getting refund, on the other hand they have to pay before GST. "

"Another big step of the Modi government before GST was demonetisation, which impacted the small businesses that used to run on cash. Such companies have not been able to recover from the damage done during demonetisation.

"And we do not even know how much this has affected because there has been so much tampering with the data related to GDP, employment etc. that it is difficult to estimate the exact problem in the economy. ."

"With this, the tax collection is decreasing due to sluggishness in the economy. But the officers sitting in Delhi are giving big goals of tax collection to their field officers. This has caused a lot of trouble to the companies including the common people who pay income tax for the field officers. Doing so is affecting the investment climate"



"If we look at the budget of the last year, the proposals made by the government in the budget completely changed after some time. In such a situation, which also has the ability to invest, is avoiding investing thinking that the government does not know tomorrow, which policy will bring". In such a situation, the situation of business and economy is not good and due to these steps, the solution of the problem is not seen.

### **Recapitalization of banks**

The Government of India has decided to give an amount of Rs. 2.11 lakh crore as additional capital to the banks to improve the financial condition. Out of this, Rs. 1.35 lakh crore is planned to be given as recapitalization bonds. Out of the remaining Rs.76000 crore, Rs. 18,000 crore will be approved from the budget under the Rainbow Plan and the remaining Rs. 58,000 crore will be raised from the banks themselves.

Recapitalization will strengthen the capital base of banks. This will prove to be helpful in generating credit for them. This will increase the profits of the banks and reduce the risk of the flow of money and save them from bankruptcy. For the short term, this measure is fine, but taking it as the only option would be unfair to the taxpayers of the country.

### **Possible Solutions**

With the recapitalization from time to time, efforts should be made to make the functioning of government banks more transparent. Internal audit of government banks should also be done as per CAG's instructions and protection. A property reconstruction company (Assets Reconstruction Company) should be formed through parity contribution with the participation of the government and RBI, which can eliminate NPAs from the banking sector. Before sanctioning a loan to a company, its financial condition and feasibility of the project should be objectively investigated and no loan is sanctioned without adequate security and mortgage. Efforts should be made to develop banks on PPP model. The government should reconsider whether 70% ownership in public sector banks is necessary, when the capacity can be increased by developing banks on PPP model with 51% ownership.

The central government is soon coming up with an ordinance that will empower the Reserve Bank, so that it can effectively deal with the problem of increasing non-performing assets (NPAs) in the banking sector. Sources said that the proposal to amend section 35A of the Banking Regulation Act has been approved through an ordinance in a meeting of the Union Cabinet chaired by Prime Minister Narendra Modi.

After this amendment, the Reserve Bank will be able to issue instructions to banks for the recovery of debt from loan defaulters. Under Section 35A, the Reserve Bank has the right to issue directions to the banks in the interest of public interest and depositors. After the cabinet meeting, Finance Minister Arun Jaitley said that the cabinet has taken some important decisions in the context of banking sector.



Jaitley said that there is such a tradition that when a proposal is sent to the President, its details cannot be disclosed before it is approved. Jaitley said that as soon as it is approved, the details of it will be shared.

Submerged debt or NPAs of public sector banks have reached a hefty figure of Rs 6 lakh crore. In the first nine months of the last financial year, there was an increase of more than one lakh crore rupees in the loans of public sector banks. By March 31, 2016, it had reached 6.07 lakh crore rupees.

### ***Special things related to the ordinance coming to fight the NPA***

In the ordinance to be brought for NPA resolution, the Reserve Bank will be empowered to direct banks for effective solution of NPA.

The cabinet allowed the ordinance to be amended in the Banking Regulation Act to deal with the financial crisis of banks. Now this ordinance has to get the President's permission.

The ordinance would give the Reserve Bank the authority to protect banks from the investigating agencies as it would have to set up an oversight panel to recover the debts of the banks, which would put the banks' side before the investigating agencies.

It is worth noting that till now banks were shying away from the option of selling through the settlement or NPA as they were afraid of strict questioning from the investigating agencies.

### **Conclusion**

There is adequate evidence to show that over a period, and particularly during the last decade, sustained efforts by the Government, Reserve Bank of India and banks themselves have resulted in making the Indian banking sector not only sound enough but also resilient enough to face challenges produced both the the international financial system as well as the Indian economic developments. Government of India is working hard to protect banks from NPAs, especially given the decline of PSBs in the country. However, there is still a strong need for stricter laws for the NPA, which needs to be enacted separately for those who are carrying large loans. Apart from this, banks should take complete information about any person or company before giving a loan. Political interference from banks should stop. NPA can be reduced if many such steps are taken up.

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## MATLAB Intervention in Weed Management for Paddy Cultivation

Rishabh Sharma, Smruti Smaraki Sarangi, Srikant Singh

Department of Computer Science Engineering,  
Kalinga University, Chhattisgarh

### ABSTRACT

Paddy is the monocrop in Chhattisgarh. About 75% of cultivable land is under the cultivation of paddy. Rice being the principal food of eastern India. Paddy is widely cultivated in the state. Weed is considered as a threat for paddy cultivation. So, weed competes for mineral nutrients, water, solar energy, space etc. Weeds reduce the crop quality and the value of the land, causes quicker wear and tear to farm implements an increase in cost of cultivation. Weeds have also certain advantages. It has medicinal value used for treating ailments by the tribes. It is also considered as a disadvantage for the farmers by competing with the crop in many aspect. Weed degrades the quality of crop in other words, quantity of crop also lowered due to the weeds. Weeds also degrades soil fertility. Additional manpower needed for controlling weed growth by plucking it from the field. At times, equipments are engaged to remove weeds. For all such reasons, profit of the farmer lowered by increasing the cost of cultivation.

MATLAB can be used to bring prosperity in agriculture. MATLAB is one such tool which can be employed for better weeds detection and prevention. Various toolboxes of MATLAB can be used for the purpose. Image processing toolbox can be used to detect the weed from the agricultural land and differentiate it from the crop. Similarly, Statistical and Data Analysis toolboxes are also used to analyse the data set of weeds for prediction. The proposed study has been undertaken in the Rajim region of Chhattisgarh in order to explore the scope of intervention for weed management. Proper weed management will minimize the cost of production and health to enhance the competitive edge of the agricultural sector. The sample of the study includes 11 number of villages located within the geographical jurisdiction of Rajim. A sample size containing 160 farmers have given their responses on paddy cultivation and weed control practices. The major types of paddy cultivated in the region includes 16 number of variety. 11 number of herbicides are used to prevent the loss arising out of weeds in the paddy fields. MATLAB can be proved as a boom for forecasting the type of weeds in the paddy field requiring appropriate herbicides with minimum labour and pest control device.

**Keywords:** Weeds, weed management, paddy cultivation, MATLAB intervention in paddy cultivation.

### 1.1 Introduction

Chhattisgarh state is situated in 17046'N and 2405 North Latitude and 80015'E and 84020' East Longitude. Total geographical area of Chhattisgarh is around 137.90 lakh hectare of which cultivable land area has been estimated to 46.77 lakh hectare. It has forest land measuring 63.53 lakh hectare. The population of Chhattisgarh is more than 2.55 crore according to the census. About 80% of the population in the state is engaged in agriculture cultivating about 43% of land. Rice is grown as monocrop in the entire state. The soil in the region for growing rice can be classified as bhata, matasi, kanhar or black soil. Major weeds found in Chhattisgarh plains are Echinochloa colona, Echinochloa crus-galli, Ichaemum rugosum, Oryza sativa (weedy rice), Leptochloa chinensis, Paspalum distichum, among the grasses Cyperus iria, Cyperus difformis, Cyperus rotundus, Fumbristylis miliacea among the sedges and Monochoria vaginalis, Eclipta prostrata, Commelinabenghalensis, Cynotissaxillaris, Cynotissaxillaris, Alternanthera triandra among the broad leaved weeds.



A plant is considered a weed if it has certain characteristics that set it apart from other plant species and this difference in characteristics results in multifarious ways of interfering with crop growth and crop culture. About 30000 plant species have been identified as weeds across the world. These plants cause damage in a variety of ways including competition for mineral nutrients, competition for water, competition for Solar Energy, competition for space, weeds reduce the crop quality, impair the quality of the animal produce, harm animal health, harbour insect pests or diseases, damage human health, contaminate water bodies, causes wear and tear to farm implements, reduce the value of the land, increase in cost of cultivation, disturbs in Public places and many more.

Classical way of eliminating weeds includes manual, animal or mechanical power. The process is adapted to pull out or kill weeds. Various classical ways of weed elimination practices are hand weeding, hand hoeing, digging, mowing, cutting, dredging & chaining, burning and flaming, mulches, intercultivation

In olden days weed detection was done by employing men and classical farm implements. With the advancement in the technology the detection of weeds are made through some automation techniques. Image processing is used to detect weeds by giving the inputs of the weed areas to an automatic spray pesticide only in the weed grown. For this a photograph of the field with good clarity to detect the weeds with more accuracy is needed. Taking a photograph can be done by attaching a camera to a tractor or taking them manually. Then image processing is applied to that image using MATLAB to detect the weed.

### 1.2 Justification of the Study

Weeds have also certain advantages. It has medicinal value used for treating ailments by the tribes. It is considered as a disadvantage for the farmers by competing with the crop in many aspect. Weed degrades the quality of crop in other words, quantity of crop also lowered due to the weeds. Weeds also degrades soil fertility. Additional manpower needed for controlling weed growth by plucking it from the field. At times, equipments are engaged to remove weeds. For all such reasons, profit of the farmer lowered by increasing the cost of cultivation.

MATLAB can be used to bring prosperity in agriculture. MATLAB is one such tools which can be employed for better weeds detection and prevention. Various toolboxes of MATLAB can be used for the purpose. Image processing toolbox can be used to detect the weed from the agricultural land and differentiate it from the crop. Similarly, Statistical and Data Analysis toolboxes are also used to analyse the data set of weeds for prediction.

As a result, use of MATLAB cause an increase the profit of agriculture. It constitutes the spectrum of study.

### 1.3 Objectives of the Study

The study pursues following objectives

- To study the varieties of paddy grown in Rajim region of Chhattisgarh.
- To study the land holdings of farmers in Rajim region.
- To study the location wise weeds grown during paddy cultivation.
- To study the herbicides used for weed management.

### 1.4 Research Methodology

Both documentary research and field research are the methods of study. The primary source includes the collection of data pertaining to classification of weeds, methods of combating weeds in the paddy (rice) fields of Rajim regions in the state of Chhattisgarh.

Purpose sampling method is adopted to choose regions namely Sursabandha, ShyamNagar, Piparchedhi, Dhuma, Bakli, Baronda, Belar, Parsada, Partewa, Pitaibandh, Rawan within the



revenue jurisdiction of Rajim. 160 farmers were chosen randomly for the purpose of study. A questionnaire in Google form was circulated among the sample farmers in order to get pertinent information on weeds in conformity with the objectives of the study.

The sample questionnaire is attached in Annexure A. The sample plan is given as under for the purpose of collection of data.

The secondary source includes earlier publications on Weed detection by using image processing, Digital Image Processing Applications in Agriculture, Weeds and Weed Management in India - A Review, Ethno-medicinal Uses of weeds of Guru Ghasidas Central University and A new approach for weed detection in agriculture using image processing techniques, Role of MATLAB in Crop Yield Estimation, Crop Analysis Based on MATLAB Image Enhancement Technology are some literature available for the study.

Data collected will be interpreted by the help of MATLAB toolboxes, Google form analysis in percentage.

### 1.5 Tools of the Study

Questionnaire is the tool of the study. During pandemic period, Google form is circulated over the internet for the data collection from the farmers of sample villages. Data collected is stored in the Microsoft Excel workbook for pre-processing. The data in the excel sheet is then imported in the MATLAB through the import tool. After importing experiments conducted by using the toolboxes of MATLAB

### 1.6 Analysis & Interpretation

Table 1.6-1 Sample Plan

S.No	Name of the Location	Number of Farmers
1	BAKLI	16
2	BARONDA	9
3	BELAR	10
4	DHUMA	19
5	PARSADA	12
6	PARTEWA	6
7	PIPARCHEDHI	30
8	PITAIBANDH	9
9	RAWAN	15
10	SHYAM NAGAR	18
11	SURSABANDHA	16
<b>Grand Total</b>		<b>160</b>

The sample for the study has been taken from Rajim block located within the jurisdiction of Chhattisgarh. 11 villages from Rajim block were chosen for the purpose of study. Villages namely Sursabandha, ShyamNagar, Piparchedhi, Dhuma, Bakli, Baronda, Belar, Parsada, Partewa, Pitaibandh and Rawan are chosen under random sampling method. The farmers from the respective villages are also chosen as respondents for the purpose of the study as shown in the table. 160 farmers from the shed villages were chosen and given a Google form with questionnaire in order to solicit responses in conformity with the purpose of study.



The figure no. 1.6-1 in Pie chart form explains sample plan which depicts that maximum farmers were chosen from Piparchedi village combining about 19% of the total sample. An inspection to the pie chart also the distribution of samples sequentially exhibits Dhuma (12 %), Shyam Nagar (11 %), Sursabandha (10 %), Bakli (10 %), Rawan (9 %), Parsada (8 %), Baronda (6 %), Belar (6%), Pitaibandh (6 %), Partewa (4 %). From Partewa village least number of farmers were taken as samples.

Table 1.6-2 Category wise Landholdings

Sl. No.	Category on the basis of Landholdings	Landholdings of Farmers
1	1 Acre - 3 Acre	83
2	4 Acre - 6 Acre	44
3	7 Acre - 9 Acre	15
4	10 Acre - 12 Acre	10
5	13 Acre - 15 Acre	7
6	16 Acre - 18 Acre	0
7	19 Acre - 20 Acre	1
<b>Total</b>		<b>160</b>

The table 1.6-2 describes that maximum sample respondents hold land to the tune of 1 acre to 3 acres. About 52 % of farmers own land from 1 acre to 3 acres only one farmer owns land between 19 acres to 20 acres. According to the economic classifications marginal farmers possess land upto 2.5 acres to 5 acres. Medium farmers own land from 5 to 10 acres of land. In agricultural census the operational holdings of small and marginal farmers estimated to about 47.3%. The holdings continue to be inequitably distributed. The semi medium and medium land holding farmers owning between 5-25 acres of lands accounting 13.2% of total farmers. The proportion of small and marginal farmers is also in an increasing trend. In the sample villages the number of small and medium farmers are more in terms of land holdings. Paddy (rice) is the staple crop of the farmers.

Table 1.6-3 Weeds identified in BAKLI Village

Sl. No.	Village	Weeds Grown
1	BAKLI	KARWAT
2		KARGA
3		BHAJIBAN
4		CHUNCHUNIYA
5		SADA KUTKI
6		KENI
7		CHUHKA
8		JHUNDI
9		SAWA
10		BADAUR
11		CHOTE BHAI
12		PODPODA
13		BHARWA

Table 1.6-4 Weeds identified in Baronda Village

Sl. No.	Village	Weeds Grown
1	BARONDA	BHASKATHIYA
2		CHOTE BHAI
3		BHARWA
4		SAWA
5		JHUNDI
6		KUTKI
7		SADA KUTKI



Table 1.6-5 Weeds identified in Belar Village

Sl. No.	Village	Weeds Grown
1	BELAR	BADAUR
2		KARGA
3		SADA KUTKI
4		SAWA
5		BHAJIBAN
6		KUTKI
7		KARWAT
8		RAKSI

Table 1.6-6 Weeds identified in Dhuma Village

Sl. No.	Village	Weeds Grown
1	DHUMA	SADA KUTKI
2		DOOBI
3		RAKSI
4		BHARWA
5		BHASKATHIYA
6		NARJEWAWA
7		CHUNCHUNIYA
8		KENI
9		BADE SAWA
10		CHUHKA
11		BADAUR
12		PODPODA

Table 1.6-7 Weeds identified in Parsada Village

Sl. No.	Village	Weeds Grown
1	PARSADA	CHUHKA
2		DOOBI
3		KUTKI
4		NARJEWAWA
5		KENI
6		KARGA
7		BHAJIBAN
9		BHASKATHIYA
10		SAWA

Table 1.6-8 Weeds identified in Partewa Village

Sl. No.	Village	Weeds Grown
1	PARTEWA	CHUNCHUNIYA
2		BHARWA
3		BHAJIBAN
4		KUTKI
5		DOOBI
6		SADA KUTKI

Table 1.6-9 Weeds identified in Piparchedhi Village

Sl. No.	Village	Weeds Grown
1	PIPARCHEDHI	NARJEWAWA
2		KUTKI
3		KENI
4		DOOBI
5		BADE SAWA
6		SAWA
7		KARWAT
8		BADAUR
9		PODPODA
10		RAKSI
11		BHASKATHIYA
12		SADA KUTKI
13		CHOTE BHAJI
14		CHUNCHUNIYA
15		BHARWA
16		JHUNDI
17		CHUHKA
18		GENGARWA
19		KARGA

Table 1.6-10 Weeds Identified in Pitaibandh Village

Sl. No.	Village	Weeds Grown
1	PITAIBANDH	PODPODA
2		GENGARWA
3		NARJEWAWA
4		KUTKI
5		RAKSI
6		KENI
7		BADE SAWA



Table 1.6-11 Weeds Identified in Rawan Village

Sl. No.	Village	Weeds Grown
1	RAWAN	KUTKI
2		KARWAT
3		KENI
4		SADA KUTKI
5		CHOTE BHAJI
6		BADAUR
7		KARGA
8		GENGARWA
9		BADE SAWA
10		CHUHKA
11		PODPODA
12		RAKSI
13		JHUNDI

Table 1.6-12 Weeds identified in Shyam Nagar Village

Sl. No.	Village	Weeds Grown
1	SHYAM NAGAR	NARJEWAWA
2		BHARWA
3		CHUHKA
4		CHUNCHUNIYA

5	SURSABANDHA	RAKSI
6		BHAJIBAN
7		GENGARWA
8		KENI
9		BADE SAWA
10		PODPODA
11		CHOTE BHAJI
12		SAWA
13		KARWAT

Table 1.6-13 Weeds inserted in Sursabandha Village

Sl. No.	Village	Weeds Grown
1	SURSABANDHA	CHUHKA
2		BADAUR
3		CHUNCHUNIYA
4		RAKSI
5		JHUNDI
6		BADE SAWA
7		NARJEWAWA
8		KARWAT
9		PODPODA
10		KARGA
11		BHASKATHIYA
12		SAWA

There are 20 types of weeds grown in paddy (rice) fields in Rajim region of Chhattisgarh. The weeds grown in the area are Badaur, Bade Sawa, Bhajiban, Bharwa, Bhaskathiya, ChoteBhaji, Chuhka, Chunchuniya, Doobi, Gengarwa, Jhundi, Karga, Karwat, Keni, Kutki, Narjewa, Podpoda, Raksi, SadaKutki, and Sawa.

It is further revealed that in Piparchedi village there are 19 types of weeds grown during paddy (rice) cultivation. Similarly 12 types of weeds grow in Dhuma village. There are 13 and 12 types of weeds grow in Shyam Nagar, Bakli&Rawan, and Sursabadndha, villages respectively. Partewa village records 6 types' pf weeds during paddy (rice) cultivation. Badaur, Bhajiban&Bharwa are commonly grown in Rajim area during rice cultivation. KUTKI, SADA KUTKI, NARJEWAWA and CHUNCHUNIYA are common weeds grown in all villages.

Figure 1.6-2 Identification of Weeds location wise

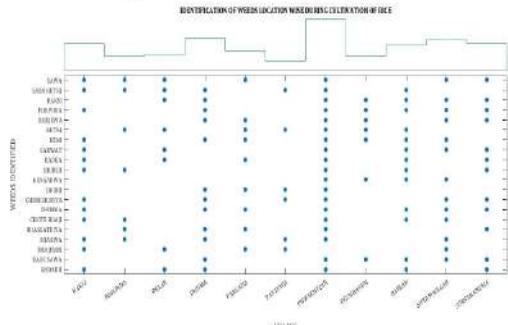




Table 1.6-14 Pesticides used to remove weeds

Sl. No.	Weeds Identified	Herbicide Used
1	BADAUR	MANIGOLD
2	BADE SAWA	NOMINIGOLD
3	BHAJIBAN	HIRA
4	BHARWA	GLICEL, HIRA, MIRA 71
5	BHASKATHIYA	GLICEL, MIRA 71
		MIRA 71, GLICEL
6	CHOTE BHAJI	2/4 D
7	CHUHKA	BASAGRAM
8	CHUNCHUNIYA	SATHI / HIRA
9	DOOBI	NOMINIGOLD, GLICEL
10	GENGARWA	GLICEL, MIRA 71
11	JHUNDI	GLICEL
12	KARGA	GLICEL
13	KARWAT	JUNOON, GLICEL
14	KENI	GLICEL
15	KUTKI	NOMINIGOLD
16	NARJEWAWA	GRANITE, NOMINIGOLD
		PLATILA CLOR
17	PODPODA	NOMINIGOLD, BASAGRAM
18	RAKSI	GLICEL
19	SADA KUTKI	GRANITE
20	SAWA	GRANITE
		GRANITE, NOMINIGOLD

Figure 1.6-3 Pesticides Adopted to remove weeds

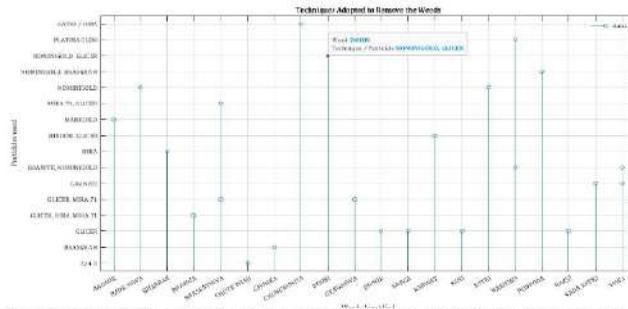


Table no. 1.6-14 describes that there are 20 types of weeds grown in the area during paddy (rice) cultivation. The herbicides used for weed control include Manigold, Nominigold, Hira, Mira 71, Glicel, 2/4 D, BASAGRAM, Sathi, Junoon, Granite and PlatilaClor. It is further revealed that Nominigold, Granite and Manigold herbicides are popularly used to control weeds namely Badaur, Bade sawa, Bhajiban, Bharwa, Bhaskathiya, Chotebhaji, Chuhka, , Chunchuniya, Doobi, Gengarwa, Jhundi, Karga, Karwat, Keni, Kutki, Narjewa, Podpoda, Raksi, Sadakutki, Sawa in the region during paddy (rice) cultivation.

Table 1.6-15 Rice varieties grown with quantity of production

Village	Variety of Rice Grown		Production in Quintal /Acre	
	Type-I	Type-II	Type-I	Type-II
I	II	III	IV	V
SURSABANDHA	HMT	64-44 GOLD	19	21
BAKLI	CHANDAN SAMBHA	RD-55	21	27
BARONDA	S49 SARNA	64-44 GOLD	29	21
PITAIBANDH	5204	SRD 55	21	24
DHUMA	NAR-NARI	SRD 55	14	22
PIPARCHEDHI	MAHAMAYA		25	
RAWAN	SARNA	SRD 55	29	22 - 24
SHYAM NAGAR	NAR-NARI	SRD 55	13	24
BARONDA	ARPANA		30	
RAWAN	SARNA	SRD 55	30	24
BARONDA	NAR-NARI	SRD 55	12	21
SURSABANDHA	5204		22	
BAKLI	MAHAMAYA	SRD 55	27	24
SURSABANDHA	IR 1010	RD-55	20	25
PARSADA	64-44 GOLD	5204	23	22
DHUMA	NAR-NARI	HMT	13	20
PIPARCHEDHI	S49 SARNA	SARNA	29	30
DHUMA	S49 SARNA	SRD 55	28	24
PARTEWA	SARNA	CHANDAN SAMBHA	30	20 - 21
PIPARCHEDHI	RD-55	SRD 55	25	23
PARSADA	HMT	5204	20	22
RAWAN	ARPANA	CHANDAN SAMBHA	30	20 - 21
PIPARCHEDHI	SAMBHA	SAMBHA	21	22 - 23
PARTEWA	HMT	SRD 55	20	24
PITAIBANDH	64-44 GOLD	SAMBHA	22	22 - 23
PIPARCHEDHI	S49 SARNA	IR 1010	30	20
PIPARCHEDHI	MAHAMAYA	SAMBHA	26	21
BELAR	HMT	SRD 55	20	24
PIPARCHEDHI	IR 1010	SRD 55	20	23
BELAR	SAMBHA	SRD 55	23	24
PARSADA	64-44 GOLD	IR 1010	23	20
DHUMA	CHANDAN SAMBHA	ARPANA	21	29
BELAR	5204	SAMBHA	23	22 - 23



It is observed from the table that mostly two varieties of rice are grown in each village. The S49 SARNA type of rice is mostly preferred as type I rice for cultivation. SRD 55 type of rice is cultivated as type II rice in the sample villages. As regards production in type I SARNA variety is considered as most yielding variety of rice. NAR-NARI type I rice gives minimum output per acre. Similarly SARNA type II rice yields maximum to the tune of 30 quintals per acre whereas IR 1010 type of rice yields minimum per acre. The average production of rice in type I category is 23 quintals per acre. Similarly the average production of type II rice is 23.3 quintals per acre.

### 1.7 Findings

Chhattisgarh is one of the largest rice producing states. It is the monocrop of the region. Understanding its importance, the study has chosen for the management of weed to prevent the crop loss particularly in paddy cultivation. Rajim region of Chhattisgarh state is the area of study. Eleven villages namely Sursabandha, ShyamNagar, Piparchedhi, Dhuma, Bakli, Baronda, Belar, Parsada, Partewa, Pitaibandh and Rawan were taken as sample villages. One hundred sixty farmers were chosen randomly from these villages for the study. A questionnaire was circulated among the farmers to seek data on weed in paddy fields. The data regarding pest control devices including manual methods were obtained for the purpose of analysis and interpretation. The comprehensive findings of the study is given as under.

About 19% of the total sample of farmers are from Piparchedi village. Similarly, 12 %, 11% and 10 % of the total sample of farmers are from Dhuma, Shyam Nagar, Sursabandha villages respectively. From Partewa village least number of farmers were taken as samples.

Land holdings of sample farmers depicts about 52 % of farmers own land from 1 acre to 3 acres. Marginal farmers in Rajim region possess land upto 2.5 acres to 5 acres. Medium farmers own land from 5 to 10 acres of land and the semi medium and medium land holding farmers own land between 5-25 acres of lands accounting to about 13.2% of total farmers. It is evident from the study that small and marginal farmers occupy a major segment of farmers in Rajim region as far as the land holdings are concerned.

Weeds grow with paddy. The study explores village wise weeds grown in paddy fields. In Bakli village weeds namely Karwat, Karga, Bhajiban, Chunchuniya, SadaKutki, Keni, Chuhka, Jhundi, Sawa, Badaur, ChoteBhaji, Podpoda and Bharwa are grown in paddy fields. In Baronda village weeds namely Bhaskathiya, Kutki, SadaKutki, Jhundi, Sawa, ChoteBhaji and Bharwa are grown in paddy fields. In Belar village weeds namely Badaur, Karga, SadaKutki, Sawa, Bhajiban, Kutki, Karwat and Raksi are grown in paddy fields. In Dhuma village weeds namely SadaKutki, Doobi, Raksi, Bharwa, Bhaskathiya, Narjewa, Chunchuniya, Keni, Bade Sawa, Chuhka, Badaur and Podpoda are grown in paddy fields. In Parsada village weeds namely Chuhka, Doobi, Kutki, Narjewa, Keni, Karga, Bhajiban, Bhaskathiya and Sawa are grown in paddy fields. In Partewa village weeds namely Chunchuniya, Bharwa, Bhajiban, Kutki, Doobi and Sadakutki are grown in paddy fields. In Piparchedhi village weeds namely Narjewa, Kutki, Keni, Doobi, Bade sawa, Sawa, Karwat, Badaur, Podpoda, Raksi, Bhaskathiya, Sadakutki, Chotebhaji, Chunchuniya, Bharwa, Jhundi, Chuhka, Gengarwa and Karga are grown in paddy fields. In Pitaibandh village weeds namely Podpoda, Gengarwa, Narjewa, Kutki, Raksi, Keni and Bade sawa are grown in paddy fields. In Rawan village weeds namely Kutki, Karwat, Keni, Sadakutki, Chotebhaji, Badaur, Karga, Gengarwa, Bade sawa, Chuhka, Podpoda, Raksi and Jhundi are grown in paddy fields. In Shyam Nagar village weeds namely Narjewa, Bharwa, Chuhka, Chunchuniya, Raksi, Bhajiban, Gengarwa, Keni, Bade sawa, Podpoda, Chotebhaji, Sawa and Karwat are grown in paddy fields. In Sursabandha village weeds namely Chuhka, Badaur, Chunchuniya, Raksi, Jhundi, Bade sawa, Narjewa, Karwat, Podpoda, Karga, Bhaskathiya and Sawa are grown in paddy fields.

Use of herbicides is a prime method to either remove or control weeds from paddy fields. There are 20 types of weeds grown in the area during paddy (rice) cultivation. The herbicides used to for



weeds control includes Manigold, Nominigold, Hira, Mira 71, Glicel, 2/4 D, BASAGRAM, Sathi, Junoon, Granite and Platila Clor. It is further revealed that Nominigold, Granite and Manigold herbicides are popularly used to control weeds namely Badaur, Bade sawa, Bhajibban, Bharwa, Bhaskathiya, Chotebhaji, Chuhka, , Chunchuniya, Doobi, Gengarwa, Jhundi, Karga, Karwat, Keni, Kutki, Narjewa, Podpoda, Raksi, Sadakutki, Sawa in the region during paddy (rice) cultivation.

For the purpose of analysis the type of paddy used for cultivation are grouped as type I and type II. Type I variety of paddy includes HMT, CHANDAN SAMBHA, S49 SARNA, 5204, NAR-NARI, MAHAMAYA, SARNA, ARPANA, IR 1010, 64-44 GOLD, RD-55 and SAMBHA. Type II variety of paddy includes 64-44 GOLD, RD-55, SRD 55, 5204, HMT, SARNA, CHANDAN SAMBHA, SAMBHA, IR 1010, ARPANA and SAMBHA. There are two varieties of rice namely S49 Sarna and SRD 55 are cultivated in the sample villages as type I and type II category respectively. The study revealed that Sarna variety of paddy is considered as most yielding variety of paddy cultivated by the farmers. On the other hand, Nar Nari type of paddy yields minimum output per acre. Sarna variety yields about 30 quintals per acre whereas IR 1010 type of variety yields minimum. The average production of rice in type I category is 23 quintals per acre whereas the average production of type II paddy is 23.3 quintals per acre.

In 1001 paddy variety 2 types of herbicides are used in different quantity to control weeds grown namely BHAJIBAN, BHARWA, CHOTE BHAJI, CHUNCHUNIYA, DOOBI, GENGARWA, KARGA, KUTKI, RAKSI and SADA KUTKI. It is revealed that GLICEL, NOMINIGOLD and HIRA herbicides are widely used to control weeds grown with 1001 variety of paddy. In 5204 paddy variety 2 types of herbicides are used in different quantity to control weeds grown namely BHARWA, BHASKATHIYA, CHOTE BHAJI, CHUHKA, GENGARWA, KARWAT, KENI, KUTKI, NARJEW, PODPODA, RAKSI and SADA KUTKI. It is revealed that GLICEL, NOMINIGOLD and BASAGRAM herbicides are widely used to control weeds grown with 5204 variety of paddy. In 64-44 GOLD paddy variety 2 types of herbicides are used in different quantity to control weeds grown namely BADE SAWA, BHAJIBAN, BHARWA, CHUNCHUNIYA, DOOBI, GENGARWA, KUTKI and SAWA. It is revealed that GLICEL, NOMINIGOLD, HIRA and MIRA 71 herbicides are widely used to control weeds grown with 64-44 GOLD variety of paddy. In ARPANA paddy variety 2 types of herbicides are used in different quantity to control weeds grown namely BHAJIBAN, BHARWA, CHUHKA, JHUNDI, KENI, PODPODA, RAKSI and SAWA. It is revealed that GLICEL, HIRA and BASAGRAM herbicides are widely used to control weeds grown with ARPANA variety of paddy. In CHANDAN SAMBHA paddy variety 2 types of herbicides are used in different quantity to control weeds grown namely BADAUR, BADE SAWA, BHAJIBAN, BHASKATHIYA, DOOBI and KARGA. It is revealed that GLICEL, NOMINIGOLD and MANIGOLD herbicides are widely used to control weeds grown with CHANDAN SAMBHA variety of paddy. In DHANI paddy variety 2 types of herbicides are used in different quantity to control weeds grown namely BADE SAWA, JHUNDI, KARGA, KUTKI, RAKSI and SAWA. It is revealed that GLICEL and NOMINIGOLD herbicides are widely used to control weeds grown with DHANI variety of paddy. In HMT paddy variety 2 types of herbicides are used in different quantity to control weeds grown namely BADAUR, BHAJIBAN, CHUNCHUNIYA, DOOBI, GENGARWA, KARGA and NARJEW. It is revealed that GLICEL herbicide is widely used to control weeds grown with HMT variety of paddy. In IR 1010 paddy variety 2 types of herbicides are used in different quantity to control weeds grown namely BHASKATHIYA, CHUNCHUNIYA, GENGARWA, JHUNDI, NARJEW, RAKSI, SADA KUTKI and SAWA. It is revealed that GLICEL, GRANITE and NOMINIGOLD herbicides are widely used to control weeds grown with IR 1010 variety of paddy. In IR 64 paddy variety 2 types of herbicides are used in different quantity to control weeds grown namely CHOTE BHAJI, DOOBI, KARWAT, NARJEW and SADA KUTKI. It is revealed that 2,4 D, JUNOON and PLATILA CLOR herbicides are widely used to control weeds grown with IR 64 variety of paddy. In MAHAMAYA paddy variety 2 types of herbicides are used in different quantity to control weeds grown namely



BADAUR, BADE SAWA, CHUNCHUNIYA, KARWAT, KUTKI, NARJEW, SADA KUTKI and SAWA. It is revealed that GRANITE, HIRA, GLICEL and NOMINIGOLD herbicides are widely used to control weeds grown with MAHAMAYA variety of paddy. In NAR-NARI paddy variety 2 types of herbicides are used in different quantity to control weeds grown namely CHUHKA, JHUNDI, NARJEW, PODPODA and SADA KUTKI. It is revealed that HIRA, GLICEL and NOMINIGOLD herbicides are widely used to control weeds grown with NAR-NARI variety of paddy. In RD-55 paddy variety 2 types of herbicides are used in different quantity to control weeds grown namely BHASKATHIYA, CHOTE BHAJI, CHUHKA, KENI, PODPODA and RAKSI. It is revealed that MIRA 71, 2, 4 D, BASAGRAM, GLICEL and NOMINIGOLD herbicides are widely used to control weeds grown with RD-55 variety of paddy. In S49 SARNA paddy variety 2 types of herbicides are used in different quantity to control weeds grown namely BADAUR, BADE SAWA, BHARWA, BHASKATHIYA, CHUHKA, DOOBI, GENGARWA, KARGA, NARJEW and PODPODA. It is revealed that MIRA 71, MANIGOLD, BASAGRAM, GLICEL and NOMINIGOLD herbicides are widely used to control weeds grown with S49 SARNA variety of paddy. In SAMBHA paddy variety 2 types of herbicides are used in different quantity to control weeds grown namely BADE SAWA, BHAJIBAN, BHARWA, CHOTE BHAJI, CHUHKA, CHUNCHUNIYA, DOOBI, KARWAT, KENI, KUTKI and SADA KUTKI. It is revealed that SATHI, JUNOON, GRANITE, HIRA, GLICEL and NOMINIGOLD herbicides are widely used to control weeds grown with SAMBHA variety of paddy. In SARNA paddy variety 2 types of herbicides are used in different quantity to control weeds grown namely BADAUR, BADE SAWA, BHAJIBAN, BHARWA, CHOTE BHAJI, CHUHKA, JHUNDI, KARGA, KARWAT, KENI, KUTKI and PODPODA. It is revealed that BASAGRAM, MANIGOLD, JUNOON, HIRA, GLICEL and NOMINIGOLD herbicides are widely used to control weeds grown with SARNA variety of paddy.

### 1.8 Further scope for the Study

The study undertaken gives a picture on weed and weed control by using MATLAB. The study is limited both in scope and contents because of pandemic situation. The dataset is also limited. Data is collected through google forms also constitute limitation in itself. However with limited database the analysis provides certain pertinent information on the scope of using MATLAB in other regions of Chhattisgarh with special reference to paddy (rice) cultivation. The objective of the study is to evolve a problem solving device for weed control in order to enhance the paddy harvest by developing a damage control strategy by using technology i.e. MATLAB with appropriate prediction/forecasting.

MATLAB has proven to be a best suited forecasting techniques for the prosperity of the agriculture by managing weeds. Toolboxes of MATLAB predicts and manages the issues arising out of weeds to cause obstacles to agriculture. The technique for application of MATLAB for weed control is presented below for the purpose of technological intervention in paddy cultivation.

Cross Industry Standard Process for Data Mining (CRISP-DM) can be used for the purpose of the study. The model offers practices for better, faster results with data mining. CRISP-DM is a data mining methodology. CRISP-DM has six phases, which provide a way to plan and carry on the data mining project. CRISP-DM phases namely: Agricultural understanding, Data understanding, Data preparation, Modelling Evaluation and Deployment.

**Agricultural understanding:** The main aim is to conduct the analysis based on real data through MATLAB by the use of knowledge discovery methods. For this reason awareness about the paddy cultivation should be in the dataset. The methods of paddy cultivation have been studied. Knowledge on weeds, variety of paddy cultivated and the remedies for weed control are some of the basics related to the study. It forms the understanding on paddy cultivation and weed management practices adopted by the farmers.

**Data understanding:** Dataset containing data about weeds grown with the different varieties of paddy in the field constitute the base data. Configuration of variables such as varieties of paddy



grown, quantity of paddy production, weeds grown with different varieties of paddy, quantity of weed grown with paddy in per acre, weed growth, classical weed removal techniques, herbicides used to remove weeds etc.. The farmer and the agricultural consultant can make a broad database by enhancing the size of the dataset

Dataset will be of mixed category i.e. type of data will be of both numeric and categorical (nominal) data. Data will be saved in Microsoft Excel. Import Tool will be used to import dataset to MATLAB. Once dataset is imported and loaded to MATLAB, experiments can be performed on the data.

**Data preparation:**The preparation of data depends on the objective of the study. The step was focused on choosing appropriate and relevant data and removing rows with missing information. The missing information is shown by NaN after the data is imported and loaded in MATLAB environment. `R = rmmisssing( A )` removes missing entries from an array or table. If A is a vector, then `rmmisssing` removes any entry that contains missing data. If A is a matrix or table, then `rmmisssing` removes any row that contains missing data. MATLAB command will be used to delete missing information from the loaded data. As a result the aggregate data is obtained for processing.

**Modeling:**Clustering is done basing on the objective of the study. MATLAB's Statistics and Machine Learning Toolbox has a function for clustering i.e. `Kmeans`. K-means is one of the simplest unsupervised learning algorithms that solve the well-known clustering problem. The procedure follows a simple and easy way to classify a given data set through a certain number of clusters (assume k clusters) fixed a priori. The main idea is to define k centroids, one for each cluster. By default, `Kmeans` uses the squared Euclidean distance measure.

**Evaluation:**The findings of the process will be evaluated in the stage either to confirm or reject the objective of the study. This step is meaningful as an output of the study. It has practical importance in the context of paddy farming.

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## DRIVERS AND BARRIERS OF ADOPTION OF MHEALTH SERVICES IN RURAL AND SEMI-URBAN INDIA

<sup>1</sup>Prof.Sangeeta Sahney,<sup>2</sup>Dr.S.Srinivasan and <sup>3</sup>Debananda Bindhani

<sup>1</sup>Professor, Vinod Gupta School of Management, Indian Institute of Technology, Kharagpur Kharagpur, West Bengal

<sup>2</sup>Assistant Professor, Vinod Gupta School of Management, Indian Institute of Technology Kharagpur, West Bengal

<sup>3</sup>Research Scholar, Vinod Gupta School of Management, Indian Institute of Technology, Kharagpur, West Bengal

### Abstract:

There are huge disparities and variations in the structure, performance and outcomes of health care delivery systems in the public-private and urban-rural set up. The grave situation of our healthcare services requires addressal at both macro (national) and micro (state and district) levels. The Indian govt. has also been proactive in spotting mHealth experiments happening across the globe and experimenting it back home but with little success. The aim of the study is to identify the drivers and barriers of adoption of mHealthcare services among the patients and doctors in rural and semi-urban population in India. The findings would help gain valuable insights is diffusion of a vital health are innovation, which is mHealth, which has within it the potential to offer a pertinent solution for long-standing healthcare issues in rural and semi-urban India.

**Keywords:** mHealth, Adoption, Drivers, Barriers

### I Introduction:

The healthcare industry is undergoing a massive transformation with the coming together of the mobile technology and the healthcare mobile apps, and this is going to benefit the healthcare professionals, be it doctors, the medical staff and administrators as well as the patients and policy makers in a major way. Mobile Health (henceforth mHealth) involves making use of the internet and the digital media to deliver healthcare services. Very little is known about customers' and practitioners' perspectives on m-health adoption in India and very few studies have attempted such a comprehensive study in the context of resource-limited settings worldwide. The use of mobile network communications to provide mHealth services enables healthcare delivery more effectively and efficiently, the most important advantages being ease of access to health services and the affordability. Although the Indian govt. has recognized the need for technology-driven initiatives and has been proactively experimenting projects but with little success.

The World Health Organization has defined mHealth as the "use of mobile and wireless technologies to support the achievement of health objectives." According World Health Organization (WHO) survey, mHealth has the potential to be used by varying stakeholders of the healthcare, and can increase healthcare quality and outcomes, expand accessibility of services, reduce costs, and improve personal wellness and public health. It may be used amongst (i) health care professionals themselves; (ii) health care professionals and patients; and (iii) intersectoral communication for surveillance and emergency situations.

India is the second most populous country, with varied socio-economic, demographic, cultural and political characteristics, and highly dynamic and changing environments. There is a huge amount of diversity that is evinced with respect to regional disparities, and the urban rural divide has attracted attention of the government and the policy makers from time to time. The widening economic and regional disparities pose huge challenges for the health sector. As per reports, 75% of health infrastructure and resources, whether physical or manpower, are concentrated in urban areas, where only 30% of the population resides. It is this rural-urban divide that mHealth services hope to bridge in emerging markets like India through its ubiquitous, low-cost, pervasive mobile channel.

mHealth contributes towards coordination and communication between healthcare providers with patients: anytime consultation and dialogue. It helps immensely in the diagnosis and medication as well as the follow-up processes like monitoring, for both inpatient and outpatient care. Health related data can be collated chronologically, and this can lead to the creation of systematic records of patient history. mHealth enhances the efficiency of doctors (through ease in maintaining of patient records and medical history, as well as accurate diagnosis and medication). Doctors are able to access patient-related information promptly, and auto checks on diagnosis and prescriptions through sophisticated apps and AI is possible, which enhances diagnostic accuracy. mHealth leads to rapport and relationship building, as it helps build a network between doctors, patients, para-medics and other health services. It also helps develop networks between scientists and researchers, insurance companies etc.

With the launch of Digital India, India is witnessing a transformation, and healthcare is no exception. A major breakthrough with respect to mobile apps during the pandemic COVID 19 is the



Aarogya setu, which is being used for patient tracking, community sensing and preventing the threat of contamination. Prior to March 2020, telemedicine in India was governed by several statutory guidelines. While telemedicine services were governed under the IT Act, 2000, clear guidelines with respect to privacy, security, confidentiality of patient data, etc. was lacking, and there was fear of misuse of electronic data records of patients. To deal with such issues, the IT ministry suggested guidelines and standardized operating procedures for telemedicine in India in May, 2003. Anticipating the severity of the Covid-19 pandemic, on March 25, 2020, the government of India, launched guidelines for telemedicine solutions.

The DOI theory is a widely used theory in diffusion and adoption of new ideas, products and services, and health care innovations are no exception. The theory acts as a key for the design of interventions required in behavioural change. Research on healthcare innovation has majorly been influenced by Rogers' seminal work on diffusion of innovation (DOI). Diffusion relates to the acceptance/rejection of an innovation by the segment(s). Rogers (1962), defined diffusion as "the process in which an innovation is communicated through certain channels over time among the members of a social system". According to him, diffusion of innovation comprises four main elements viz., innovation, communication channels, time and social system. Straub (2009) has defined diffusion as "the collective adoption process over time." The rate of adoption is a measure of how long it takes a new product or service offering to be adopted by the members of the target market. Rogers (2003) defines the rate of adoption as "the relative speed with which an innovation is adopted by members of a social system". The rate of adoption is "relative" in the sense that people differ in the speed with which they adopt an innovation, and one adopter category is quicker than another. The rate of adoption depends upon the traits and characteristics of people, in terms of their receptivity to new things, as well as the characteristics of the innovation itself, which draws people towards it or against it. Some product categories get adopted instantly well some take a longer period of time. Rogers (1962) has defined consumer adoption as "a sequence of steps in which the consumer passes from initial knowledge of an innovation, to forming an attitude towards it, to reaching an adoption decision". According to Rogers's people pass through five stages when accepting innovations. First, potential adopters learn about the innovation (knowledge); second, they need to be persuaded regarding the advantages of the new good and service (persuasion); third, they decide to buy the product or service (decision); fourth, they buy and use it (implementation); and fifth, they reaffirm their decision to adopt the new good or service (confirmation). People follow these five stages during the adoption process, and may reject the innovation during any of these five stages or even after adopting it (Sahney, 2017).

#### **Objectives of the study:**

The aim of the project is to explore the relevance of mHealthcare services and to examine the relationship between the various factors that act as drivers and barriers towards adoption of mHealth by the doctors, patients and households in rural and semi-urban India. The objectives of the study are listed as follows:

1. To explore the factors that trigger and inhibit the adoption of mHealth services among doctors, patients and households in rural and semi-urban India.
2. To explain the dependency-interdependency relationship between the various factors that act as drivers and barriers towards adoption of mHealth across user segments like doctors, patients and households in rural and semi-urban India.

## **II Methodology:**

### ***Variable conceptualization:***

Adoption of a new good or a service is not only influenced by the characteristics of the adopter, but also by the characteristics of the innovation. This is explained through the theory of perceived attributes of the innovation. According to the theory of perceived attributes, people's perception about attributes of an innovation play an important role in the rate of adoption of a new good or service. The speed with which adoption of an innovation takes place is based on relative advantage of the product, its compatibility with values and norms, its complexity of use, its trialability (divisibility), and its observability (communicability) to the potential market. These product characteristics influence user acceptance of new goods and services and the diffusion process. While product characteristics like relative advantage, compatibility, trialability, and observability, boost the rate of diffusion and adoption, perceived complexity in purchase and usage of innovative offerings, retards the process.



Innovations could also meet resistance from socio-cultural, economic, situational and technological forces. Also, the innovative offering may not be compatible with social norms, values and lifestyle; or may not go well with the economic strata; or be technologically complex, leading to fear of usage, obsolescence and risk.

**Questionnaire Preparation and Administration:**

Literature review helped identify and conceptualise the relevant factors pertaining to mHealth service adoption. Based on the review and synthesis of the relevant literature (Rogers, 1962, 1995, 2002; Beach and Mitchell, 1978; Bandura, 1982; Davis, 1989; Herr et al., 1991; Moore and Benbasat, 1991; Venkatesh and Davis, 2000; Venkatesh, 2000; Venkatesh and Davis, 2000; Ganesh, 2004; Ramani and Mavalankar, 2006; Rouibah and Abbas, 2006; Park and Chen, 2007; Ray and Mukherjee, 2007; Holden and Karsh, 2010; Ramachandran et al., 2010; Melas et al., 2011; Dunnebeil et al., 2012; Brown III et al., 2013; Schuster et al., 2013; Chib et al., 2015; Lee et al., 2015; Mshali et al., 2018; Rivera et al., 2015; Deng et al., 2015; Park et al., 2016; and Kuciapski, 2017), the various variables included in the study were conceptualized. Three different sets of questionnaires were developed, one each for doctors, patients and households, and as the questionnaire was treated as a schedule, the respondents were asked open ended questions and were interviewed.

**Method of Data Collection and Analysis:**

Based on the objectives of the study, both primary and secondary data were used. Secondary data was gathered from health reports of government and non-government organizations as well as world bodies and health organizations, like Ministry of Health and family Welfare, Government of India Census Reports, WHO etc. Primary data was collected through a structured questionnaire as well as discussions with healthcare personnel, patients and members of the community in select rural and semi-urban areas of four states of India, viz., Andhra Pradesh, Jharkhand, Odisha, and West Bengal. Non-probabilistic judgmental and purposive sampling technique was used to select the rural and semi-urban areas under study, the basis being health infrastructure availability, both doctors and medical facilities for people. While judgmental and convenience sampling was used for the choice of states under study, data with respect to the number of Sub-Centres (SC), Primary Health Centres (PHCs) and Community Health Centres (CHCs) in such states as compared to other states and union territories also provided support to the choice of states. After collection of data, quantitative tools and techniques were used to analyse the data.

**Sampling Method and Size:**

The study aimed at gaining insights into stakeholders' behaviours and attitudes, be it doctors or patients is critical, and hence the sample comprised doctors, patients and households. The segmentation analysis was conducted through a micro analysis of 4 states, namely Andhra Pradesh, Jharkhand, Odisha and West Bengal. Non-probabilistic judgmental and purposive sampling technique was used to select the rural and semi-urban areas under study, the basis being health infrastructure availability, both doctors and medical facilities for people. Within an area, random sampling was used for collection of primary data from patients and households, and purposive sampling was used to collect data from doctors.

**III Data Analysis and Findings:**

Objective 1: To explore the factors that trigger and inhibit the adoption of mHealth services among doctors, patients and households in rural and semi-urban India.

Objective 2: To explain the dependency-interdependency relationship between the various factors that act as drivers and barriers towards adoption of mHealth across user segments like doctors, patients and households in rural and semi-urban India.

Based on literature review, the items for the study were generated, and these are depicted in Table 1. To explore the factors that trigger and inhibit the adoption of mHealth services among doctors, patients and households in rural and semi-urban India as well as to examine the relationship between the various factors that act as drivers and barriers towards adoption of mHealth by the doctors, patients and households in rural and semi-urban India, the logistic regression with the adoption of mHealth as a categorical variable was used. Regression models provide a fair idea about significant independent factors that predict a dependent output variable.

**Table 1 Variables and Description for Correlation**

Sl. No	Variable Codes	Descriptions of the Variables
1	AMH	Adoption of mHealth
2	FHC	Frequency of health check ups
3	DHC	Distance of health care centre
4	AWM	Awareness of mHealth
5	KMH	Knowledge about mHealth
6	AWT	Awareness of telemedicine
7	KTM	Knowledge about telemedicine
8	AMHA	Awareness of mHealth service applications (apps)
9	KMHA	Knowledge about mHealth service applications (apps)
10	EOP	Ease of operation
11	MHRE	Reduced costs
12	THR	Training of using mHealth
13	INFRA	Availability of infrastructure for mHealth services
14	COMN	Availability of applications (apps) in local language

Table 2 depicts the Logistic Regression Analysis of determinants of adoption of mHealth by doctors. Nagelkerke's  $R^2$  (0.209) exhibits that there exist a slightly moderate relationship between the prediction and the predictors (Paustian and Theuvsen, 2017). Results indicate that the DHC (distance of health care centre) and MHRE (reduced costs) appear to have positive influence on the adoption of the mHealth by the doctors. However, THR (training of using mHealth) appears to have a negative influence on the adoption of the mHealth. The Wald statistics criterion demonstrates that DHC has a significant contribution to mHealth adoption at 5% level of significance ( $p=.049$ ). Therefore, DHC plays a significant role as far as adoption of a mHealth is concerned. Similarly, MHRE has a significant contribution to mHealth adoption at 10% level of significance ( $p=.064$ ) and THR has a significant contribution to mHealth adoption at 1% level of significance ( $p=.001$ ). EXP (B) values indicate that for one unit increase in MHRE, the odds ratio becomes 2.002 times greater and in turn it increases the chances of the mHealth to be adopted by the doctors 2.002 times. DHC has a similar effect on doctors' decisions to adopt mHealth.

**Table 2: Logistic Regression Analysis of Determinants of Adoption of mHealth by Doctors**

Variables	B	S.E.	Wald	Sig.	Exp(B)	95% C.I. for EXP(B)	
						Lower	Upper
FHC	-.161	.174	.849	.357	.852	.605	1.199
DHC	.525	.267	3.872	.049 <sup>**</sup>	1.690	1.002	2.851
AWM	-.368	.877	.176	.675	.692	.124	3.861
KMH	.571	.675	.716	.398	1.771	.471	6.654
AWT	.462	.366	1.598	.206	1.588	.775	3.251
KTM	.268	.616	.189	.664	1.307	.391	4.371
AMHA	.250	1.147	.048	.827	1.284	.136	12.158
KMHA	.325	.420	.597	.440	1.384	.607	3.152
EOP	-.650	.781	.692	.405	.522	.113	2.414
MHRE	.704	.380	3.436	.064 <sup>*</sup>	2.022	.960	4.256
THR	-1.872	.551	11.554	.001 <sup>***</sup>	.154	.052	.453
INFRA	-1.103	1.417	.606	.436	.332	.021	5.336
COMN	.572	.605	.895	.344	1.772	.542	5.794
Constant	.737	1.368	.290	.590	2.090		
-2Log likelihood	188.999						
Cox & Snell $R^2$	.155						
Nagelkerke $R^2$	0.209						
Hosmer and Lemeshow $\chi^2$	3.092						

\*\*\* denotes 0.01(1%) level of significant, \*\* denotes 0.05(5%) level of significance and \* denotes 0.1(10%) level of significance

Table 3 depicts the Logistic Regression Analysis of determinants of adoption of mHealth by patients. Nagelkerke's  $R^2$  (0.306) exhibits that there exist a moderate relationship between the prediction and the predictors (Paustian and Theuvsen, 2017). Results indicate that AWT (awareness of telemedicine) appears to have positive influence on the adoption of the mHealth, whereas AWM (awareness of mHealth) and AMHA (awareness of mHealth service apps) appear to have negative influence on the adoption of the mHealth by the patients. The Wald statistics criterion demonstrates that AWM has a significant contribution to mHealth adoption at 5% level of significance ( $p=.011$ ). Therefore, AWM plays a significant role as far as adoption of a mHealth is concerned. Similarly, AWT and AMHA have significant contribution to mHealth adoption at 1% level of significance ( $p=.004$ ) and 10% level of significance ( $p=.091$ ) respectively. EXP (B) values indicate that for one unit increase in AWT, the odds ratio becomes 4.013 times greater and in turn it increases the chances of the mHealth to be adopted by the patients 4.013 times.

**Table 3: Logistic Regression Analysis of Determinants of Adoption of mHealth by Patients**

Variables	B	S.E.	Wald	Sig.	Exp(B)	95% C.I. for EXP(B)	
						Lower	Upper
FHC	.093	.213	.190	.663	1.097	.722	1.667
DHC	-.174	.222	.616	.432	.840	.543	1.298
AWM	-1.189	.469	6.427	.011**	.305	.122	.764
KMH	.021	.476	.002	.964	1.022	.402	2.597
AWT	1.389	.481	8.338	.004***	4.013	1.563	10.305
KTM	-.162	.185	.769	.380	.850	.592	1.222
AMHA	-1.387	.821	2.856	.091*	.250	.050	1.248
KMHA	.851	1.193	.509	.475	2.343	.226	24.270
EOP	.201	.886	.051	.821	1.222	.215	6.940
MHRE	-.078	.910	.007	.932	.925	.155	5.505
THR	-.627	.708	.785	.376	.534	.133	2.139
INFRA	.056	.636	.008	.929	1.058	.304	3.679
COMN	.578	.610	.898	.343	1.783	.539	5.895
Constant	.591	1.254	.222	.637	1.806		
-2Log likelihood	122.666						
Cox & Snell $R^2$	.228						
Nagelkerke $R^2$	.306						
Hosmer and Lemeshow $\chi^2$	7.316						

\*\*\* denotes 0.01(1%) level of significant, \*\* denotes 0.05(5%) level of significance and \* denotes 0.1(10%) level of significance

Table 4 depicts the Logistic Regression Analysis of determinants of adoption of mHealth by households. Nagelkerke's  $R^2$  (0.314) exhibits that there exist a moderate relationship between the prediction and the predictors (Paustian and Theuvsen, 2017). Results indicate that AWM (awareness of mHealth) and AMHA (awareness of mHealth service apps) appear to have positive influence on the adoption of the mHealth by households. However, EOP (ease of operation) appears to have a negative influence on the adoption of the mHealth. The Wald statistics criterion demonstrates that AWM and EOP have significant contribution to mHealth adoption at 10% level of significance, where corresponding p values are 0.065 and 0.059 respectively. Similarly, AMHA also appears to have significant contribution to mHealth adoption at 5% level of significance ( $p=.021$ ). Therefore, AWM, AMHA, and EOP play significant role as far as adoption of a mHealth by households is concerned. EXP (B) values

indicate that for one unit increase in AMHA, the odds ratio becomes 6.339 times greater and in turn it increases the chances of the mHealth to be adopted by households 6.339 times. AWM has a similar effect on households' decisions to adopt mHealth.

**Table 4: Logistic Regression Analysis of Determinants of Adoption of mHealth by Households**

Variables	B	S.E.	Wald	Sig.	Exp(B)	95% C.I. for EXP(B)	
						Lower	Upper
FHC	1.119	.703	2.533	.112	3.061	.772	12.145
DHC	-.296	.328	.810	.368	.744	.391	1.416
AWM	1.279	.692	3.415	.065*	3.592	.925	13.937
KMH	-.277	.652	.180	.671	.758	.211	2.722
AWT	.713	.788	.818	.366	2.039	.435	9.552
KTM	-.079	.724	.012	.913	.924	.224	3.816
AMHA	1.847	.800	5.322	.021**	6.339	1.320	30.435
KMHA	.788	.693	1.294	.255	2.199	.566	8.550
EOP	-1.932	1.022	3.577	.059*	.145	.020	1.073
MHRE	1.180	1.169	1.018	.313	3.253	.329	32.184
THR	-.661	.503	1.724	.189	.517	.193	1.385
INFRA	.207	.919	.051	.822	1.230	.203	7.446
COMN	.045	.841	.003	.957	1.046	.201	5.441
Constant	-1.083	1.032	1.101	.294	.339		
-2Log likelihood	66.5						
Cox & Snell R <sup>2</sup>	.235						
Nagelkerke R <sup>2</sup>	.314						
Hosmer and Lemeshow Chi <sup>2</sup>	14.408						

\*\*\* denotes 0.01(1%) level of significant, \*\* denotes 0.05(5%) level of significance and \* denotes 0.1(10%) level of significance

Table 5 depicts the Logistic Regression Analysis of determinants of adoption of mHealth by doctors in Andhra Pradesh. Nagelkerke's R<sup>2</sup> (0.403) exhibits that there exist a highly moderate relationship between the prediction and the predictors (Paustian and Theuvsen, 2017). Results indicate that KMHA (knowledge about mHealth service apps) appears to have positive influence on the adoption of the mHealth by the doctors in Andhra Pradesh. The Wald statistics criterion demonstrates that only KMHA has a significant contribution to mHealth adoption at 10% level of significance (p=.053). Therefore, KMHA plays a significant role as far as adoption of a mHealth is concerned. EXP (B) values indicate that for one unit increase in KMHA, the odds ratio becomes 17.392 times greater and in turn it increases the chances of the mHealth to be adopted by the doctors in Andhra Pradesh 17.392 times.

**Table 5: Logistic Regression Analysis of Determinants of Adoption of mHealth by Doctors: Andhra Pradesh**

Variables	B	S.E.	Wald	Sig.	Exp(B)	95% C.I. for EXP (B)	
						Lower	Upper
FHC	-.080	.455	.031	.860	.923	.378	2.251
DHC	-.264	1.220	.047	.829	.768	.070	8.397
AWM	.431	1.303	.109	.741	1.538	.120	19.774
KMH	3.530	3.992	.782	.377	34.118	.014	85316.095
AWT	.201	1.487	.018	.893	1.222	.066	22.526



KTM	-1.543	2.300	.450	.502	.214	.002	19.390
AMHA	-1.592	1.965	.657	.418	.203	.004	9.567
KMHA	2.856	1.476	3.743	.053*	17.392	.963	314.022
EOP	-.310	3.004	.011	.918	.733	.002	264.487
MHRE	-.214	1.190	.032	.857	.807	.078	8.321
THR	.929	1.133	.672	.412	2.532	.275	23.332
INFRA	-2.037	1.728	1.389	.239	.130	.004	3.858
COMN	1.701	1.366	1.551	.213	5.477	.377	79.616
Constant	-1.969	2.690	.536	.464	.140		
-2Log likelihood	33.977						
Cox & Snell R <sup>2</sup>	.279						
Nagelkerke R <sup>2</sup>	.403						
Hosmer and Lemeshow Chi <sup>2</sup>	5.473						

\*\*\* denotes 0.01(1%) level of significant, \*\* denotes 0.05(5%) level of significance and \* denotes 0.1(10%) level of significance

Table 6 depicts the Logistic Regression Analysis of determinants of adoption of mHealth by doctors in Jharkhand. Nagelkerke's R<sup>2</sup> (0.458) exhibits that there exist a highly moderate relationship between the prediction and the predictors (Paustian and Theuvsen, 2017). Results indicate that AWM (awareness of mHealth) appears to have positive influence on the adoption of the mHealth by the doctors in Jharkhand. However, FHC (frequency of health check ups) appears to have a negative influence on the adoption of the mHealth. The Wald statistics criterion demonstrates that AWM has a significant contribution to mHealth adoption at 10% level of significance (p=.075). Therefore, AWM plays a significant role as far as adoption of a mHealth by the doctors of Jharkhand is concerned. Similarly, FHC has a significant contribution to mHealth adoption at 10% level of significance (p=.060). EXP (B) values indicate that for one unit increase in AWM, the odds ratio becomes 11.124 times greater and in turn it increases the chances of the mHealth to be adopted by the doctors in Jharkhand 11.124 times.

**Table 6: Logistic Regression Analysis of Determinants of Adoption of mHealth by Doctors: Jharkhand**

Variables	B	S.E.	Wald	Sig.	Exp(B)	95% C.I. for EXP(B)	
						Lower	Upper
FHC	-1.375E+00	.732	3.534	.060*	.253	.060	1.060
DHC	1.891	1.799	1.105	.293	6.626	.195	225.283
AWM	2.409	1.355	3.163	.075*	11.124	.782	158.271
KMH	2.829	4.962	.325	.569	16.929	.001	283276.925
AWT	.854	1.207	.501	.479	2.350	.221	25.002
KTM	-8.609E-02	7.974	.000	.991	.918	1.497E-07	5.625E+06
AMHA	1.478	7.854	.035	.851	4.384	9.046E-07	2.125E+07
KMHA	.474	1.741	.074	.786	1.606	.053	48.757
EOP	-6.944E+00	4.761	2.127	.145	.001	8.536E-08	10.888
MHRE	-8.464E-01	1.459	.337	.562	.429	.025	7.483
THR	1.630	1.516	1.157	.282	5.106	.262	99.573
INFRA	.258	4.579	.003	.955	1.295	.000	10221.947
COMN	2.036	1.625	1.570	.210	7.662	.317	185.185
Constant	-1.636E+00	2.992	.299	.584	.195		



-2Log likelihood	24.121					
Cox & Snell R <sup>2</sup>	.277					
Nagelkerke R <sup>2</sup>	.458					
Hosmer and Lemeshow Chi <sup>2</sup>	5.193					

\*\*\* denotes 0.01(1%) level of significant, \*\* denotes 0.05(5%) level of significance and \* denotes 0.1(10%) level of significance

Table 7 depicts the Logistic Regression Analysis of determinants of adoption of mHealth by doctors in Odisha. Nagelkerke's R<sup>2</sup> (0.224) exhibits that there exist a slightly moderate relationship between the prediction and the predictors (Paustian and Theuvsen, 2017). Results indicate that MHRE (reduced costs) appears to have positive influence on the adoption of the mHealth by the doctors in Odisha. However, THR (training of using mHealth) appears to have a negative influence on the adoption of the mHealth. The Wald statistics criterion demonstrates that MHRE has a significant contribution to mHealth adoption at 10% level of significance (p=.075). Therefore, MHRE plays a significant role as far as adoption of a mHealth by the doctors of Odisha is concerned. Similarly, THR has a significant contribution to mHealth adoption at 1% level of significance (p=.001). EXP (B) values indicate that for one unit increase in MHRE, the odds ratio becomes 1.965 times greater and in turn it increases the chances of the mHealth to be adopted by the doctors in Odisha 1.965 times.

**Table 7: Logistic Regression Analysis of Determinants of Adoption of mHealth by Doctors: Odisha**

Variables	B	S.E.	Wald	Sig.	Exp(B)	95% C.I.for EXP(B)	
						Lower	Upper
FHC	-.189	.173	1.190	.275	.828	.590	1.162
DHC	.364	.260	1.961	.161	1.439	.865	2.395
AWM	.430	1.487	.084	.772	1.537	.083	28.325
KMH	1.341	.969	1.915	.166	3.822	.572	25.520
AWT	.453	.371	1.488	.223	1.572	.760	3.254
KTM	.732	.744	.968	.325	2.079	.484	8.937
AMHA	-.783	1.383	.320	.571	.457	.030	6.872
KMHA	.453	.430	1.107	.293	1.573	.677	3.655
EOP	-.308	.840	.135	.713	.735	.142	3.808
MHRE	.676	.379	3.173	.075*	1.965	.934	4.132
THR	-1.873	.585	10.259	.001***	.154	.049	.483
INFRA	-1.373	1.480	.860	.354	.253	.014	4.610
COMN	.435	.611	.505	.477	1.544	.466	5.117
Constant	.333	1.699	.038	.845	1.395		
-2Log likelihood	186.927						
Cox & Snell R <sup>2</sup>	.166						
Nagelkerke R <sup>2</sup>	.224						
Hosmer and Lemeshow Chi <sup>2</sup>	2.268						

\*\*\* denotes 0.01(1%) level of significant, \*\* denotes 0.05(5%) level of significance and \* denotes 0.1(10%) level of significance

Table 8 depicts the Logistic Regression Analysis of determinants of adoption of mHealth by doctors in West Bengal. Results indicate that both EOP (ease of operation) and MHRE (reduced costs) have positive influence on the adoption of the mHealth by the doctors in West Bengal. The Wald statistics criterion demonstrates that EOP has a significant contribution to mHealth adoption at 5% level of significance ( $p=.032$ ). Therefore, EOP plays a significant role as far as adoption of mHealth by the doctors in West Bengal is concerned. Similarly, MHRE has a significant contribution to mHealth adoption at 1% level of significance ( $p=.006$ ). EXP (B) values indicate that for one unit increase in EOP, the odds ratio becomes 4244.280 times greater and in turn it increases the chances of the mHealth to be adopted by the doctors in West Bengal 4244.280 times. MHRE has a similar effect on doctors' decisions to adopt mHealth.

**Table 8: Logistic Regression Analysis of Determinants of Adoption of mHealth by Doctors: West Bengal**

Variables	B	S.E.	Wald	Sig.	Exp(B)	95% C.I. for EXP(B)	
						Lower	Upper
FHC	-2.390	.716	.112	.738	.787	.194	3.201
DHC	1.458	1.645	.785	.375	4.295	.171	107.873
AWM	-1.802	1.569	.013	.909	.835	.039	18.087
KMH	3.284	14057.151	.000	.998	1.838	.000	.
AWT	-1.621	1.551	1.091	.296	.198	.009	4.138
KTM	-4.007	2.589	2.395	.122	.018	.000	2.909
AMHA	-5.840	6.539	.798	.372	.003	7.892	1071.223
KMHA	-1.322	2.001	.436	.509	.267	.005	13.472
EOP	8.353	3.893	4.605	.032**	4244.280	2.062	8.735
MHRE	5.672	2.064	7.553	.006***	290.575	5.088	16594.419
THR	2.673	1.593	.028	.867	1.306	.058	29.627
INFRA	-3.349	14057.150	.000	.998	2.868	.000	.
COMN	4.950	4.167	1.411	.235	141.126	.040	497202.573
Constant	-6.576	5.775	1.297	.255	.001		
-2Log likelihood	23.805						
Cox & Snell R <sup>2</sup>	0.53.6						
Nagelkerke R <sup>2</sup>	.721						
Hosmer and Lemeshow Chi <sup>2</sup>	2.324						

\*\*\* denotes 0.01(1%) level of significant, \*\* denotes 0.05(5%) level of significance and \* denotes 0.1(10%) level of significance

#### IV Findings of the Study and Discussion:

Logistic regression with the adoption of mHealth as a categorical variable was used. Regression models provide a fair idea about significant independent factors that predict a dependent output variable.

##### A) Doctors:

- There exist a slightly moderate relationship between the prediction and the predictors. Results indicated that the distance of health care centre, reduced costs and training of using mHealth appears to have an influence on the adoption of the mHealth.

##### B) Patients:

- There exists a moderate relationship between the prediction and the predictors. Results indicated that awareness of telemedicine, awareness of mHealth and awareness of mHealth service apps appear to have an influence on the adoption of the mHealth by the patients.



C) Households:

- There exists a moderate relationship between the prediction and the predictors. Results indicated that awareness of mHealth, awareness of mHealth service apps and ease of operations appear to have an influence on the adoption of the mHealth by households. However, EOP (ease of operation) play significant role as far as adoption of a mHealth by the households is concerned.

Due to limitations of the small sample size, state-wise analysis was done only for the doctors.

A) Doctors: Andhra Pradesh:

- There exists a moderate relationship between the prediction and the predictors. Results indicated indicate that knowledge about mHealth service apps appears to have positive influence on the adoption of the mHealth by the doctors in Andhra Pradesh.

B) Doctors: Jharkhand:

- There exists a moderate relationship between the prediction and the predictors. Results indicate that awareness of mHealth and frequency of health check ups appears to have positive influence on the adoption of the mHealth by the doctors in Jharkhand.

C) Doctors: Odisha:

- There exists a moderate relationship between the prediction and the predictors. Results indicated that reduced costs and training of using mHealth appears to have positive influence on the adoption of the mHealth by the doctors in Odisha.

D) Doctors: West Bengal

- There exists a moderate relationship between the prediction and the predictors. Results indicated that ease of operation and reduced costs have an influence on the adoption of the mHealth by the doctors in West Bengal.

Disparities and inefficiencies surrounding Indian Healthcare system are one of the serious concern of government since days of independence. The fact that over more 70% of nation's population who resides in rural India is deprived of access to basic healthcare indicates underlying inequalities in healthcare distribution. The widespread use of ICT in medicine has revolutionized healthcare delivery in India. While government programmes are initiated, there is procedural delay, which leads to ineffectiveness. Even the use of digital technologies via mHealth, which was expected to bridge the rural-urban divide has not met with much progress and impact as was expected. In India, the access to mHealth apps is low because of poverty, illiteracy, and lack of awareness and knowledge, and technical know-how.

The robustness of Roger's Diffusion of Innovation theory lies in its application across various disciplines and fields of study, and across varied countries and contexts. Yet issues that need to be addressed are with respect to intervention by doctors and para-medical staff, social clusters and opinion leadership, demonstration projects, so that the spread of evidence-based practices, police and programs can be enhanced.

The DOI in healthcare services innovation is influenced by interests of multiple stakeholders. Innovations must demonstrate a clear advantage over existing ideas and practices, and a social element manifested as a social contagion and communication within facilitates the diffusion process. The advantage over current practices must be explained, and research evidence supporting mHealth must be clearly visible. This can act as a vital input into policy makers as well as the government in future innovation adoption planning of health services. At the system level, the adoption process is multifaceted, both from the doctor and patient perspective. It is always challenging and cumbersome to promote change in regular healthcare practices when it is felt that the change does not afford a relative advantage. Also, similar to adoption at a more micro, i.e. individual level, doctors and health care specialists as well as patients may perceive the adoption of innovative practices like mHealth care as difficult and complicated in proving healthcare services and solving problems. Members of a social system vary with respect to the manner in which they respond to an innovation. Adoption decisions in a social system may be individually based or group based through consensus or may be mandated by authority through laws. While mass media helps spread of awareness about an innovation, interpersonal communication and social networks helps in attitude formation and change.



Interpersonal ties are effective in attitude formation and change. The influence of the opinion leaders in rural areas is based on their awareness and knowledge, competence and social position. While analyzing the social system, it is important to assess who is more knowledgeable and informed, influential and persuasive, trustworthy, and who has access to various communication channels. The local community members and opinion leaders act as important nodes of influence in communication networks.

The ineffectiveness of mHealth programs designed by central and state governments has been due to gaps in the implementation. While policies are formulated, the implementation at the grassroots is weak. The link between government and health care providers (like hospitals, health care centres, pathology laboratories, chemists and druggists, private nursing homes), government to healthcare business sectors (medical equipment manufacturers, pharma companies, and infrastructure suppliers) and government to citizens will facilitate the adoption of e-health care. Inter-sectoral collaboration is necessary for social and health improvement. The solution to quality of healthcare lies in overall governance and accountability. Policy formulation and execution, as well as regulation and enforcement in public health, capacity building and infrastructure development along with trained healthcare professionals, and a strong surveillance and monitoring mechanism are essential towards building a robust health care system. Healthcare organisations in India are not sufficiently equipped both technologically as well as in terms of trained human resources to be able to adopt and use mobile technology. Barriers to mHealth among patients include fear of the unknown, doubts over security and privacy of healthcare information, complexity of mHealth applications, illiteracy, and non-availability of the service in vernacular languages. Patients' are more comfortable with face-to-face interaction, and there is resistance to change. In spite of the benefits, there is reluctance with respect to usage of mobile phones and tablets, and applications in day-to-day healthcare practices. For adoption of mHealth, community participation is essential. People like to behave like others in their reference groups. Opinion leaders also exercise strong influence in rural areas. Generally, the Sarpanch/Pradhan (village head) and the Gram Sevaks, the school principal and teachers, as well as the doctor and the nurse, and other prominent villagers act as opinion leaders. Youth who have had exposure in cities both because of attending schools and colleges and because of work, or even the migrated rural people, also tend to act as opinion leaders.

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## DRIVING RETAILER'S GROWTH BY LEVERAGING ANALYTICS FOR HOMELINEN CATEGORYRETAILER'S PROFITABILITY

<sup>1</sup>Prof Dr. Kavita Kalyandurgmath,<sup>2</sup>Prof Dr.Swapna Pradhan  
and <sup>3</sup>Riddhima Hublikar

<sup>1</sup>Associate Dean Analytics and Operations ,Prin. L.N. Welingkar Institute of Management Research & Development, Matunga, Mumbai

<sup>2</sup>Dean Academics, Prin. L.N. Welingkar Institute of Management Research & Development, Matunga, Mumbai

<sup>3</sup>Prin. L.N. Welingkar Institute of Management Research & Development , Matunga, Mumbai , Student PGDM Retail

### Abstract :-

This paper seeks to explore the significant impact of consumer purchase behavior & Promotions on the Assortment Planning of the Home Linen Category. It also seeks to highlight the importance of expanding the assortment of Private Labels in the Home Linen Category. The researchers in various metro cities primarily conduct the study. The problem statement was of a leading Indian multinational conglomerate to expand their business of home linen category across major metros.

Research methodology adopted is primary. The research type is descriptive. Convenience sampling of 270 respondents, who had walked into the store of four metro cities of a specific retailer. The number of respondents considered for scheduled interviews for different metros namely Mumbai, Delhi, and Bengaluru. The scheduled interviews and the observation methods are the tools in the data collection at the retail outlets of the metros. Using Analytics on the primary data mainly Testing of Hypothesis, Z Test of Proportion for large sample, major conclusions arrived at, are that the majority of the consumers make impulse driven purchases in this category, and therefore including Promotional activities in the Assortment Plan are vital. Another critical insight derived is that, customers in this category are largely price driven and precisely price sensitive. This highlights the need to introduce & amplify the Private label assortment in this category.

**Key Words:-**Home Linen, Category Management, Assortment Planning, Analytics, Profitability

### I. Introduction

The retail scenario in India has undergone a complete metamorphosis, from the rudimentary mom and pop stores to high street experiential retailing. A robust growth in GDP has enabled the economy to emerge as a favored destination in many sectors and retail is one such sector.

Large Indian business houses and many international brands have entered the retail space and formats new to the marketplace have emerged. This has largely been driven by multiple factors, which include the changing consumer demographics, an enhancement in the purchasing power, the proliferation of technology and a conducive



investment climate which enabled many international retailers to gain an entry into the country.

The retail sector in India was estimated at \$672 billion, in the year 2017 and was expected to reach the mark of \$1.1 trillion by 2020.<sup>1</sup> The penetration of organized retail in the country stood at just 7% thus demonstrating a large potential for growth. The online retail sector has clocked revenues of \$17.8 billion in the year 2017 and is likely to reach \$60 billion in revenues in 2020.<sup>2</sup> Online retail is expected to grow rapidly aided by the proliferation of smart phones and the growth of the internet. The Indian consumer is now more aware of his brand choices, the price that he would like to pay for a product or service and the service levels that he expects for the same. Home Linen as a category being largely margin driven, revising assortment plans & understanding consumer mindset & the motivations that drive their purchase decisions in this category, can assist retailers in maximizing their revenues from this category. The research into the buying habits of consumers specifically for this category, has revealed that consumers shopping from this category are majorly impulse driven. They are not very brand conscious, they are price conscious, which is reinforced by the sales figures of Private label brands that supersede those of established National Brands by a great margin. This is a significant insight for Assortment Planners, to broaden their assortments in the Home Linen category by way of Private labels. Also the success of the Promotional activities carried out in this category emphasizes the criticality of this activity to boost sales & increase the bill penetration of this category.

#### **The need of Assortment Planning**

Retailers are becoming aware of diverse product categories that need to be available in the store to cater to the needs of the discerning consumers. Apart from standard categories like apparel and footwear, baby care and home linen are also emerging as dominant categories in various retail formats. Private labels within categories have also seen a growth and this has had significant implications on how retail buyers make buying decisions for their stores and their respective target audiences. Retailers are increasingly becoming aware of the fact that in certain cases growing a category and not a specific brand is where the business opportunity lies coupled with a gamut of data mining possibilities, has led to the emergence of the concept of Category Management. Category Management aided by the refined data mining tools has made it virtually possible for retailers to enter into the homes of their consumers, by identifying their demographics, shopping patterns & basing their purchase decisions & assortment plans on logical outcomes derived from the consumer insights.

The consumer shopping basket is now defined by retailers in terms of categories shopped by the consumers and the focus is on increasing category penetration. With this increased focus on category growth, the way retailers plan their assortments to suit customer needs has undergone a cosmic change. This has in turn enhanced the focus on Assortment Planning, which today plays a vital and often game changing role within the retail store.



Assortment Planning has been defined as the creation of a curated selection of merchandise on the basis of the target audience preferences & including details like which & how many brands, sizes, styles, price points, packaging etc., to maintain an inventory of. The stage of assortment planning is of critical importance to the retailers, as a key asset of the retailer is the shelf space that he can offer and hence optimization of this shelf space is extremely vital. A key aspect of improving customer satisfaction levels in the store lies in the retailer's ability to offer to the customers the choice of merchandise that they seek is as closely aligned as possible to their demographic and shopping patterns. Assortment or Range Planners need to be specific in understanding the preference of their target audience in terms of merchandise mix, the tradeoff between national brands and private labels, the price and promotion dynamics as well as focus on enabling an efficient and agile supply chain.

## **II.Literature Review**

Researchers had long recognized the critical importance of Assortment Planning to the business model of retailers. Efficient assortment optimization models having taken into consideration any level of quality & variable costs, in the presence of fixed costs & exogenous prices, had been developed. (Pan & Honhon, 2011, April-May). Evaluation of profitability of each variant using a comprehensive measure, "profit rate", and then the determination as to which product should be selected. The profit rate refers to the expected profit generated by the variant if it were to attract 100% of store traffic. The optimal assortment contained the few items that had the highest profit rate. This research had provided managerial insights on assortment planning and accentuated the importance of measuring the profitability of variants when the demand is random and there is cannibalization among different products (Li, 2007, May-June). The goal of the research was to investigate the impact of a recent trend in the consumer goods supply chains where retailers rely on a leading manufacturer in a category for recommendations regarding the assortment offering to the consumers. Retailers benefited from the category captain's superior knowledge about the consumers and/or ability to drive additional traffic into the category. The results were along these two dimensions. The overall conclusion of the research was that although using category captains for category management could be an excellent value proposition for retailers, the consequences of using category captains should be better understood by retailers. The consequences of using category captains may have differed depending on what the category captains are used for (Kurtulus & Nakkas, 2011). The focus of this research was on the question, whether it was necessary to explicitly account for consumer search in the assortment planning process. The no-search model assumed the consumers' preference for a variant is fixed, i.e., not dependent on the other variants in the assortment. The other two models expanded upon the no-search model to include some form of consumer search. Furthermore, the consequence for failing to account for consumer search in an assortment-planning model could be substantial: the no-search model may recommend closing down a category (include no variants in the assortment) even though there existed an assortment with positive profit (a 100% profit loss). (Cachon, Terweisch & Xu, 2005). There are two ways an ineffective assortment may have adversely affected the category revenue

(1) the ineffective assortment could shift demand from high-margin brands to low-



margin brands,

(2) The ineffective assortment may have reduced the total category sales.(Chong, Ho &Tang, 2001).

An important managerial insight of the paper was that incorporating dynamic substitution in assortment planning could lead to a significant gain in expected profit, especially when price and cost parameters varied across products, and even when customers were homogeneous in their preferences.(Honhon,Gaur& Seshadri,2010).The paper introduced differential evolution to assist retailers in adapting their product portfolios in periods of economic recession and facilitate strategic PAP decisions, related to

- (a) optimal variety of PL product categories,
- (b) optimal service level of PL merchandise within a product category, and hence,
- (c) optimal balance between PLs and National Brands in a retailer's product portfolio.

It was widely recognized that economic recessions contributed to the prolonged upward evolution in PL share, leaving scars on NBs performance levels. As a result, the proposed mechanism facilitated PL-PAP decisions that are nowadays more important than ever before. (Tsafarakis et al, 2015).We found that decentralized assortment planning, as in CM, where category managers were responsible for their own category's profit is likely to lead to lower variety, higher prices, and significantly lower profits than optimal. However, a centralized optimal solution was almost surely not implementable in practice due to the complexity of the required data estimation and optimization. Therefore, we proposed a decentralized regime, like CM, but instead of evaluating each category manager's accounting profit, we measured their basket profits where basket profits could be estimated using point-of-sale data. We found that our basket profit approach provides near-optimal solutions for a retailer. Hence, although the presence of basket shopping consumers is known to create significant analytical complications for the assortment-planning problem, a robust and simple analytical solution exists. (Cachon&Kok, 2007)

### **III.Research Problem**

Researchers acknowledge the significance & monetary impact that the Assortment Planning function has on a retailer's profitability.However most of the analytical solutions offered to address this problem, are in the form of Assortment Optimization Models. These models incorporate variables such as Brand, Price, Consumer Search, & Category Captains &based on varied underlying assumptions that have been in discussions on global context, and few studies have been found that are relevant in the Indian context, where organized retail is still in its growing phase. Lesser studies have been found that focus on critical qualitative factors of Assortment Planning that revolve around Customer, Competitors, Vendors & Visual Merchandising. In addition, the prioritization of product attributes by consumers varies depending on the product category to be purchased, lesser studies have been found that align their research towards a specific product category & plan their assortments taking into consideration the consumer decision-making tree for that category.

This paper seeks to explore and bring to the forefront certain critical factors that need to



be taken into account while creating an assortment plan for a Hypermarket Chain. The category chosen for this purpose is the Home Linen Category. These factors have been identified by conducting a research on consumer buying habits, catchment area analysis, Competitive landscape, Display Techniques, & Vendor Support for the Home Linen category.

#### **IV Research Objectives :**

The study aimed at the following research objectives for the Home Linen Category.

- To analyze the trends of consumer purchase behavior for Home Linen products.
- To examine the effect of sales promotions on Home Linen Products on their customers.
- To emphasize criticality of the Private Labels in Home Linen Assortment.

#### **Study Hypothesis :**

1 To study the customers behavior is it Planned & Impulse purchases while buying Home Linen Products.

2 Does the promotional activities conducted within the stores of the hypermarket influence the Purchases of the Home Linen products .

3 To study is there a significant impact of sales revenue of Private Label brand versus the National Brands in the Home Linen Category.

#### **V. Research Methodology:**

Research design is well crafted to study the above objectives .The study is conducted primarily for a retail outlets at Mumbai , Delhi, Bengaluru to understand the top of mind awareness of the presence of home linen category, at the well-known Hypermarket of Mumbai and also to study whether there is impulse or planned behavior while purchasing the Home linen category. The Main aim of the study is to analyze the consumer purchase behavior, specifically of the Home Linen Category in a Hypermarket. It also seeks to proliferate the importance of Promotional Activities & Private Labels in the Assortment Planning process. A quantitative research has been carried out & a close ended questionnaire has been designed for this purpose. Scheduled interviews for 270 respondents were conducted in the stores of the customers across the metros Primarily by the researchers. The type of research was descriptive .Since the store operated in Major Metros of India ,Accordingly the Probability and nonprobability sampling techniques were adopted for the study .Initially as step 1 the probability sampling technique namely cluster sampling was done considering Mumbai, Delhi, Bengaluru as the clusters. Next step 2 is using Non probability sampling methods namely Quota Sampling & Convenience Sampling, which were adopted in the major cities where the Hypermarkets are Located. Totally the respondents were covered the in store customers from 20 Hypermarkets in the Metro Regions of Delhi, Mumbai & Bangalore, with the sample size being estimated to be 270 respondents. The overall reliability was found to be 0.8 which indicates there is a good internal consistency between the study variables chosen , within the primary data



collected by the researchers. Apart from this primary data the researchers, conducted observation method by being present at the week days and weekends. Also performed Content Analysis has been used to analyze the Sales data of 20 Hypermarkets, across the 3 Metro regions. The Primary data is later coded, data was cleaned and analyzed using advanced statistical techniques with the help of Statistical package IBM Spss.

## VI .Data Analysis & Interpretation

As per Aditya Birla Report who has invested heavily is strong believer that there would be increasing trend in buying of Home linen Category. The analysis blends the art and science of assortment planning of home linen category within the major metros. The primary data was coded using excel for Further Statistical Analysis to study the stated objectives.

Thus, the data was segregated into customers who are pre decided and impulse buyers and was treated as two different proportions. The Statistical analysis is done using Testing of proportion for large sample test using Z Test.

### Null Hypothesis1

H01: There is no significant difference in proportion between Planned & Impulse purchases of the customers in the Home Linen Category at Hyper Markets.

### Analysis and Interpretation:

There is a 85% of awareness of respondents that the home linen category exists at the store but Bengaluru customers are shopping at the Hypermarkets followed by Delhi who are of the opinion that the products are matching with their requirements. Whereas Mumbai respondents are though being equally aware however showed least response when it comes for shopping home linen products at hypermarkets. Thus proving statistically using testing of Proportions for large samples using Z test.

Catchment Analysis: **Catchment** is defined as the region of influence from which the specific retailer is likely to attract its customers. Thus it is the area from where they expect to count on their footfalls and run their business. Most recent studies show of various catchments is Primary, Secondary and Tertiary that attract 75%, 20% and 5% of the total visitors respectively. The size of the catchment area for Mumbai, Delhi and Bengaluru is determined by the size, and the format of the store, density of population of its catchment, the intention of competition, and the way in which its proposition fits the needs of the customer base of the regional area. The major determining factor for the size of the area is the format –the bigger the formats would have larger trade areas and hence a large catchment to cater as against a small retail player or any other retailer or department stores nearby. Typically the primary catchment has a span of around 5 kilometers on each side of the establishment. In spite of prior Catchment Analysis done by the Investor company the Mumbai Store is not yielding attractive results and more so the linen category as compared to Bengaluru followed by Delhi.



Display Techniques: According to research article by Harvard Business the digital marketing technology helps in boosting the sales. Retailer's need to start with designing creative effective window , signage boards to pull in the customers by display boards to ensure increased footfalls .It is important to apply techniques ,like display the linen sheets , vertical hangers for curtains, organizing Bedroom space , online advertising, which further helps in look and feel of the product. “ The punched line goes as is as **show don't tell** “The following display tactics may influence the customers to go for impulse buying if the display uses different themes , color codes, eyelevel, balance is the key keeping things simple and organized.

Application of Testing hypothesis for proving hypotheses

Research Hypothesis :To study the Consumer purchase behavior whether planned or are Impulse for homelinen category

Statistical Hypothesis H01:There is a nosignificant difference in the proportions ofPlanned& Impulse purchases for this category.

H12: There is a significant difference between the proportions of customers who were planned and the customers who do impulse purchases for home linen category planned and impulse purchases .

X1 represents sample observations for Planned purchases and

X2 denotes sample observations of impulse purchases.

N1 sample size first sample of planned purchases of home linen category

& N2 second sample size for impulse purchases of home linen category

$Z = (\text{Mean of } X1 - \text{Mean of } X2) / \sqrt{(\text{Sq}(\text{std dev of First sample} + \text{sq}(\text{std dev of second sample}) / n1+n2)}$

Student t test for two sample means reveals that there is a significant difference between the proportions of customers who planned their purchases versus the impulse buyers.

Testing for proportions has revealed that the calculated value of Z for H1, is 6.09, since the calculated value of Z is greater than the tabled value i.e. 2 at 5% level of significance.

Therefore, we reject the null hypothesis H01 and conclude that there is a significant difference in the proportions of Planned & Impulse purchases for this category.

Consumer purchase behavior in the Home Linen Category is largely impulse driven & not a planned purchase of their basket .More the so the display techniques could be influencing the impulsive decision of consumers while buying the homelinen Category. This Hypothesis lead the retailers to test whether the display and motivation techniques applied to the internal customers could drive the sales for influencing the impulse buying behavior.

Study objective 2

Research Hypothesis:The store promotion activities were initiated by the company to study whether it impacts the sales revenue after motivating internal sales consultants and also using display techniques. From the results of univariate statistics it is evident that that there is a significant impact on sales with respect to Promotional Activities. This reveals that in store Promotions are a significant motivational factor for consumers making Home Linen purchases.



Student t test for two sample means reveals that there is a significant impact on sales with respect to Promotional Activities. This reveals that in store Promotions are a significant motivational factor for consumers making Home Linen purchases.

P1 proportion of planned Non -promo sku's with respect to total sales of all metros.

P2 proportion of impulse purchases with respect to promo sku' s total sales of all metros.

N1 observed /interviewed customers sample size representing planned or nonpromoactivities .

N2 sample size representing promo activities performed to motivate the customers .

$$Z = \frac{p1 - p2 + z\alpha/2 \cdot s.e.(\hat{p1} - \hat{p2})}{s.e.(\hat{p1} - \hat{p2})}$$

$$\text{wheres.e.}(\hat{p1} - \hat{p2}) = \sqrt{\hat{p1}(1 - \hat{p1})n1 + \hat{p2}(1 - \hat{p2})n2}$$

Students t test for proportions for large sample size was applied to test the hypothesis. The results show that the calculated value of Z is 12 i.e. greater than the tabled value of Z at 5% level of significance, i.e. 2.33. Hence we reject the null hypothesis & accept the alternate hypothesis, i.e. there is a significant difference in the sales revenue of Private Label & National brands, with Private labels contributing to a significant proportion of the overall Sales Revenue of this category.

### VII. Managerial Insights:-

The findings of this paper will enable Assortment Planners of the Home Linen category to frame their Assortment Plans inclusive of influential promotional strategies around the merchandise. Value driven promotional strategies would prove to be the most effective trigger to boost the sales of this category that is largely driven by impulse purchases. Actively involving Promotions as an integral aspect of the Assortment Planning process, by providing the best offers, on the appropriate merchandise while carefully monitoring the margins & inventory carrying cost, can lead to a significant spike in the sales revenue of this category. Also the wide gap observed in the sales of the Private label brands & National Brands, with Private Labels clearly dominating the sales in this category, indicates the vitality of broadening the Private label assortment, for the Assortment Planners. The dominant position of Private Labels in a category that includes some of the most established brands like Bombay Dyeing, Spaces & Welspun, is indicative of the shift & the experimental mindset of the consumers, seeking a value driven proposition. This information can help Assortment Planners to increase the number of SKU's under their Private Label brands, by observing price gaps in comparison to the competitors & the National Brands & establishing a presence in those price segments by way of Private Labels.

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## PROCESS BASED MODELS OF LEARNING STYLES WITH LEARNING CENTRED APPROACH

<sup>1</sup>Patil Sandip Diliprao and <sup>2</sup>Dr. S. H. Vishwasrao

<sup>1</sup>Research Scholar <sup>2</sup>Associate Professor

Adarsh Comprehensive College of Education and Research, Pune  
Savitribai Phule Pune University, Pune

### ABSTRACT:-

This research paper discusses concept of style, approaches and models of learning style. The three distinct traditions of style based work in Psychology have also been focused here. It highlights Learning centred approach began in 1970s and involved the activity centred theories of learning style associated with educationists addressing environmental and process based issues related to meeting individual differences in the classroom. The approach is based on three features- greater interest in the impact of individual differences on pedagogy; development of new constructs and concepts of learning style; and the presentation of assessment instrument as a foundation for exploring theory. Learning centred approach includes three models viz. process-based models of learning styles, preference-based models and cognitive skills-based models of styles.

**Keywords:** Style, Activity (Learning) Centred Approach, Process Based Models, Honey And Mumford Typology, Curry's Onion Model

### INTRODUCTION:-

A knowledge of one's own style of learning is important in learning to learn. An apt Learning style not only helps in the discovery of information but also is the reconstruction of reality by the learner. The idea of learning style is based on the theory that an individual responds to educational experience with consistent behavior and performance patterns.

The concept style is used in variety of contexts, in high street fashion, the arts, the media and many academic disciplines including Educational Psychology.

### THE STYLE AS A CONCEPT:-

The concept style in Psychology is developed in number of different areas, for example: personality, cognition, communication, motivation, perception, learning and behavior. It's emergence as a theory entails both separate and related development, reflecting both a Philosophical and Psychological concerns of individuality, but as a result, reinforcing difficulty in definition.

Several writers have provided an account of the origin of style in cognitive Psychology. Matinsen(1994) cited Vernon (1973) when he claimed that antecedents of style can be traced back to classical Greek literature. Riding and Cheema(1991) and Grigerenko and Sternberg(1995) agree that Allport(1973), in his work which developed the idea of 'life-styles', was probably the first researcher to deliberately use the style concept in association with cognition.

Vernon (1963) provides an early critique of cognitive style. Vernon was critical of style development in the Psychology of perception, pointing to a serious problem with the style construct, which many writers were subsequently to repeat. She commented that



cognitive style had largely evolved from theories generalized on single experiments and little empirical evidence.

**APPROACHES EMERGED THROUGH STYLE BASED WORK (THE THREE TRADITION):-**

Grigerenko and Sternberg's (1995) discussion of style-based theory and research, brought forward the three distinct traditions of ‘style based work in Psychology’. Viz. Cognition-centred approach, Personality-centred approach and Activity(learning) centred approach.

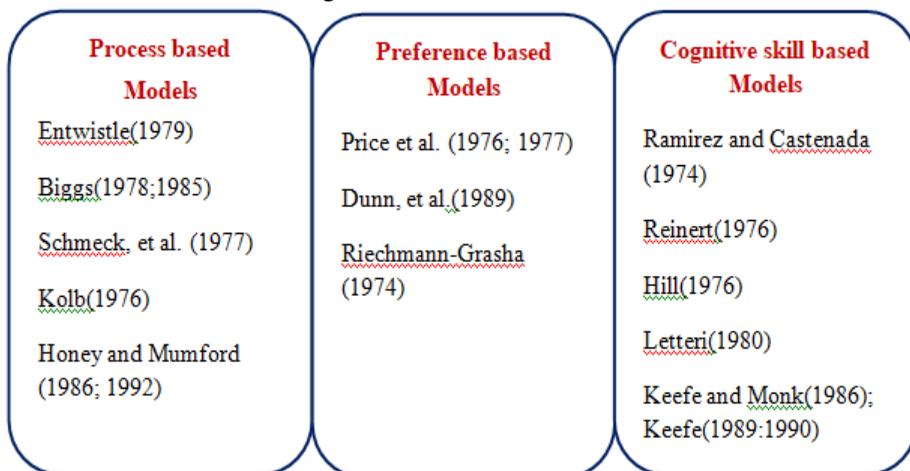
A Cognitive centred approach focuses the identification of styles based on individual difference in cognitive and perceptual functioning. The discussion of cognitive-centred approaches attempts to integrate the earlier work of Riding and Cheema (1991), categorising models according to wholist–analytic and verbal–imager principles.

Limited discussion of personality-centred approaches is discussed According to Rayner and Riding, its limited influence in the area and the existence of only a single model (Myers Briggs style model) that explicitly includes personality as a major factor.

Learning centred approach began in 1970s and involved the activity centred theories of learning style associated with educationists addressing environmental and process based issues related to meeting individual differences in the classroom.

**ACTIVITY/LEARNING CENTRED APPROACH:-**

Learning-centred approaches are distinguished on the basis of three features. First, a greater interest in the impact of individual differences on pedagogy; the second, development of new constructs and concepts of learning style; and the third presentation of assessment instrument as a foundation for exploring theory. It is organized into three style groups which reflect common features pointing to the measurement and the conceptualization of a particular dimension of the learning process. Rayner and Riding's subsequent discussion of learning-centred approaches is framed around the distinction among the three models namely process-based models; preference-based models and cognitive skills-based models.





## **PROCESS BASED MODELS OF LEARNING STYLES (Learning-Centred ,Processed-Based Approach / Information Processing Style) :-**

Process based models with learning centred approach are defined in terms of perceiving and information processing, with Kolb's Experiential Learning Model representing one such approach. Preference models focus on preferences of individuals for the learning condition and include preferred study time of day, temperature, light, preference for type of study. These are also known as information processing styles. Process based models are as below-

### **1) Kolb's Experiential Learning Model (ELM) and Learning Styles Inventory (LSI):-**

#### **Model-**

Kolb (1976, 1984) proposed a four-stage hypothetical learning cycle. Kolb states that the learning process always engages 4 components those associate 4 learning mode which are described as: concrete experience (CE; experiencing); abstract conceptualisation (AC; thinking); active experimentation (AE; doing); and reflective observation (RO; reflecting). The four learning orientations form two bipolar dimensions of learning. The first dimension is prehension—the grasping of information from experience—and is constituted by the two way orientations CE–AC. The second dimension described is transformation—the processing of grasped information—and is constituted by the remaining orientations AE–RO. These dimensions lead to four types of learning style preferences as-

- 1) Diverging- combines preferences for experiencing(CE) and Reflecting.
- 2) Assimilating- combines preferences by reflecting(AC) and thinking(RO)
- 3) Converging- combines preferences for thinking(AC) and doing(AE)
- 4) Accommodating- combines preferences for doing(AE) and experiencing(CE)

#### **Measurement-**

Initially prepared 9-item self-report scale (Kolb, 1976) was revised as LSI (Kolb, 1985) with 12-item self-report questionnaire. Respondents are required to rank four sentence endings corresponding to each of the four learning styles. LSI scores reflect an individual's relative emphasis on the four learning orientations and enable categorisation according to the corresponding learning style. Two combined scores measure an individual's preference for abstractness over concreteness (AC–CE) and action over reflection (AE–RO).

#### **Comments-**

Styles outlined by Kolb associated with student performance have been born out in a number of studies. For example, convergers perform better on conventional examinations involving concrete answers (Lynch et al., 1998). Kolb's emphasis on experiential learning and the developmental nature of learning suggests a potential for change in style (Rayner & Riding, 1997). The ELM forms the basis of the work of Honey and Mumford (1986) in the field of learning style and management.

### **2) Honey and Mumford's Learning Styles Questionnaire:-**

#### **Model-**

Honey and Mumford's (1992) categorization of learning style is based on Kolb's experiential learning model. The Learning Styles Questionnaire was developed for management trainees and was proposed as an alternative to Kolb's Learning style



Inventory. The four learning styles measured by the LSQ are: activist (Kolb's active experimentation); reflector (Kolb's reflective observation); theorist (Kolb's abstract conceptualisation); and pragmatist (Kolb's concrete experience).

**Measurement-**

The LSQ is an 80-item self-report inventory based on Kolb's ELM but developed specifically for use in industry and management. Tendency towards a preferential learning style is shown by the ratings of behaviour and preferences.

**Comments-**

Though the LSQ is developed for use with management trainees, the LSQ has been used in a range of settings including education. Duff and Duffy (2002) reported a failure to support the existence of either the two way dimensions or learning styles proposed by Honey and Mumford and found that LSQ has only modest levels of internal consistency (with a range from 0.52 to 0.73 for the four style subscales). Given that their sample was 388 undergraduate students, Duff and Duffy conclude the LSQ is not an acceptable alternative to the LSI and that its use in the field of higher education is premature.

**3) Vermunt's Learning Styles Inventory (LSI):-**

**Model-**

Vermunt's Learning Styles Inventory (LSI) was designed as a diagnostic tool to use in higher education context. Vermunt (1992) describes the concept of learning style in terms of: processing strategies, regulation strategies, mental models of learning, and learning orientations which is described as personal aims, intentions and expectations based on past experience of learning. Based on these strategies and orientations, Vermunt derived four learning styles:- 1) Undirected-Difficulty in assimilating learning material, coping with the volume of material and prioritising the importance of components of the material;2) Reproduction- Little or no effort is made to understand but information is reproduced to complete the task or achieve the minimum essential standard3) Application directed- Characterised by the application of learning material to concrete conditions for understanding. 4) Meaning directed- Involves attempts to gain a deeper understanding of learning material and to draw on existing and related knowledge to achieve critical understanding.

**Measurement-**

The LSI is composed of 20 subscales and 120 items relating to study strategies, motives and mental models. Individuals need to respond to statements on a five-point scale according to the degree to which the statement describes their behaviour or the extent to which the individual agree with the statement.

**Comments-**

Vermunt's (1992) own reports of acceptable reliability and validity of the LSI received some support from Busato, Prins, Elshout, and Hamaker (1998) who confirmed the existence of four factors corresponding to learning styles described by Vermunt. The influence of Kolb, Honey and Mumford, and Entwistle and Tait (see below) all seem present in Vermunt's approach to the assessment of learning styles.

**4) Entwistle et al.'s Approaches to Study Inventory:-**

**Model-**

Based on earlier work by Marton and Saljo (1976) Entwistle, Hanley, and Hounsell (1979) designed an instrument to assess learning style. The proposed model centres four



modes of orientation of the learner: meaning orientation; reproduction orientation; achieving orientation; and holistic orientation. Following learning styles are identified- 1) Deep learning-Intention to understand, relative ideas, use of evidence, and active learning. 2) Surface apathetic- Intention to reproduce, unrelated memorising, passive learning, and fear of failure. 3) Strategic (Nonn apathetic)- Study organisation, time management, assessment demands 4) Apathetic- Lack of direction and lack of interest).

**Measurement-**

The original 64-item ASI underwent a number of revisions and finally the number was 44 items in 1995 (Entwistle & Tait, 1995). The revised ASI (RASI) is a 44-item self-report inventory of learning activities with a Likert scale response format. It identifies six approaches to learning: deep approach; surface approach; strategic approach; lack of direction; academic self-confidence; and metacognitive awareness of studying.

**Comments-**

The ASI inventory has been used extensively in educational research and a recent study examining the psychometric properties of the RASI and its utility in an educational setting recommends its continued use for educational management and research (Duff, 2000).

**5) Biggs' Study Processes Questionnaire (SPQ):-**

**Model-**

Biggs (1985) further developed Entwistle's model to incorporate an extensive motivational dimension defined as intrinsic, extrinsic and achievement orientation. Bigg's study processes measure comprises both a strategy dimension and a motivational dimension.

**Measurement-**

Initial 42-item self-report questionnaire was revised to two-factor SPQ (Biggs, Kember, & Leung, 2001). It has 20 items and provides scores in relation to strategy (deep/surface) and motive (deep/surface).

**Comment-**

The composite score indicates consistently deep or surface approach of learning. In new version the achieving approach is not separated as in old version.

**6) Schmeck's Inventory of Learning Processes (ILP):-**

**Model-**

Schmeck et al.'s (1977) learning processes style construct is developed with the belief that it is the level and quality of thinking during learning that affects the learning outcome. This model follows the work of Marton and Saljo (1976). The four subscales of the ILP are: synthesis-analysis; elaborative processing; fact retention; and study methods (Rayner & Riding, 1997).

**Measurement-**

Initial ILP with 62-item self-report inventory had four subscales. A revised version (ILP-R) composed of 160 items with seven subscales (Schmeck, Geisler-Brenstein, & Cercey, 1991).

**Comment-**

Further studies stated that each version of the ILP came under criticism and Richardson (2000) concludes that the ILP cannot be recommended for use in investigating student learning.

**7) Hunt et al.'s Conceptual Level Model:-**

**Model-**

Hunt, Butler, Noy, and Rosser (1978) described learning style in terms of an individual's need for structure and the situations under which that individual will learn most effectively. The aim of the model is to match students' learning style with the most appropriate methods of teaching.

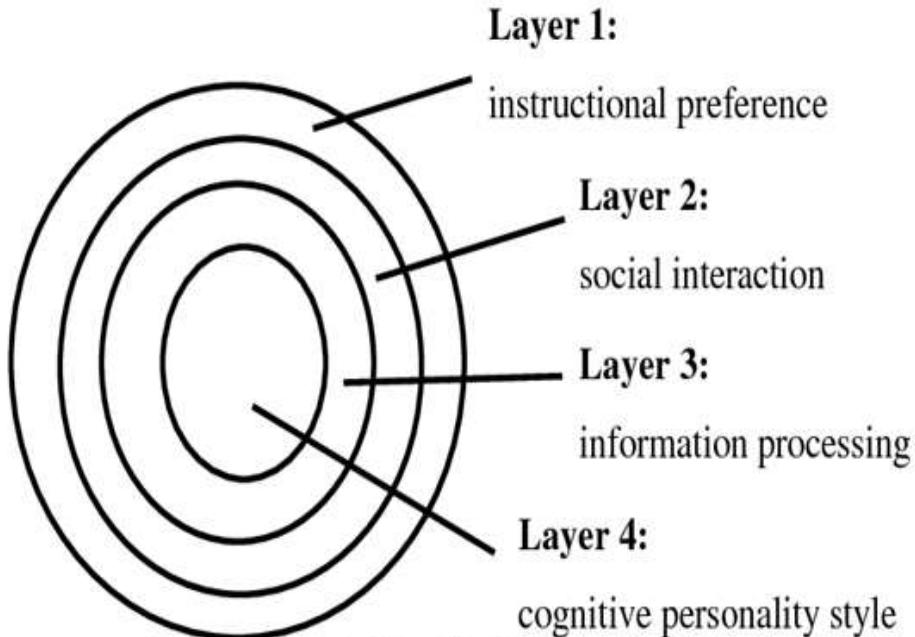
**Measurement-**

The Paragraph Completion Test demand individuals to complete and elaborate on six incomplete sentences since the responses are scored according to their degree of complexity. The scoring and interpretation of the test needs special training (De Bello, 1990).

**Comments-**

Suedfeld and Coren (1992) stated an association between conceptual level and divergent thinking and support the existence of the construct as a cognitive style rather than a mental ability. In line with findings, Hunt believes that although teaching needs to be enhanced towards students' learning style to facilitate learning, there may be a developmental component to style.

**CURRY'S ONION MODEL:-**



**Figure.-1 Curry's Onion Model of Learning Style theories.**



In view of the different terminology related to learning style, and given the existence of a large number of learning models [Coffield et al. 2004], a categorisation of these models can illuminate their key aspects. The model of Curry's onion can be used to classify learning theories [Curry 1983]. Curry (1983, 1987) utilises an onion metaphor to illustrate inner and outer layers of the construct of learning style. Initially proposed three layers, later "social interaction" as a fourth layer was included. The outermost layer called "Instructional preference" refers to the individual's preferred choice of learning environment. Social interaction provides the next layer and relates to the individual's preference for social interaction during learning. The third stable layer is "information processing style" which is described as the individual's intellectual approach to the processing of information. Instruments associated with the measurement of this layer are Kolb's Learning Style Inventory (Kolb, 1976), Cognitive Preference Inventory (Tamir & Cohen, 1980) and Inventory of Learning Processes (Schmeck, Ribich, & Ramaniah, 1977). The final layer described is "cognitive personality style". This appears the most robust component, described as a "relatively permanent personality dimension ... apparent only when an individual's behaviour is observed across many different learning situations" (Riding & Cheema, 1991, p. 195). Associated instruments for measurement are the Embedded Figures Test (Witkin, 1962), Myers Briggs Type Indicator, (Myers, 1962) and Matching Familiar Figures Test (Kagan, 1965).

#### **CONCLUSION:-**

Learning style models are classified on the basis of approaches used. Focusing on process based model they are combination of activities, information processing learning approach models. These learning style models have different dimensions, and each dimension has different categories. For example, The Kolb model has two main dimensions: concrete experience versus abstract conceptualisation and reflective observation versus active participation. Learning style models are usually augmented with a self-report questionnaire as an instrument for identifying individuals' learning styles. These tools vary in size, validity and reliability. Many educational theorists agree that taking learning style into account in instructions can improve learning. Curry's Onion Model is used to classify various learning theories and models. It's layers are compared to various approaches emerged.

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## EFFECTS OF CHEMICAL FERTILIZERS ON FISH

**Dr. Ashok Kumar Singh**

Assistant Prof. Dept of Zoology, M.R.S.M. College, Anandpur, Darbhanga, Bihar

### Abstract

Fertilizer industries use a variety of chemical compounds due to which the effluents are complex in nature. The effluents are rich in various organic compounds, heavy metals, dissolved and suspended solids. The effluents adversely affect the metabolism of fish inhabiting the aquatic bodies causing mortality and impairment in physiological activities. On the basis of pollution load, fertilizer producing industries have been categorized under red list industries in India by the Ministry of Environment, Forest and Climate Change. LC50 is the most reliable and preliminary test for toxicity evaluation in fish. Acetyl cholinesterase (AChE, EC: 3.1.1.7), an acetylcholine (ACh) hydrolyzing enzyme, plays an important role in neurotransmission in both the vertebrates and invertebrates. Inhibition of AChE by pesticides, heavy metals or industrial effluents results in ACh accumulation in synaptic cleft, causing neuromuscular paralysis and asphyxiation, resulting finally in mortality. The order of decrease in AChE activity was brain > gills > muscles for all sublethal concentration of the untreated effluent studied, however, no significant change was observed in the treated effluent exposed fishes.

**Key Words:**Fertilizer, Industries, Chemical Compounds, Acetyl cholinesterase and aquatic.

### Introduction

In an era of industrialization, developing countries face a big problem in proper industrial waste treatment prior to its disposal due to technical limitations and heavy economic expenses behind the treatment process. Therefore, an effective management to prevent or at least minimize waste generation by developing technologies for waste recycling and reuse are the need of the hour (Jadhav and Hocheng, 2012). Many ecological incidents occurred in the past across the planet, and there are still high probabilities that untreated industrial effluent may reach the nearby aquatic bodies and adversely affect the organisms living therein.

Fertilizer industries use a variety of chemical compounds due to which the effluents are complex in nature. The effluents are rich in various organic compounds, heavy metals, dissolved and suspended solids. The effluents adversely affect the metabolism of fish inhabiting the aquatic bodies causing mortality and impairment in physiological activities (Roopadevi and Somasekhar, 2012). On the basis of pollution load, fertilizer producing industries have been categorized under red list industries in India by the Ministry of Environment, Forest and Climate Change.

In the aquatic ecosystem, fish play crucial role in the monitoring of water contamination as they respond in most sensitivity to variations in aquatic pollution. The species, *Labeorohita*, is one of the major and most widespread carp species in India. It is suitable for experimental purposes due to its easy capturing and maintenance in the



laboratory and is also economically important. *L. rohitis* found throughout the year in lakes and rivers of India, has spindle shaped body for floatation purpose and is basically planktivorous.

LC50 is the most reliable and preliminary test for toxicity evaluation in fish (Shreelekshmy et al., 2016). Acetylcholinesterase (AChE, EC: 3.1.1.7), an acetylcholine (ACh) hydrolyzing enzyme (Gaitonde et al., 2006), plays an important role in neurotransmission in both the vertebrates and invertebrates (Valbonesi et al., 2003). Inhibition of AChE by pesticides, heavy metals or industrial effluents results in ACh accumulation in synaptic cleft, causing neuromuscular paralysis and asphyxiation, resulting finally in mortality.

Water quality is one of the major environmental issues. Day by day the concern is growing about water quality suitable for use by humans and animals. Daily activities of man by one way or the other affect the aquatic environment negatively. These activities, which include the discharge into streams and river systems of various pollutants, such as different types of agricultural fertilizers, pesticides, insecticides and industrial effluents, pollute the water bodies and alter ecological balance .

Environmental pollution by chemical fertilizers had been reported by Lloyd R. The sources of input of fertilizers into the aquatic environment as reported by Long DF, include superphosphate production effluent, run-off, and discharge from industrial effluents. Increased interest in the use of chemical fertilizers (Urea and NPK) in aquaculture and agriculture in general, necessitated an investigation on the toxic effects these fertilizers on aquatic organisms.

#### **Materials and Methods:**

Fishes, *Labeorohita*, were procured from the local fish market (Darbhanga, Bihar, India) and treated with potassium permanganate solution for one min to remove any kind of subcutaneous adherent. The fishes were acclimatized in glass aquarium (capacity 50 L) with dechlorinated aerated tap water (pH  $6.8 \pm 0.2$ , dissolved oxygen  $6.8 \pm 0.5$  mg L<sup>-1</sup> and total hardness  $111.4 \pm 4.0$  mg L<sup>-1</sup>). Before exposure, quality of water was assessed and tested according to the American Public Health Association Guidelines (APHA, 1985). For fifteen days, fishes were acclimatized at room temperature ( $26.0 \pm 1.2^\circ\text{C}$ ) and were fed commercially available food pellets ad libitum. All of the chemicals used in the present study were of analytical grade and standard quality.

#### **Physicochemical Analysis:**

The untreated and treated samples were collected from local market of Darbhanga and brought to the laboratory for physicochemical analysis followed by experimentation. Standard methods were used for the analysis of collected samples. pH and electrical conductivity (EC) were determined electrometrically. The physicochemical parameters such as alkalinity, hardness, dissolved oxygen, free ammonia and chloride were determined by titration method. Determinations of phosphate, sulphate and nitrate concentrations were done by spectrophotometric methods. Zinc, iron, chromium and potassium concentrations were determined by using atomic absorption spectrophotometer (Perkin Elmer Analyst 200, USA).



### **Determination of acute toxicity (LC<sub>50</sub>):**

Feeding was stopped twenty four hours before experimentation. Twelve individuals of *L. rohita* of average length of  $12.0 \pm 1.69$  cm and average weight of  $43.0 \pm 1.43$  g were placed in each of the aquaria containing 12 L of water (n = 12/glass aquarium). Untreated and treated effluent samples were added as per following concentrations – control, 0.75, 0.85, 0.90, 0.95, 1.00, 1.05% (v/v) and control, 20, 40, 60, 80 and 100% (v/v), respectively. At an interval of twenty four hours, the water of aquaria was changed and different concentrations of fresh effluents were added. Fish kept in effluent-free medium served as the control. The test was performed for 96 h treatment period and dead fish were removed as the test proceeded. The number of dead fish per group was recorded against the time of their mortality in a tabular form, as specified by Sprague (1969). The 96 h LC<sub>50</sub> value of untreated and treated effluents was calculated using arithmetic method of Kärber (1931), modified by Dede and Kaglo (2001).

### **Sub acute toxicity Test:**

The fishes were sacrificed by using mild anaesthesia (Trichloromethane) after exposure to three sublethal concentrations of effluents (1/15th of LC<sub>50</sub>, 1/10th of LC<sub>50</sub> and 1/10th of LC<sub>50</sub>) for 96 h. Key organs (brain, muscle and gills) of exposed fishes along with the control were surgically removed and thoroughly rinsed in 0.69% cold saline, at 4-6°C and blotted dry. The tissues were weighed and homogenized (10%, w/v) in 50 mM sodium phosphate buffer (pH 8.0), containing 0.1% Triton X-100, using Potter-Elvehjem homogenizer fitted with a Teflon-coated pestle under ice cold conditions. For 30 min, the homogenates were kept in cold with intermittent stirring and centrifuged at 4°C for 30 min at 10,000 g in a refrigerated centrifuge (Model-3K30 Sigma, St. Louis, USA). The corresponding supernatants were used afresh for determination of protein contents by AChE assay.

### **Test of Acetylcholinesterase (AChE):**

AChE activity was assayed according to Ellman's method (Ellman et al., 1961). The reaction mixture (3 mL) contained 1.5 mL of 100 mM sodium phosphate buffer (pH 8.0), 0.3 mL of 5 mM DTNB [5,5'-dithiobis-(2-nitrobenzoic acid), prepared in 10 mM sodium phosphate buffer, pH 7.5 containing 15 mg sodium bicarbonate added per 10 mL of solution], 0.3 mL of 5 mM Acetylthiocholine iodide (ATI), 0.1 mL of supernatant and 0.8 mL of distilled water. In a UV-visible double beam spectrophotometer (Shimadzu, Model: UV 1800, SL - 02480, Japan), the increase in absorbance was monitored at 412 nm and 28°C for 3 min with quartz cuvettes against distilled water as blank. For each tissue, measurements were made in triplicate. Simultaneously, two blanks were also used. One (enzyme blank) contained phosphate buffer, DTNB and ATI but not the enzyme to determine the spontaneous hydrolysis of ATI, and the second (substrate blank) contained phosphate buffer, DTNB and enzyme protein but no substrate to correct any non-AChE-dependent formation of thionitrobenzoic acid (TNB).

The data of physicochemical parameters are represented as mean  $\pm$  SEM. The lethal concentration for 96 h was calculated by Kärber method (1931) as adopted by Dede and Kaglo (2001), and confidence interval calculated by SPSS 16.0. The data for AChE activity and protein content were represented as mean  $\pm$  SEM and were analyzed



by the one-way analysis of variance (one-way ANOVA) using SPSS software (16.0, 2008).

### Results and Discussion:

Various physicochemical characteristics like pH, conductivity, alkalinity, hardness, dissolved oxygen, concentration of phosphate, sulphate, nitrate, chloride, zinc, iron, potassium, chromium and free ammonia of untreated and treated fertilizer industry effluents were studied. Some of the parameters like pH, conductivity, chloride content, free ammonia and chromium have been found quite high, while dissolved oxygen, concentration of nitrate, zinc and iron were even below the permissible limit of the Bureau of Indian Standards (BIS 10500:1991, 2003). However, others like alkalinity, hardness and the concentration of sulphate, phosphate and potassium were in moderate range.

The pH of untreated and treated effluent samples was  $9.99 \pm 0.17$  and  $7.2 \pm 0.048$ , respectively, and similarly alkalinity was  $627.0 \pm 0.54$  and  $192.0 \pm 0.49$  mg L<sup>-1</sup>, respectively. The higher pH (showing alkalinity) of the untreated sample is probably due to the presence of ammonia which may result in bio-concentration of metals in aquatic organisms and cause adverse effect on their health (Durrani et al., 2007). Conductivity of water shows the ability of solvent to conduct electricity which depends on the presence of ions and their concentrations (Abdullah and Musta, 1999). Conductivity is significantly correlated to the pH, alkalinity, hardness, concentrations of phosphate, sulphate, free ammonia, chloride, ion mobility and temperature, and is an indicator of salinity or total salt content of discharged effluent (Kumar and Sinha, 2010). A quite higher level of conductivity in the untreated effluent than in the treated one is probably due to the presence of a higher level of nitrate, free ammonia, chromium content, etc.. Hardness is a measure of capacity of water to precipitate soap, contributed by presence of calcium, magnesium and presence of minerals. The hardness of both the untreated and treated samples was almost close to the permissible range. Dissolved oxygen in the untreated effluent sample was  $3.33 \pm 0.09$  mg L<sup>-1</sup>, which is much lower than in the treated one (as per ISO-guidelines). A dissolved oxygen level > 5 mg L<sup>-1</sup> is necessary to support adequately the metabolism and health of fishes (Bhatnagar and Devi, 2013; Nirgude et al., 2013).

Thus the observed lower dissolved oxygen recorded in the untreated effluent seems inadequate for the maintenance of good health of fish. Effluent from the fertilizer industry contains a higher level of phosphate and sulphate, therefore higher concentrations of these in the untreated effluent sample were recorded. Increased phosphate results in eutrophication of aquatic ecosystem, which might be a cause for mortality of fish in aquatic system (Grubb et al., 2000; Horrigan et al., 2002). A higher level of chloride content observed in the untreated sample may be due to the usage of hydrochloric acid, hypochloric acid, chlorine gas, etc., as raw materials during various processes. A higher free ammonia and a lower nitrate content in the untreated sample indicates the presence of nitrogen in bound form (NH<sub>4</sub>OH) which decomposes into free ammonia and water, resulting in increase in ammonia concentration in comparison to the treated effluent. The zinc and iron levels in the untreated effluent sample are close to the permissible range. However, level of potassium is higher than in the treated sample, which may cause physiological imbalance in the fish (Sah et al., 2002). Chromium level

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is much higher in the untreated effluent sample than in the treated sample. It is non-biodegradable and therefore has potential to cause toxicity and biomagnifications in aquatic organisms (Wicklund-Glynn and Olsson, 1991; Praveena et al., 2013).

**Table: 1**

**Physico-chemical parameters of the untreated and treated effluent sample (Mean ± SEM) of the fertilizer industry and their permissible range (BIS 10500: 1991, 2003)**

S. No	Parameters	Permissible Range	Untreated effluent	Treated effluent	Method employed
1.	pH	6.6 - 8.3	9.89 ±0.17	7.3 ± 0.048	Electrometric
2.	Conductivity	200 (µScm-1)	9465 ±1.82	218 ± 1.08	Electrometric
3.	Alkalinity	200 (mg L-1)	628.0 ± 0.54	193 ±0.49	Titrimetric
4.	Hardness	300-600 (mg L-1)	662.0 ± 0.09	304 ± 0.84	Titrimetric
5.	Dissolved Oxygen	5 (mg L-1)	3.43 ± 0.09	4.93 ± 0.23	Titrimetric
6.	Phosphate	5 (mg L-1)	7.42 ± 0.50	5.03 ± 0.11	Spectroscopic
7.	Sulphate	200 - 400 (mg L-1)	868.0 ± 1.58	334.8 ± 0.28	Spectroscopic
8.	Nitrate	45 – 100 (mg L-1)	10.79 ± 0.57	63.25 ± 0.88	Spectroscopic
9.	Free NH3	0-5 (mg L-1)	413.6 ± 0.47	4.6 ± 0.29	Titrimetric
10.	Chloride	250-1000 (mg L-1)	1697.2 ± 0.56	856.2 ±0.96	Titrimetric
11.	Zinc	<2 (mg L-1)	0.142 ± 0.01	1.95 ± 0.05	Atomic Absorption Spectrophotometric
12.	Iron	1.0 (mg L-1)	0.089 ± 0.01	0.93 ± 0.03	Atomic Absorption Spectrophotometric
13.	Potassium	<20 (mg L-1)	26.57 ± 0.72	19.30 ± 0.82	Atomic Absorption Spectrophotometric
14.	Chromium	0.05 (mg L-1)	1.264 ± 0.09	0.07 ± 0.01	Atomic Absorption Spectrophotometric

**Toxicity assessment :**

Acute toxicity assessment provides a lethal value of tested effluents in carps. The obtained values show susceptibility of fish to particular contaminants and reflect



their survival potential. Accordingly, carps due to their physiological and ecological condition (Abedi et al., 2012). LC50 for 96 h for the untreated effluent in *H. fossilis* and *L. rohita* was determined as 2.35 and 0.85 % (v/v) (confidence interval: 1.94 - 2.47 and 0.786 - 0.958).

A similar finding was reported by Yadav et al. (2007) in *Channa striatus* (70% v/v). However, fishes exposed to dechlorinated tap-water and the treated effluent sample were observed to be healthy and normal.

However, reports regarding lethal toxicity in fishes exposed to fertilizer industry effluent are very scanty. Only a few are currently available but for varying exposure duration (shorter than 96 h) and for different fish species. The LC50 values at 24, 48 and 72 h were 72.05, 30.81 and 15.26% (v/v). The LC50 values of different industrial effluents for 96 h exposure of different fish species have been reported. These values were 20, 6 and 22% (v/v) in *L. rohita* for tannery, electroplating and textile effluents, respectively (Muley et al., 2007); 4.21 and 2.5% (v/v).

**Acetylcholinesterase activity:**

After exposure to sublethal concentrations (1/15th, 1/10th and 1/5th of LC50) of the untreated effluent for 96 h, AChE activity was found to decrease in a concentration-dependent manner in fish species. The order of decrease in AChE activity was brain > gills > muscles for all sublethal concentration of the untreated effluent studied, however, no significant change was observed in the treated effluent exposed fishes.

AChE is a transmembrane protein present in cell membranes of vertebrates and invertebrates (Jebali et al., 2013) which hydrolyzes the neurotransmitter acetylcholine into choline and acetic acid in synapses as well as neuromuscular junctions. However, only scanty information is available related to the impact of fertilizer industry effluents on this enzyme.

**Table: 2**

LC50 determination value of the untreated fertilizer industry effluent in *L. rohita* for 96 h based on arithmetic method of Kärber (1931) as adopted by Dede and Kaglo (2001)

Concentration % (v/v)	Concentration difference	Number of alive fish	Number of dead fish	Mean mortality	Mean mortality x concentration difference
Control	0	12	0	0	0
0.75	0.75	10	2	1	0.75
0.85	0.10	08	4	3	0.30
0.90	0.10	05	7	5.50	0.55
0.95	0.05	04	8	7.50	0.375
1.00	0.05	2	10	9	0.45
1.05	0.05	0	12	11	0.55
					Σ = 2.975

Summation indicates sum (Mean mortality x Concentration difference) LC50 for LC100 -Σ (Mean mortality x Concentration difference)/ number of organisms per group untreated effluent  $1.05 - 2.975/12 = 1.05 - 0.248 = 0.80\%$  (v/v).



The waste water released from fertilizer industry contains various contaminants which may act synergistically and if accumulated by inhibiting AChE activity may pose serious threat to the inhabiting species. Hence, measurement of fish AChE activity has been considered as a suitable indicator for biomonitoring aquatic/industrial pollution (Jebali et al., 2013). The results further indicate that this effluent may act on AChE as a key target for its action. The negative impact caused by the untreated effluent, such as decrease in AChE activity and protein content in fish tissues could be attributed to the presence of certain heavy metals and ammonia in it which may bind irreversibly on active site (Ravindra, 1999). The physical factors of fertilizer industry effluent such as dissolved oxygen, pH, temperature and salinity may also influence certain biochemical indices in both fishes by altering multiple pathways (Bobmanuel et al., 2006; Kumari et al., 2010). In aquatic ecosystems, fertilizer industry effluent containing low concentrations (Sultana and Rao, 1998) of zinc may cause tissue damage by reacting with proteins and could also affect the respiratory efficiency, ion exchange and osmoregulatory function of the organs (Lloyd, 1992). The heavy metals present in the effluent in association with other chemicals may distort the cell organelles and alter the activity of several enzymes (Jan et al., 2015).

#### **CONCLUSION:**

The physico-chemical characteristics of the untreated fertilizer industry effluent sample exhibited high pH, conductivity, free ammonia, chloride and chromium while low dissolved oxygen, iron and nitrate might be the reason for its high toxicity. The treated effluent sample had no toxic effect even when undiluted. This may be due to the fact that the physico-chemical parameters were in defined range of ISO guidelines (BIS 10500, 1991, 2003). The sublethal exposure of the untreated effluent sample clearly resulted in an inhibitory effect on the AChE activity in a concentration-dependent manner. These results indicate impairment of neuronal signalling on exposure to fertilizer industry effluent. The order of decrease in AChE activity was brain > gills > muscles for all sublethal concentration of the untreated effluent studied, however, no significant change was observed in the treated effluent exposed fishes. However, further biochemical and molecular studies may help in better understanding of the mechanism of action of fertilizer industrial pollutants. It is thus recommended that the application of these fertilizers in aquatic ecosystems either in ponds, industries should be carefully controlled or monitored, such that concentrations that are lethal to aquatic life could be avoided. There is also a great need to provide further baseline data on urea and NPK fertilizers. Such studies should be concerned with providing information on research.

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## **CONSUMER BEHAVIOUR TOWARDS ONLINE SHOPPING IN INDIA: A CASE STUDY OF DARBHANGA DISTRICT**

**Dr. Mukesh Kumar Singh**

Teacher, +2 Marwari High School, Darbhanga, Bihar

### **Abstract**

Consumer Behaviour is the study of individuals, groups or organizations and processes they use to select, secure, use and dispose of products, services, experiences or ideas to satisfy needs and the impact that these processes have on the consumer and society. Marketers have to study consumers in particular segment. When consumer is treated as the king of the market, the study of consumer behaviour becomes more important for marketing decisions. Consumer search is the main method, besides advertising, for acquiring information necessary to purchase decisions. Consumers look for products and competitive prices in an attempt to make a “right choice” and decide what, when, and from whom to purchase. Consumers make everyday decisions regarding choice, purchase and use of products and services. These decisions are often important to consumers and thus difficult to make. Online Shopping is relatively new type of retailing.

**Key words:** Consumer, Behaviour, Purchases, Market & Online Shopping.

### **INTRODUCTION:**

The Indian consumer market has higher disposable income the development of modern urban lifestyles. Increase in consumer awareness has affected buyer's behavior in cities, towns and even rural areas. According to a 2010 report by McKinsey & Co., India is set to grow into the fifth largest consumer market in the world by 2025. Rising incomes in the hands of a young population, a growing economy, expansion in the availability of products and services and easy availability of credit all has given rise to new consumer segments and a rising acceptability of debt, whether it is mobile phones, credit cards, apparel or organized retail, people clearly seem to be spending more, particularly on discretionary items. The credit facility from business houses has been increasing at a rapid rate. This shows the terrific cut-throat competition in the ever changing market.

Purchasing urban products is taking place in India at a tremendous pace and is influencing the life style and buying behavior of the consumers. The working urbanites are depending more on fast and ready-to-serve food, they take less pain in traditional method of cooking and cleaning. Consumer behaviour has been always of great interest to marketers. The knowledge of consumer behavior helps the marketer to understand how consumers think, feel and select from alternatives like products, brands and the like and how the consumers are influenced by their environment, the reference groups, family, and salespersons and so on. A consumer's buying behavior is influenced by cultural, social, personal and psychological factors. Most of these factors are uncontrollable and beyond the hands of marketers but they have to be considered while



trying to understand the complex behavior of the consumers. Simple observation provides limited insight into the complex nature of consumer choice and researchers have increasingly sought the more sophisticated concepts and methods of investigation provided by behavioural sciences in order to understand, predict, and possibly control consumer behaviour more effectively.

Consumer Behaviour is the study of individuals, groups or organizations and processes they use to select, secure, use and dispose of products, services, experiences or ideas to satisfy needs and the impact that these processes have on the consumer and society. Marketers have to study consumers in particular segment. When consumer is treated as the king of the market, the study of consumer behaviour becomes more important for marketing decisions. Consumer search is the main method, besides advertising, for acquiring information necessary to purchase decisions. Consumers look for products and competitive prices in an attempt to make a “right choice” and decide what, when, and from whom to purchase. Consumers make everyday decisions regarding choice, purchase and use of products and services. These decisions are often important to consumers and thus difficult to make. Online Shopping is relatively new type of retailing. The rise of the Online Shops or Internet Shops is a type of E-Commerce that is Internet based and has proliferated worldwide since the mid-90s. It is an alternative way of selling and buying products and services. It reduces the cost of business investment including the cost of advertising, human resources, inventory, time to market, product improvement and service qualities. People can sell products and buy products through the online shop once the owner has established the shop. Online shopping offers free home delivery, cash on delivery options, 24 x 7 customer case service, Interest-free EMI options, payment through Debit or Credit cards of their customers.

#### **Trendy Life Style:**

The current urban middle and upper class Indian consumer buying behavior to a large extent has western influence. There is an increase in positive attitude towards western trends. The Indian consumer has become much more open-minded and experimental in his/her perspective. Foreign brands have gained wide consumer acceptance in India, they include items such as; Beverages, Packed food, Ready to eat food , Pre-cooked food, Canned food, Personal care products , Audio/video products, Garment and apparel, Footwear , Sportswear, Toys and Gift items.

The way Indian consumers are spending their money on various items has changed in recent years. The share being spent on the basis (food and beverages) are falling. For urban India, averagely 30 days consumer expenditure was split up into food, and for nonfood. Food expenditure includes cereals and cereal substitutes, milk, milk products, vegetables, edible oil and others. Non-food expenditure included fuel and light, and rest on clothing, footwear and on other non-food expenditure.

In India, the higher income group spends more amount of their income on luxury goods and trendy products than fact moving consumer products. The middle income group spends more on consumer expendables than the rich.

#### **REVIEW OF LITERATURE :**

Review of related literature makes the investigator fully aware with the previous work that has been done. It also provides an opportunity of gaining insight into

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the method, measures, subject and approaches employed by the other researchers. The problem to be investigated is one of the important steps in the planning of any research studied.

**Sinha and Batra(2005)** In this study on effect of consumer price consciousness on private label purchase found that the purchase of private label brands is associated with the consumer's price consciousness and also pointed that the consumer's value and buying intention perceptions are affected by the price offered and they may look elsewhere for a product that could be obtained at a lower price.

**Subadra, S, Murugesan K.M & Ganapathi, R (2010)** Studied "Consumer perceptions & Behavior" & concluded that consumer behavior consists of all human behavior that goes in making purchase decisions. An understanding of the consumer behavior enables a marketer to take marketing decisions which are compatible with its consumer needs. These are four major classes of consumer behavior determinants & expectations, namely, cultural, socioeconomic, personal & psychological.

**Pandey, A.C & Pandey, M.K (2013)** studied impact of lifestyle on brand preference of buyer behavior & concluded that same of the factors have major role in the changing of buyers behavior. There was a significant relationship between gender & insistence on specific brand by consumers for consumer durables at every purchase, secondly there was no significant relationship between gender & place of purchasing consumer durable.

**Suresh, A.S. (2018)** has identified the factors related to traits of utilitarian and hedonistic shoppers and provides insights into characteristics and behavioural patterns of utilitarian and hedonistic shoppers spanning organized apparel, sports, jewelry, Books and FMCG retail format.

#### **METHODOLOGY:**

The paper also analyses awareness of consumers towards online shopping. Nature of study is exploratory as well as descriptive in this study both primary & secondary data have been used. For this study we used structured questionnaire as a research instrument. In the context of the current study we used both primary & secondary data. Primary data have been collected with the help of structured questionnaire by respondent field survey method. In case of secondary data we used internet websites, journals, newspaper etc.

**Sampling Technique:** The purposive sampling method was applied in this case study. Source of the sample is Limited to Darbhanga District. Keeping in mind the objectives of the study, a structured questionnaire was prepared for the purpose of collecting the primary Data. A part from variables like: Gender, Age and overall customer satisfaction were collected and percentage method used for this study. The present study was conducted in an Darbhanga District. A total of 500 respondents were selected.

#### **Objectives:**

The study is based on the following objectives:

- To know about consumer's buying behaviours towards online shopping.
- To identify the customers opinion towards online shopping in Darbhanga District.
- To find out the problems faced by the customers in online shopping.

#### **RESULTS AND DISCUSSIONS:**

As mentioned above, the study is based on a sample of 500 respondents. The demographic profile of sampled customer is shown in table 1.

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**Table: 1**  
**Gender of the Respondents**

Gender	Frequency	Percentage
Male	350	70
Female	150	30
Total	500	100

Source: Primary Data

It is evident from the table 1 that out of the total respondents taken for study, 70% are male and 30% are female. It is concluded that the male respondents are highly involved in online purchase.

**Table: 2**  
**Age of the Respondents**

Age	Frequency	Percentage
Below -20	60	12
21-25	140	28
26-30	180	36
31-35	80	10
36-40	40	8
Above - 40	30	6
Total	500	100

Source: Primary Data

It is evident from Age wise analysis that 12% are in the age group of below 20 years, 21 to 25 years age group respondents are around 28%, 36% of the respondents fall in the age group of 26 to 30 years, 10% of the respondents are in the age group of 31 to 35 years, the respondents in the age group of 36 to 40 years come to 8% and 6% of the respondents are in the age group of above 40 years. It is evident that, the respondents in the age group of 26 to 30 years are higher.

**Table: 3**  
**Marital Status**

Marital Status	Frequency	Percentage
Unmarried	180	36
Married	300	60
Separated	20	4
Total	500	100

Source: Primary Data

The above table shows that 60% of the respondents are married and 36% are unmarried respondents remaining 4% respondents are separated. It is concluded that married respondents highly preferred online purchases.

**Table: 4**  
**Employment Status**

Employment Status	Frequency	Percentage
Homemaker	40	8
Service	100	20
Own business	200	40



Professional	120	24
Student	40	8
Total	500	100

Source: Primary Data

It is evident from Employment Status Analysis that 40% of the respondents are doing own business, 24% of the respondents are professionals, 20% of the respondents come under Service, 8% of the respondents are homemakers, and 8% of the respondents are students. It is understood that self employed (40%) prefer higher online purchases.

Table: 5

Monthly Income

Monthly Income	Frequency	Percentage
Below Rs10000	100	20
Rs 10001 to Rs25000	220	44
Rs 25001 to Rs 50000	50	10
Above Rs 50000	130	26
Total	200	100

Source: Primary Data

It is evident from the table that the number of respondents with income below Rs. 10000 are 100 respondents, 220 respondents monthly income is between Rs. 10001 to Rs. 25000, 50 respondents have monthly income of Rs 25001 to Rs. 50000 and 130 respondents receive above Rs 50000.

Table: 6

Family Type

Family Type	Frequency	Percentage
Nuclear	400	80
Joint	100	20
Total	500	100

Source: Primary Data

It is evident from Family type analysis that 80% of the respondents are from Nuclear family and rest of the 20% of the respondents are from joint family. Sources show that 80% of Nuclear family respondents have access to online shopping.

Table:7

Respondents Opinion towards the Quality of the Goods Purchase Through Online

Quality Opinions	Frequency	Percentage
All the goods are of good quality	280	56
Some goods are inferior	70	14
Some are damaged	40	8
Mostly used goods are sold	10	2
Duplicate goods are sold	100	20
Total	500	100

Source: Primary Data

The above table shows the opinion of 500 respondents towards the quality of the goods purchased through online shopping, It is clear that maximum 56%



respondents are of the opinion that All the goods are in good quality in online shopping, 20% respondents opine that Duplicate goods are sold in online shopping, 14% respondents have the opinion that Some goods are inferior in online shopping, 8% respondents are of the opinion that Some are damaged goods in online shopping, and the rest of 2% respondents are of the opinion that Mostly used goods are sold in online shopping. It is concluded that maximum 56% respondents’ opinion is that goods are of good quality in online shopping.

**Table: 8**  
**Opinion of Respondents towards the Price of the Goods in Online Purchase**

<b>Purchase Price Opinion</b>	<b>Frequency</b>	<b>Percentage</b>
Common as in the shop	150	30
Low	300	60
High	50	10
Total	500	100

*Source: Primary Data*

The above table shows that, 300 respondents are of the opinion that the price of the goods in online shopping is low, 150 respondents’ opinion is that the price of goods in online shopping is common as in the shop level, 50 respondents have the opinion that the price of the goods in online shopping is high. It is found that most of the respondents are of the opinion that the price of goods is low in online shopping.

**Table: 9**  
**Problems Faced in Online Purchase**

<b>Problems in Online Purchase</b>	<b>Frequency</b>	<b>Percentage</b>
Received damaged goods	50	10
Delay in delivery	200	40
Replacement of damaged goods takes too much of time and formalities	150	30
Order not properly executed	40	8
Dispatch is not as per schedule	60	12
Total	500	100

*Source: Primary Data*

The above table shows that out of 500 respondents, 200 respondents have faced problems in online purchase like delay in delivery, 150 respondents face problems like Replacement of damaged goods takes too much of time and formalities in online shopping, 50 respondents have received damaged goods in online shopping, 40 respondents orders are not properly executed in online shopping, 60 respondents’ purchase dispatch is not as per schedule in online shopping. It is found that delay in delivery of the goods is the higher problem faced by the respondents while shopping online.



### **FINDINGS:**

- Among the total respondents taken for study, 70% are male and 30% are female. It can be concluded that the male respondents are highly involved in online purchase.
- Age wise analysis shows that the respondents of the age group between 26 to 30 years are higher.
- Marital status analysis shows that married respondents highly prefer online purchases.
- Employment status Analysis shows that online purchases are highly preferred by self employed (40%).
- Monthly income analysis shows that 220 respondents earn monthly income from Rs 10001 to Rs 25000 they highly prefer online shopping.
- Family type analysis shows that 80% of Nuclear family respondents have access to online shopping, than joint family.
  
- Out of 500 respondents, 200 respondents have faced problems in online purchase like delay in delivery, 150 respondents face problems like Replacement of damaged goods takes too much of time and formalities in online shopping, 50 respondents have received damaged goods in online shopping, 40 respondents orders are not properly executed in online shopping, 60 respondents' purchase dispatch is not as per schedule in online shopping. It is found that delay in delivery of the goods is the higher problem faced by the respondents while shopping online.

### **SUGGESTIONS:**

Online shopping or electronic buying has become popular and convenient for the consumers. This new innovative pattern of shopping not only brings a great number and wide range of merchandise to consumers; it also offers huge market and numerous business opportunities. Indian consumer behaviour is totally different compared to other consumers in the rest of the world. Indian consumers prefer to go around the shopping area, to find the product in relation to their wants, i.e. design, colour, quality, price, etc.

- Inferior goods are sold online, for which consumers are affected, and in some cases they are unable to get the payment back, hence, the marketers have to provide assurance of quality and genuineness.
- Comparison of products, prices are not available in some of the online shopping sites, they must come forward to display comparison.
- Compare the product with other online marketers, for product quality, price, etc. There are very many web sites that offer comparison, though you do not have comparison option towards other marketers within the web site, only products can be compared in the particular sites.
- Buy products assured for quality than for cheap price. Cheap priced products are mostly defective and non-standard.

### **CONCLUSIONS:**

Indian consumers are also associated with values of nurturing, care and affection. Product which communicate feelings and emotions gel with the Indian



consumers. Consumers undertake complex buying behavior when they are highly involved in a purchase and perceive significant differences among brands. Consumers are highly involved when the product is expensive, risky, purchased infrequently, and highly self expressive. It can be concluded that the e-commerce market has a great potential for youth segment. If the demographic features are considered carefully, then it can be easily identified that maximum number of respondents of online shopping lie in an age group between 26-30 years. There is a wide mismatch in this segment compared with the global market therefore the E-commerce companies in line with manufacturers and service providers should target this segment for rapid future growth of their business.

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ck; tujomu 2020 us vi us yf k ea fy [k gS fd dksM&19 egkekjh ea nfu; k Hk ds Nk=ka ds fy, vMlybu yfuak gh , dek= 0; kogkj d fodYi jg x; k gA bl fy, vc rdudh vk/kfjr yfuak bdkfl LVe cukuk vlg Hh t: jh gIs x; k gA yfuak bdkfl LVe dls , s snyuk glex tIs thou Hk yfuak ds egRo dls c-k, A rdudh l s da sV vk/kfjr] i l YykbTM yfuak dls c-kok nus dh t: jr gA dy dh d(kvka ea rdudh v/kd egRo i wZ gIs xA Hkfo'; ea ou Vvrou yfuak Hh c-xh] ftl l s Nk=ka dls muds eprkcd l oZsB fey ik, xA

"keZ uouh 2020 us vi us yf k ea fy [k gS fd f"kk(k ea uokpj , d vpkud ghus okyh nqk/vuk ugha gS oju- , d l rrpuy okyh ifO; k gA vMlybu ek/; e , d uokpj p.j.k gIs l drk gS ij i kB"kyk dls Hkx djus dk , tMk ugha ; g ekuk tk jgk gS fd vMlybu f"kk(k vpd vskf/k dk dke djsxh] u gh Ldnyh de jha vlg mu ij Nrka dh fpUr] u gh "; keiVV o cp dh] u gh f"kk(k fo | kfhz vuqfr ds i fr tolcngA i rhr gnrk gS fd vMlybu f"kk(k) f"kk(k txr ea ekf tS h l kFkr gA i jUrq vMlybu f"kk(k ea fo | kfhz dls N% QhV pklr; ; keiVV ds l keus l fO; : i l s fcbk i kuk vl Etko gS rls 16 bp dh LØhu , oa yi VM ds l keus ml dk /; ku dlnhr djuk rls vlg Hh eq'dy gA f"kk(k l s l oikh.k fodkl ds l kjs y{; bl f"kk(k ea xSk gIs x, gA



ulfr vk; lxx us mPprj f"kk(fohkx); w:hl h vlg , vtbl h/vbz ds l kfk ?kfu'B l g; kx l s vMlykbu f"kk dh papkr; ka dh igpku djus vlg mPprj f"kk fu; ked <apla ea l fkhj ka dls rS kj djus ea egroi w/z Hhedeck fulhkbz ga Hhskfyd ck/kvla l s j s xqkoYkk w/z mPprj f"kk rd igpp dls l fke djus ds fy, ijh rjg l s vMlykbu dk; Dela dls vupfr nh gsftl ea vMlykbu fMxh vlg fMlytekk ikB; Dela dls vupfr Hh inku dh xbz ga

**ijEijxkr f"kk.k, oavMlykbu f"kk.k&**

Hhjr h; f"kk izkkyh earhu egroi w/z mnas; ka ij dk; Zfd; k tkrk gsftl ea 0; fDrRo fodkl vlg pfj= fuekz l l ekt dY; k.k, oaKlu dk mlkjklj fodkl iedk ga ijEijxkr f"kk izkkyh ea fo l kfkz ka dls f"kk.k ds l kfk l kfk muds pfj= fuekz dh i f0; k fu ll rj pyr h jgrh ga d fkh; okroj.k ea og l g vLrRo opkfjd l fg; kqk l ketgd l nHkko l nkpjrl fopj Lohdr dh Hhokul rd&fordz dh "ksh vfrn ds cksj ea Hh tkrk ga f"kk(d ds vlpj.k) okroj.k vlg 0; ogkj l s og cgr l s rf; ka dls vudgs gh l e>rk ga og f"kk.k l kFku ea fofo/krki w/z okroj.k ea l keltfd vkrfd vlg /krfd elgls dls nkrk gs vlg muds ifr vius fopj ka dk fuekz djrk ga bl l s ml ea foHku ifjoska dls l e>us dk Klu i shk glrk gs tcd vMlykbu f"kk.k ea ml s Klu ris i ktr glrk gs ijurqbu l c rf; ka dh tkudkj mls ugha fey i ktr ga og , d e'khu dh Hhkr 0; ogkj djrk ga og l ekt vlg dgjh okroj.k l s d v tkrk gs; gk rd dh ml dk ijokj l s h h t h ko de gk tkr ga bl idkj ml dk l e; d vlg l rnyr fodkl ugha gk i ktr ga , d s ea vMlykbu f"kk.k l s ml ds 0; fDrRo dk fodkl ugha gk i ktr ft l l s , d vkr w/z l ekt vlg ijokj dk fodkl ugha gk l drk tks , d nsk ds fy, Hh fouk'kdj h glrk ga bl idkj vMlykbu f"kk.k , d l hek rd gh l gh ga foKku ds dbz (k= t s sbatfu; fjak) eMdy dk ris bl idkj l s f"kk.k djokuk cgr gh ?krd gk l drk ga ; gk fo l kfkz l kFku eagh f"kk.k xq.k d jds ; k; rk vlg oHnr n'krk gk l y dj l drk ga vMlykbu f"kk.k ds )kj okl rfu' B ijh kh gh gk i ktr gsftl l s fo l kfkz ka dk vkykukred eW; ka du ugh gk l drk vlg ; g eW; ka du dh mfr izkkyh Hh ugh ga bl idkj l s fd, x, dkl Z dks T; knk egro ugha f; k tkrk gs orzku ea ukd f; ka ds fy, T; knk 0; kogjfd vlg l keltfd dskys dls v/ld egro fn; k tkrk ga vr% l s kurd Klu dls T; knk ykk ugha fey i ktr gs D; krd i ktr Klu dls 0; ogkj ea d s mkrk tk, ] ; g l c ijEijxkr f"kk.k l s gh l h [kk tk l drk ga ftu l epk; ka ea m fkr oxz vefgyk, yz dk fo l ky; , oa egko l y; ea v; ; u djuk , d miYc/h ekuk tkrk gk ogk rls vMlykbu f"kk.k l s fodkl dh /kjk gh fojhr gk tk, xh

rduhd ea vucl cnyko gkus ds ckn Hh geus f"kk ds (k= ea T; knk cnyko ugha gk ga ; g (k= vkt Hh ijEijxkr gh jgk ga t s fd ge itphudky ea cPpla dls xq dky ea i <kr s l s v l kFkula ea vkt Hh vucl , oa xM ndj ijh kh ds ek; e l s k= Klu dk Lrj tlpk tkrk ga vMlykbu f"kk.k ds fy, xqkoYkk ; D r f"kk.k gkus vko"; d ga orzku f"kk.k i) fr dpy jVus vlg ikl gkus dh fo/k dk Klu djokrh ga ijurq foM; l s , oa , fueku dk mi; lxx dj ga : fpdj f"kk.k dj l drs ga fo l kfkz n'kdj vPNh rjg l h [krs ga cPpla dls , fDVo uyj cuus dh vko"; drk ga ijEijxkr f"kk.k cPpla dls l oky gy djuk fl [krs gs ijurq l oky i n'uk ugha cPpla dls rduhd vkrfj r f"kk.k l s muea [kp l h [kus dh Hhokul dk fodkl dj l drs ga ge l Hh cPpla dls , d gh rjg dh tkudkj inku djrs gs yfdu fQj Hh dN cPps tYnh l e> tkrk gs vlg dN n'j l a gea, d gh rjhd l Hh ds fy, ds fl ) krd dls R; kxuk gskA f"kk(kla dls vey) d rduhd i f"kk.k inku dj mlga fMfVyh etar culuk gsk rkd fo l kfkz ka dls mpp Js kh ds b&cd v/ vey l da vMlykbu f"kk.k l s l o s B Klu dls nsk dsfd l h Hh dks ea vkl kuh l s igpk l drs ga vkus oky l e; vMlykbu vlg rduhd ea uohurk ykus oky gskA , u, u, l vls ds uohure l o s ds vucl kj dpy 42 ifr"kr "kgjha vlg 15 ifr"kr xteh.k ?kja ea ba/jus/ dh l fo/k ga buea l s Hh 34 ifr"kr "kgjh vlg 11 ifr"kr xteh.k ka us yxkrj , d elg rd bl ba/jus/ dk mi; lxx gh ugha fd; k gs vkrfz ba/jus/ dh xqkoYkk m'ye ugha ga ulfr vk; lxx vlg LVs'tht Okw U; wbf.M; k@75 ds vucl kj nsk Hhkr ea 10 ifr"kr tul e; k fMfVY l kjk ga ogha cMh vlcinh ds ikl LekVQsu] yi vMlyk vlg dEl; Wj dh l fo/k gh ugha ga yxHx 55] 619 xpla ea ekskby dojst gh ugha ga nsk dh yxHx 70 ifr"kr vlcinh , d MhWj ifrfnu ds fgl kc l s xqj c j dj jgh gk rls l keltfd , oa vkrfd xfr"kyrk i ktr djus gs vMlykbu f"kk.k i ktr djuk fd l h papkr h l s de ugha ga

**vMlykbu f"kk.k espulr; k@: dloV@ l el; k, @nks&**

1- vkt Hh ba/jus/ vlg dEl; Wj dh l fo/k l Hh dls vkl kuh l s miYc/k gh ugha ga vucl xlp&<f.k; k; , d h gs tgl vku&tks ds fy, l Mela rd ugha ga ba/jus/ vlg dEl; Wj rls muds fy, nj dh ckr ga

2- cMh f"kk.k l kFku t s s gkoMz LVs'QmZ vfrn ea Hh d'kk&cd f"kk.k dls v/ld egro fn; k tkrk gs tcd ; gk rls rduhd vlg thoulrj Hh mpp Js kh dk ga ; | fi buds dkl vMlykbu Hh miYc/k gs ijurq fQj Hh Nk= d'kk&cd f'k ea v/ld Qhl ndj v/; ; u djrs ga

3- ; g f"kk.k dpy dledkth 0; fDr; ka ds fy, gh ykkkdj h gs tks u, rjg dh i n'urh ; k u; k jst xj dskys i ktr djuk plgrs ga

4- Osl n'j (k= tgl vPNs f"kk.k l kFkula dk vHko gs vlg tgl f"kk(kla dh deh gs ogk ; g ojnu l kfr gk l drk ga



5- vudl v/; ki dka dks bl rjg dk f'k{k.k dk; Z djuk gh ugha vkrk gA os vMdykbu i <kus ea egjkr gfl y j [krs gh Hh rdudh ds {s= ea Lo; adksfi NMk ekurs gA

6- vHh fo | kFkz Hh bl ds vH; Lr ugha gA mUga Hh ij Ei jkxr v/; ; u dh gh vkrn gA

7- dDy v/; ki d vMdykbu f'k{k.k 0; oLFk gS bl ea Nk=ka dh i wZ Hkxmkjh ugha jgrhA ftl l s l h [kus dh {kerk ij udkjRed i Hko i Mf k gA

8- f'k{k.k vMdykbu f'k{k.k l s Nk=ka ea vki kuh l s dksy fodkl ugha dj l drk gA d {k&d {k ea og ckrphr ds ek/; e l s Nk=ka ea jpuRed fopkjka dks tle ns l drsgA og ubz fopkjka dks fl [k l drk gA

9- vMdykbu f'k{k.k l s Nk=ka ea l Ei sk.k dksy dk fodkl ugha dj l drk gA

10- vMdykbu f'k{k.k l s mnas; ; fofgu ikr f'k{k.k fMxh l dyu dk , d l k/ku ek= cu dj jg tk, xkA ftl l s f'k{k.k dh xqloYk ea deh vk, xh) tks, d fopkj.kh; fcnq gA

11- vMdykbu f'k{k.k ea ek= l puk; j vS vkrM s l k > k fd, tkrsg 0; kogfjd Kku rls dDy xq ds l e {k mi l Fkr jgdj gh ikr fd; k tk l drk gA

Hfo'; %  
vMdykbu f'k{k.k l s f'k{k.k ds dfo; krh < kpa ea l dkjRed vS uohu i fforZu nEkus dks feys gA ij l r q eglekjh dky , oa ykM Mkm ea Nk=ka ds "kj h j d vS ekul d LokLF; l s Hh l e > k r k ugha djuk pfg, A bl ds fy, d k n z l j d k j us vMdykbu f'k{k.k g r q v i o"; d f n'k fun'k t j h f d , g s r k f d f u ; r v o i / k d s g h f o f m ; k a , o a v / ; ; u l k e x h g h M k y h t k l d a f o | k f k z , k a , o a v f h h k o c h a d s e k u l d , o a " k j h j d L o k L F ; d k H h / ; k u j [ k x ; k g A v M d y k b u f ' k { k . k i z k y h e k = i j d d s : i e a v i u k ; h t k l d r h g S ; g i j E i j k x r f ' k { k . k d k L F k u u g h a y s l d r h A e g l e k j h , o a y k M M k m u d s n q i H k k o l a d k s d e d j u s d s f y , v S b l n S k u v / ; ; u r d N k = k a d h f u j l r j i g p l f u f " p r d j u s d s f y , e k u o l a k / k u f o d k l e a = k y ; d s i z k l k a l s n s k e a b z y f u i k a e a f o d k l g y k g A L c h y k a v S m P p f ' k { k . k l k F k k u a n k u a u s g h v i u s v S N k = k a d s i k l m i y C / k l a k u l a d s v k / k j i j v M d y k b u d { k v l a d s f o f m k u r j h c h a d k s v i u k u s v S v / ; ; u l k e x h d k s l k > k d j u k " k d j f n ; k g A v M d y k b u d { k v l a l s y d j f ' k { k d l a } k j k ; w ; w } o g k v t v i v k f n d s e k / ; e l s 0 ; k ; k u l a v S D y k l u i k / d k s v i y k M d j u s y x s g s v S l k F k g h f M f t V y y f u i k l a k u l a d s f y a l l k - k d j u s v S i j r d i a , o a v / ; ; u l k e x h d s f y , v i o"; d , i H h c r k , t k j g s g A d k j k u k d k y e a n s k e a L o ; i n h { k } b z c l r k v k f n v u d , i d s e k / ; e l s f ' k { k . k d k d k ; Z f d ; k t k j g k g A o r e k u e a ; g h l c l s m i ; l x h , o a l k f i z d r j h d k g A v c f ' k { k d k f e y k t y k e h M y g h 0 ; o g j e a y u k g l s k A c < f s l e k V Z O k u v S b a / j u s / l s ; g i f 0 ; k v S r s t g l s k A f ' k { k d H h v c r d u h d e k / ; e l s f l [ k k u d k e g R o l e > j g s g A b l d k j . k d { k v l a i j H h b l d k v l j f n [ k b z n s k A b l l s l d y u k e l a d u d h n j e a o f ) d h t k l d r h g A ; g f ' k { k i n k r k v S f ' k { k f k z n k u a d s f y , L k L r h g S ; k i d b l e a ; k r k ; k r 0 ; ; u g h a g l a k } M S u g h a f l y o k u h i M f k } d { k & d { k , o a v k / k j H h r l j p u k d k f u e k z k u g h a d j u k i M f k t k i d l e ; , o a / k u n k u a d h c p r d j r k g A b l f ' k { k . k e a l o n u " k h y o x z t S s f n 0 ; k a x } x j h c v S e f g y k , j H h f ' k { k i k l r d j l d r h g t s l k e l f t d l " k f d r d j . k d h v o / k j . k k d k e g R o i w k z v k ; k e g A

I m H z z

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- 6- H k . M s f t r i n z d e j j m P p f ' k { k l E H k o u k , j v S p u l s r ; k j ; k s t u k f l r E c j ] 2019 ] k V l e ; k 61&64
- 7- c k ; t w j o h n u ] n i u d H k l d j t ; i j l d j . k j 21 t y k b z 2020 ] i V l e ; k 6
- 8- " k e l z u o u h r ] j k t L F k u i f = d k t ; i j l d j . k j 23 t w 2020 ] i V l e ; k 10
- 9- u h r v k ; k x o l f i d f j i k z 2018 & 19 ] i V l e ; k 20
- 10- L V A h t h t Q W U ; w b f . M ; k @ 75 ] i V l e ; k 89
- 11- f M f t V y y f u i k e a c < k r j h ] ; k s t u k e b z 2020 ] i V l e ; k 50



## മാധ്യമ സാധീനം നൃത്തത്തിൽ

ഡോ.ആർ.രാജേഷ്

ആധുനികതയുടെ ശക്തമായ വക്താവായി മലയാള സാഹിത്യത്തിൽ രംഗപ്രവേശം ചെയ്ത എഴുത്തുകാരനാണ് എം.മുകുന്ദൻ. ഒരേ സമയം തന്നെ കാലത്തിന്റെ സൂക്ഷ്മമായ ചലനങ്ങളെ ഒപ്പിയെടുക്കുവാനും നോവൽ രൂപങ്ങളെ നിരന്തരമായ പരീക്ഷണങ്ങൾക്ക് വിധേയമാക്കുവാനും ഈ നോവലിസ്റ്റിനു കഴിയുന്നു. സർഗ്ഗധനമായ എഴുത്തുകാരെ മാറി വരുന്ന പരിസരങ്ങൾ ആഴത്തിൽ സാധീനിക്കുന്നു. പരിവർത്തന വിധേയമാകുന്നു ഈ പശ്ചാത്തലത്തിൽ നിന്ന് അവർ പുതിയ പുതിയ യാഥാർത്ഥ്യങ്ങൾ കണ്ടെടുക്കുന്നു. പുതിയ ഭാഷയും ആവിഷ്കരണ സങ്കേതങ്ങളും ഇതിനുവേണ്ടി സൃഷ്ടിക്കുന്നതിന് അവർ നിർബന്ധിതരായിത്തീരുന്നു. ആധുനികതയെ ഒരു പ്രസ്ഥാനമാക്കി വളർത്താൻ പ്രധാന പങ്കുവഹിച്ച മുകുന്ദൻ ആ ഭാവുകത്വത്തിന്റെ പ്രാരംഭകരിൽ ഒരാളാണ്.

‘വിവര സാങ്കേതിക വിദ്യയും മാധ്യമ ബാഹുല്യവും ചേർന്നൊരുക്കുന്ന ഒരു പുതിയ ചരിത്ര ഘട്ടത്തെയാണ് ഫ്രഞ്ച് ചിന്തകരനായ യാങ്ബോദ്രിയർ ഉത്തരായുനികമെന്നു വിശേഷിപ്പിക്കുന്നത്.’<sup>(1)</sup> സാങ്കേതികവിദ്യ വഴി സംജാതമാകുന്ന അനുകരണങ്ങളും യാഥാർത്ഥ്യത്തെ തോല്പിക്കുന്ന പ്രതീതി യാഥാർത്ഥ്യങ്ങളും ഉത്തരായുനികതയുടെ സവിശേഷതയാണ്. വിവര സാങ്കേതിക വിദ്യയുടെയും മാധ്യമങ്ങളുടെയും പ്രസരം മുഖേന എല്ലാം സുതാര്യമാക്കപ്പെടുന്ന ഒരു അവസ്ഥ ഇന്നുണ്ട്. വ്യക്തിയുടെ സ്വകാര്യതകൾ, പൈതൃക മൂല്യങ്ങൾ , കല, സാഹിത്യം എന്നിവയെല്ലാം വിപണികേന്ദ്രീകൃതമായി വ്യാഖ്യാനിക്കപ്പെടുന്നു.

ശാസ്ത്ര സാങ്കേതിക രംഗങ്ങളിലുണ്ടായിട്ടുള്ള വളർച്ച ഉത്തരായുനിക പ്രവണതകളുടെ പ്രേരകശക്തിയായി വർത്തിക്കുന്ന സാഹചര്യത്തിൽ ഇന്റർനെറ്റിനെയും നൃത്തകലയെയും ബന്ധിപ്പിച്ചുകൊണ്ട് മുകുന്ദൻ രചിച്ച നോവലാണ് ‘നൃത്തം.’ ഇൻറനെറ്റ്, ഫോട്ടോഗ്രാഫി, പുത്രം എന്നീ മാധ്യമങ്ങളുടെ സാധീനം ഈ നോവലിന്റെ ആഖ്യാനത്തിൽ മുന്നിട്ട് നിൽക്കുന്നു. കഥാഖ്യാനം നടക്കുന്നത് സൈബർ സ്പെയ്സിലൂടെയാണ്. ആഗോള മേൽവിലാസത്തിലൂടെ പരിചയപ്പെട്ട വ്യക്തികൾ പരസ്പരം അറിയാതെ ബന്ധപ്പെടുമ്പോൾ ജീവിതം തന്നെ യാഥാർത്ഥ്യത്തിൽ നിന്നും മാറി പ്രതിഷ്ഠിക്കപ്പെടുകയാണ്. പ്രതീതിയാഥാർത്ഥ്യത്തിന്റെ ഈ ലോകത്ത് സാധാരണ പൗരൻ (citizen) നെറ്റിലെ പൗരൻ ( Netizen) ആയി മാറുന്നു.



കേരളീയ സമൂഹത്തിൽ ഇന്റർനെറ്റ് പ്രാബല്യത്തിൽ വന്ന് തുടങ്ങിയ കാലമായിരുന്നു അത്. ഇന്റർനെറ്റിന്റെ കടന്നു വരവോടെ മനുഷ്യർക്കെല്ലാം ഭൂമിയിൽ എവിടെ പോയാലും ഒരൊറ്റ മേൽവിലാസം മാത്രമേ ഉള്ളൂ എന്ന സ്ഥിതി വന്നു ചേർന്നു. രാജ്യങ്ങൾക്കോ സമുദായങ്ങൾക്കോ വർഗ്ഗങ്ങൾക്കോ ഒന്നും ഇന്റർനെറ്റിന്റെ ലോകത്ത് സ്ഥാനമില്ല. നൃത്തത്തിൽ കമ്പ്യൂട്ടറിലൂടെ വിലാസം കണ്ടെത്തുന്ന ശ്രീധരൻ, എവിടെ ജീവിക്കുന്നു? അയാളുടെ ചുറ്റുപാടുകളെന്ത്? കുടുംബ പശ്ചാത്തലമെന്ത്? എന്നൊന്നും നോവലിസ്റ്റ് വ്യക്തമാക്കുന്നില്ല. സ്വന്തമായൊരു ഹോട്ട്മെയിൽ വിലാസം ഉണ്ടായതോടെ ശ്രീധരന്റെ ശീലങ്ങളിൽ തന്നെ പ്രകടമായ വ്യതിയാനങ്ങൾ വന്നു ചേർന്നു. 'കുട്ടിക്കാലം മുതലേ പല്ലുതേക്കാതെയും കുളിക്കാതെയും ഒരു തുള്ളി വെള്ളം കുടിക്കുകയില്ല എന്ന ശീലത്തോടെ വളർന്ന അയാൾ ഇപ്പോൾ പ്രാതൽ കഴിഞ്ഞാണ് പല്ലുതേയ്ക്കുന്നത്. കുളി ഒരാവശ്യമല്ലെന്നും ശരീരം വൃത്തിയാക്കി സൂക്ഷിച്ചാൽ മാത്രം മതിയെന്നുമാണ് ഇപ്പോൾ അയാളുടെ വാദം.<sup>(2)</sup>

ഇന്റർനെറ്റിലൂടെ സ്വന്തം വിലാസം കണ്ടെത്താനുള്ള ശ്രമത്തിനിടയ്ക്കാണ് ശ്രീധരൻ ഇ-മെയിലിലൂടെ അഗ്നി എന്നു സൂഹൃത്തിനെ പരിചയപ്പെടാനിടവരുന്നത്. അയാളുടെ കുടുംബമോ, ദേശമോ, കുടുംബ പശ്ചാത്തലമോ ഒന്നും ശ്രീധരൻ അറിയില്ല. യഥാർത്ഥ വ്യക്തിയാണ് അഗ്നി എന്നതിന് തെളിവുകൾ ഒന്നും തന്നെ ഇല്ല. പരസ്പരം ബന്ധപ്പെടുത്തിയിട്ടുള്ള കമ്പ്യൂട്ടറുകൾ സൃഷ്ടിക്കുന്ന സ്ഥലത്താണ് അയാളുടെ അസ്ഥിത്വം. കമ്പ്യൂട്ടറിലൂടെ വരുന്ന സന്ദേശങ്ങളിൽ കൈയൊപ്പുണ്ടാകാറില്ല. നാടനും വീടനും, മേൽവിലാസങ്ങൾക്കും പ്രസക്തിയില്ലാത്ത ഒരു സൈബർ യുഗത്തിലാണ് നാമിന് ജീവിക്കുന്നത് എന്ന സൂചന ഇവിടെ നോവലിസ്റ്റ് നൽകുന്നുണ്ട്. തന്നെ വിശ്വസിക്കണമെന്ന് ശ്രീധരനോട് ആവശ്യപ്പെടുന്ന അഗ്നി, പിന്നീട് ശ്രീധരനെ ആശയക്കുഴപ്പിലാക്കും വിധം മറ്റൊരു സന്ദേശമയയ്ക്കുന്നു. 'അഗ്നി എന്ന പേരിൽ മറ്റാരെങ്കിലും സന്ദേശമയച്ചുകൂടെ എന്നാണ് അയാൾ ശ്രീധരനോട് ചോദിക്കുന്നത്. അത് തൊട്ടപ്പുറത്തെ ഫ്ലാറ്റിൽ സദാ കമ്പ്യൂട്ടറിന് മുമ്പിൽ ഇരിക്കുന്ന പയ്യൻ ആവാം.<sup>(3)</sup> അതുകൊണ്ട് തന്നെ കാണുന്ന കാര്യങ്ങളെ മാത്രം വിശ്വസിക്കുക. ചോദ്യങ്ങൾ ചോദിക്കരുത്. 'സാഹിത്യനിർമ്മിതിയുടെ പരമ്പരാഗത ധാരണകളെ നിരാകരിച്ചുകൊണ്ട് സാങ്കേതിക വിദ്യ നിയന്ത്രിക്കുന്ന ഇ-മെയിൽ എന്ന ആഖ്യാന രീതി മലയാള നോവലിൽ ആദ്യമായി കാണുന്നത് നൃത്തത്തിലാണ്.<sup>(4)</sup> അഗ്നിയുടെ സന്ദേശങ്ങൾ വായിക്കുന്ന ടി.പി. ശ്രീധരന്റെ മനസ്സിൽ തെളിഞ്ഞുവരുന്ന ചിത്രങ്ങളിലൂടെയാണ് നോവലിന്റെ ആഖ്യാനം മുന്നോട്ട് പോകുന്നത്. ഇ-മെയിൽ ആഖ്യാന സങ്കേതമാകുന്ന നോവലിന്റെ ആഖ്യാന ഭാഷയിൽ സാങ്കേതികതയുടെയും സൈബർ ലോകത്തിന്റെയും സ്വാധീനം നമുക്ക് കാണാൻ സാധിക്കും.



സൈബർ സ്പെയിസിന്റെ എല്ലാ സാധ്യതകളും ഇവിടെ നെറ്റിലെ പൗരൻ ഉപയോഗപ്പെടുത്തുന്നുണ്ട്. ശ്രീധരൻ ജീവിക്കുന്ന ഇടം ഒഴികെയുള്ള സ്ഥലങ്ങൾ സൈബർ സ്പെയിസിലൂടെയാണ് നോവലിൽ കടന്നുവരുന്നത്. കമ്പ്യൂട്ടർ സ്ക്രീനു കളിൽ കമ്പ്യൂട്ടർ മൗസ്, കീബോർഡ്, എന്നിവയുടെ സഹായത്തോടെ സൃഷ്ടിക്കുന്ന യാഥാർത്ഥ്യത്തിന്റെ ലോകത്തിന് സമാന്തരമായി അയാഥാർത്ഥ്യമായി സൃഷ്ടിക്കപ്പെടുന്ന പ്രതീതി യാഥാർത്ഥ്യത്തിന്റെതായ ഒരു ലോകം നൂത്തത്തിലുണ്ട്. 'അറ്റ്ലാന്റിക് സമുദ്രത്തിന് മുകളിലൂടെ പറക്കുന്ന പാൻ അമേരിക്കൻ കമ്പനിയുടെ വിമാനത്തിൽ ഇരുന്നു ലാപ്ടോപ്പിലാണ് ഞാൻ ഈ സന്ദേശം ടൈപ്പ് ചെയ്യുന്നത്. നാലുമണിക്കൂറു കൾക്കു ശേഷം ന്യൂയോർക്കിൽ ഇറങ്ങിയാൽ ഹോട്ടൽ മുറിയിലെ ഇന്റർനെറ്റ് ഉപയോഗിച്ച് ഈ മെസേജ് പോസ്റ്റ് ചെയ്ത് ഹോട്ട്മെയിലിലൂടെ ഞാൻ താങ്കൾക്കു അയയ്ക്കും.'<sup>15)</sup> ഇത്തരത്തിൽ നോവലിൽ ഉടനീളം പ്രതീതി യാഥാർത്ഥ്യത്തിന്റെ ഒരു അന്തരീക്ഷമാണ് ഉള്ളത്. സൈബർ സ്പെയിസ്, ഫോൾഡർ, ഇൻബോക്സ്, യാഹൂ, ഫ്ലോപ്പി, ഹോട്ട്മെയിൽ, തുടങ്ങിയ കമ്പ്യൂട്ടർ സാങ്കേതിക പദങ്ങൾ നോവലിൽ അടിക്കുറുപ്പുകളില്ലാതെ തന്നെ ഉപയോഗിച്ചിരിക്കുന്നു. ഇ-മെയിലു വെബ്സൈറ്റുകളും ചാറ്റിംഗും, ആഗോള ആശയ വിനിമയത്തിനുള്ള സാധ്യതകൾ തുറന്നു തരുന്നു. എന്നാൽ അവശേഷിക്കുന്ന വൈകാരികതയുടെയും, വിശ്വാസ്യതയുടെയും നഷ്ടം ഒരു ശൂന്യതപോലെ നൂത്തത്തിന്റെ ആഖ്യാന ഭാഷയിൽ നിലനിൽക്കുന്നു. ഇത്തരത്തിലല്ലാം നൂത്തം മലയാള നോവലിനും നോവൽ ഭാഷയ്ക്കും സൈബർ സ്പെയിസിൽ ഒരിടം ഒരുക്കുന്നു.

ഈ കൃതിയിലെ നായകനായ അഗ്നി ഒരു നർത്തകനാണ്. പാശ്ചാത്യ രാജ്യങ്ങളാണ് അയാളുടെ നർത്തന വേദി. കഥകളിയുടെ നാടുകാണുവാനായി കേരളീയ ഗ്രാമങ്ങളിലെത്തിയ നവനൂത്തത്തിന്റെ തീജാലയെന്ന് വിശേഷിപ്പിക്കപ്പെടുന്ന പാട്രിക് റെഡോൾഫ് എന്ന വിദേശി, കളരിയിൽ പയറ്റു നടത്തുന്ന ബാലകൃഷ്ണന്റെ മെയ് വഴക്കത്തിലും ശരീര ചലനങ്ങളിലും ആകൃഷ്ടനായി അവനെ യൂറോപ്പിലേക്ക് ക്ഷണിക്കുന്നു. നോവലിൽ അഗ്നി എന്ന ബാലകൃഷ്ണനെ അവതരിപ്പിക്കുന്നതിലൂടെ പാശ്ചാത്യ ഉപഭോഗ സമൂഹത്തെക്കുറിച്ച് ഇതിൽ പരാമർശമുണ്ടാകുന്നു. അലക്സാ ഡ്രിപ്പുസിനൊപ്പം അറ്റ്ലാന്റിക് സമുദ്രം കടന്ന് ന്യൂയോർക്കിലെത്തുന്ന അഗ്നി അമേരിക്കയുടെ വർത്തമാന കാല ചരിത്രം ടി.പി. ശ്രീധരൻ വെളിപ്പെടുത്തികൊടുക്കുന്നു.

ഉത്തരാധുനിക ഉപഭോഗ സംസ്കൃതിയുടെ കേന്ദ്രമായി ഇവിടെ അമേരിക്കയെ അവതരിപ്പിക്കുന്നു. സഹസ്രാബ്ദങ്ങളുടെ പ്രായമുള്ള യൂറോപ്പിനെ വാർദ്ധക്യം അതിവേഗം കീഴടക്കിക്കൊണ്ടിരിക്കുകയാണെന്നും അമേരിക്ക ഈ നിറഞ്ഞ യൗവനത്തി



ലാഭമെന്നും നോവലിൽ പരാമർശമുണ്ട്. പാശ്ചാത്യ ഉപഭോഗ സംസ്കൃതിയുടെ അടയാളങ്ങളായി നിൽക്കുന്ന ഭക്ഷണ സംസ്കാരം, സാമൂഹിക ജീവിതം എന്നിവയെ കുറിച്ചും നോവലിൽ നിരവധി പരാമർശങ്ങൾ കാണാം. റൂഡോൾഫ് പരിശീലിപ്പിച്ചതുപോലെ റൂഡോൾഫിനെ വെറും ശരീരമായികണ്ട് അയാളുടെ പ്രതികൂലാവസ്ഥയിൽ അയാളെ ഉപേക്ഷിച്ചു പോകാനാണ് അഗ്നി തയ്യാറാകുന്നത്. വൈകാരികതയുടെ അംശത്തെ നിഷേധിക്കുന്ന ആധുനികതയുടെ ഒരു ദൃശ്യമാണ് ഇവിടെ കാണാൻ കഴിയുന്നത്. ആധുനിക സാങ്കേതിക വിദ്യയുടെ അതി പ്രസരം മനുഷ്യനെ സ്നേഹവും മമതയും താല്പര്യവും ബന്ധങ്ങളുമെല്ലാം വെറും കാല്പനിക ആശയങ്ങളാണെന്നു കരുതാൻ നിർബന്ധിക്കുകയാണെന്ന് അഗ്നിയുടെ ജീവിതാനുഭവങ്ങളിലൂടെ മുകുന്ദൻ വ്യക്തമാക്കുന്നു. റൂഡോൾഫിൽ നിന്നും തന്നിലേക്ക് പടർന്ന എയ്ഡ്സ് എന്ന മഹാവിപത്തിനെ അയാൾ തിരിച്ചറിയുകയും അമേരിക്കയിൽ നിന്നും സ്വന്തം ഗ്രാമത്തിലേക്ക് മടങ്ങിയെത്തിയ ശേഷം അയാൾ തിരികെ ആഗോള ഗ്രാമത്തിലേക്ക് തന്നെ മടങ്ങുകയും ചെയ്യുന്നു.

മനുഷ്യൻ അപ്രസക്തനാകുന്ന സാങ്കേതിക വിദ്യയുടെ അതിപ്രസരം അലക്സാഡ്രാപ്പാസിലൂടെ മുകുന്ദൻ ചിത്രീകരിക്കുന്നു. അഗ്നിയെ അമേരിക്കയിലേക്ക് ക്ഷണിച്ച അലക്സാഡ്രിപ്പാസും നൂത്തസംഘവും അഗ്നി അവിടെ എത്തുന്നതിനു മുമ്പുതന്നെ അയാൾ നടത്തേണ്ട നൂത്തത്തിന്റെ സിമുലേഷനുകൾ കമ്പ്യൂട്ടറിൽ സൃഷ്ടിക്കുന്നു. 'ഞാൻ അവരുടെ അരികിൽ എത്തുന്നതിന് മുൻപ് തന്നെ അവൾ എന്നെ സൃഷ്ടിക്കുകയും എന്റെ ശരീരം കൊണ്ട് നൂത്തം ചെയ്യിക്കുകയും ചെയ്തിരുന്നു.'<sup>(6)</sup> കമ്പോള യുക്തിയും അതിനനുസരിച്ച് പരുവപ്പെട്ട ആസാദക സമൂഹവും ചേർന്നൊരുക്കുന്ന കലാനിർമ്മിതികളിൽ ശരീരം ഒരു വിഭവമായി അവതരിപ്പിക്കപ്പെടുന്നു.

'ഒരു കഥയും പറയുവാനില്ലാത്ത ഒന്നും സംവദിക്കാനില്ലാത്ത നവീന നൂത്തത്തിന് ആധാരം ശരീരത്തിന്റെ സാധ്യതകൾ മാത്രമാണ്. ഒരു നർത്തകന്റെ മുടി ഈ സാധ്യതകൾക്ക് ഒരു സംഭാവനയും നൽകുന്നില്ല.'<sup>(7)</sup> എന്നതുകൊണ്ടുതന്നെ തലമുടി വെട്ടി കളയുന്നതിനെപ്പറ്റി റൊഡോൾഫ് അഗ്നിയോട് പറയുന്നുണ്ട് പാട്രിക് റൊഡോൾഫ് ബാലകൃഷ്ണനെ അഗ്നിയോട് മാറ്റി പാശ്ചാത്യ ഉത്തരാധുനിക ലോകത്തിന് പ്രിയപ്പെട്ട ഒരു വിഭവമാക്കി മാറ്റുന്നു. റൊഡോൾഫിന്റെ നവീന നൂത്തകമ്പിനിയിൽ അംഗമായ അഗ്നിക്ക് കിട്ടുന്ന നിർദ്ദേശം ഇത്തരത്തിലുള്ളതാണ്. 'നീ കാലുകൾ കൊണ്ടും കൈകൾകൊണ്ടുമാണ് നൂത്തം ചെയ്യുന്നത്. അതുപോര, മുഴു



വൻ ശരീരം കൊണ്ടും നൃത്തം ചെയ്യാൻ നീ പഠിക്കണം.<sup>(8)</sup> റോഡോൾഫ് നൃത്തം ചെയ്യുമ്പോൾ തന്റെ മനസ്സിനെ ഉപേക്ഷിക്കുകയും വെറും ശരീരം മാത്രമായി തീരുകയുമാണ് ചെയ്യുന്നത്. ഇവിടെ ശരീരത്തെയും ഒരു മാധ്യമമാക്കി മാറ്റുന്നു. സ്വന്തം ശരീരത്തിന്റെ നിറമുള്ള ഒരു കൗപീനം മാത്രം ധരിച്ച് സ്റ്റേജിൽ നൃത്തം ചെയ്യുന്ന റോഡോൾഫിനെ കണ്ടാൽ വസ്ത്രമില്ലാതെ നൃത്തം ചെയ്യുന്നതുപോലെ കാണികൾക്ക് തോന്നുമായിരുന്നു. അക്വാടൊ, സോളോ, ബോഡീസ്, എന്നിങ്ങനെ റോഡോൾഫ് ചിട്ടപ്പെടുത്തുന്ന പുതിയ നൃത്ത പരിപാടിയിൽ ശരീര ചലനങ്ങൾക്കും മനുഷ്യശരീരത്തിന്റെ നിറത്തിനുമാണ് പ്രാധാന്യം നൽകിയിരുന്നത്. ഇവിടെ നൃത്തം എന്ന നോവലിൽ ബാലകൃഷണന്റെ ശരീരവും ശരീരത്തിന്റെ നിറവുമാണ് വിപണനം ചെയ്യപ്പെടുന്നത്.

നോവലിൽ കാഴ്ചയുടെ സമൂഹം ഒരു വിഷയമായി കടന്നുവരുന്നുണ്ട്. കമ്പ്യൂട്ടർ സ്ക്രീനിൽ കൂടിയുള്ള വിവരണങ്ങളിലൂടെ വികസിക്കുന്ന വ്യക്തി വിവരണവും ജീവിത കഥയുമാണ് ഈ നോവലിൽ ഉള്ളത്. കമ്പ്യൂട്ടർ സ്ക്രീനിലൂടെ ലോകത്തെ നോക്കിക്കാണുന്ന മൂന്നാം ലോക രാജ്യത്തെ പൗരന്റെ പ്രതിനിധി മാത്രമാണ് ഇവിടെ ടി.പി. ശ്രീധരൻ. തന്റെ കൺമൂന്നിൽ തെളിയുന്ന വിവരങ്ങളിലൂടെ അയാൾ ഒരു ഭാവനാ ലോകം നിർമ്മിച്ചെടുക്കുന്നു. കമ്പ്യൂട്ടർ സാങ്കേതിക വിദ്യ കേരളത്തിൽ വ്യാപിച്ചു തുടങ്ങിയ ഒരു കാലഘട്ടത്തിലാണ് നൃത്തം എന്ന നോവൽ എഴുതപ്പെടുന്നത്. ഇന്ന് ഇന്റർനെറ്റുവഴി ലഭ്യമാകുന്ന ദൃശ്യങ്ങളുടെ ബഹുലത അന്ന് സുലഭമായിരുന്നില്ല. ലോകത്തിന്റെ ഏതോ കോണിൽ നിന്ന് അഗ്നി അയയ്ക്കുന്ന ഇ-മെയിൽ സന്ദേശങ്ങളിലൂടെ അഗ്നിയുടെ കഥ ശ്രീധരൻ വായിച്ചെടുക്കുകയാണ് ചെയ്യുന്നത്. പുസ്തകങ്ങളിൽ നിന്നും ലഭിക്കുന്ന അറിവല്ല ഇവിടെ സാധ്യമാകുന്നത്. ഈ വായന; മറിച്ച് നിരന്തരം നവീകരിക്കപ്പെടുന്ന വിവരങ്ങളാണ്. ഇന്റർനെറ്റും ഇ-മെയിലും അടങ്ങുന്ന പുതിയ സാങ്കേതിക രീതികൾ കാഴ്ചയുടെ ഒരു സമൂഹത്തെ തന്നെ നിർമ്മിക്കുന്നു. നോവലിൽ മാർക്കറ്റിലെ സൈബർ കഫേയിൽ അശ്ലീല സൈറ്റുകൾ സർച്ച ചെയ്യുന്ന കുട്ടികളെ ഓർത്ത് ശ്രീധരൻ വ്യാകുലപ്പെടുന്നുണ്ട്. 'എട്ടാം ക്ലാസ്സിലും പത്താം ക്ലാസ്സിലും മറ്റും പഠിക്കുന്ന ആൺകുട്ടികളാണ് അവിടുത്തെ പതിവുകാരിൽ ഏറെയും. സ്കൂളിൽ നിന്നും മടങ്ങി വരുമ്പോഴോ, വൈകുന്നേരങ്ങളിൽ ക്രിക്കറ്റ് കളിക്കുവാൻ പോകുമ്പോഴോ, അച്ഛനമ്മമാരുടെ കണ്ണുവെട്ടിച്ച് അവർ അവിടെ ചെന്ന് നീല വെബ്സൈറ്റുകൾ സർച്ച ചെയ്യും.<sup>(9)</sup> പ്രായഭേദമില്ലാതെ ആൾക്കൂട്ടങ്ങൾക്കുവേണ്ടി ആഗോളീകരണ ശക്തികൾ സൃഷ്ടിച്ചെടുക്കുന്ന സ്വതന്ത്ര ലീലകളുടെതായ രസകരമായ ഒരു ഭ്രമകാഴ്ചകളുടെ അടിമകളായി അവരെ മാറ്റി



എടുക്കുന്നു. ഇവിടെ സാമൂഹിക ജീവി എന്ന നിലയിൽ മനുഷ്യനുള്ള മുല്യങ്ങളെ തന്ത്രപരമായി അപനിർമ്മിക്കുന്നു.

ദൃശ്യ സംസ്കാരത്തിനും വ്യക്തി വിനിമയത്തിനും പുതിയ അർത്ഥ തലങ്ങൾ നൽകിയാണ് ഫോട്ടോഗ്രാഫിയുടെ സാധീനം നൃത്തത്തിൽ ആവിഷ്കരിക്കപ്പെടുന്നത്. നവ നൃത്തത്തിന്റെ ഏറ്റവും ആധികാരികമായ പ്രസിദ്ധീകരണങ്ങളിലൊന്നായ ഹേർബർട്ട് ബ്രോഡിന്റെ ഡാൻസ് മാഗസിനെക്കുറിച്ച് നോവലിന്റെ പത്തൊൻപതാം അദ്ധ്യായത്തിൽ പരാമർശിക്കുന്നുണ്ട്. ലോക പ്രശസ്തരായ പല നർത്തകരേയും വളർത്തിയെടുത്ത ഈ മാസികയുടെ കവർപേജിൽ അഗ്നിയുടെ ചിത്രം പ്രത്യക്ഷപ്പെടുന്നു. വളരെ കൗശല പൂർവ്വവും സമർത്ഥവുമായി അഗ്നിയുടെ ശരീരത്തെ ഹേർബർട്ട് ബ്രോഡ് ഇവിടെ ഉപയോഗപ്പെടുത്തി. ആ മാഗസിന്റെ തന്നെ പഴയ ലക്കങ്ങളിൽ പാട്രിക് റോഡോൾഫിന്റെ കലയെക്കുറിച്ചുള്ള പഠനങ്ങളും അഭിമുഖങ്ങളും ഫോട്ടോകളും വന്നിരുന്നെങ്കിലും അതിന്റെ മുഖചിത്രമായി ഒരിക്കലും അമേരിക്കയിലെ പ്രശസ്ത നർത്തകനായ പാട്രിക് റോഡോൾഫിന്റെ ചിത്രം വന്നിരുന്നില്ല. ഒരു ഒത്തുതീർപ്പിനും തയ്യാറല്ലാത്ത, ആർക്കും കീഴടങ്ങാത്ത ഹേർബർട്ട് ബ്രോഡ് അഗ്നിയുടെ ശരീരത്തിന്റെ വിപണി മുല്യമാണ് ആ മാഗസിനിലെ മുഖചിത്രത്തിലൂടെ ലക്ഷ്യം വയ്ക്കുന്നത്. ഇവിടെ ഫോട്ടോഗ്രാഫി എന്ന സാങ്കേതിക വിദ്യ ഡിജിറ്റൽ സാമ്യതകളിലൂടെ ഛായാഗ്രഹണത്തിന്റെ അനന്തസാധ്യതകൾ തുറന്നിടുന്നു. ഇത്തരത്തിൽ ആധുനികതയിൽ നിന്നും വ്യത്യസ്തമായ ഫോട്ടോഗ്രാഫിയുടെ തന്ത്രപരമായ ഉപയോഗം നൃത്തത്തിൽ ചിത്രീകൃമാക്കുന്നുണ്ട്. സാങ്കേതികതയുടെ ഇടപെടലുകൾ നിമിത്തം കലയുടെ സർഗ്ഗാത്മക ലാവണ്യം നഷ്ടമാകുന്ന ഒരു കാഴ്ചനമുക്ക് ഇവിടെ കാണാൻ സാധിക്കും.

നോവലിലെ ടി.പി. ശ്രീധരൻ എന്ന കഥാപാത്രം തന്റെ മേൽവിലാസത്തിൽ മാറ്റം വരുത്തിയതോടെ അയാൾ ഒരു ആഗോള പൗരനായി മാറുന്നു. അയാൾ ഒറ്റവരിയിൽ ഉള്ള പുതിയ ഒരു മേൽവിലാസം സ്വന്തമാക്കുന്നു. sreedhar.lp@hotmail.com. വീട്ടുടമസ്ഥന്റെ സമ്മർദ്ദത്തിനു വഴങ്ങി വാടക വീട് ഒഴിയേണ്ടിവന്നാലോ, എത്ര തന്നെ ട്രാൻസ്ഫറുകൾ എവിടെയെല്ലാം ഉണ്ടായാലോ ഈ വിലാസത്തിന് മാറ്റം ഉണ്ടാവുകയില്ല. ഈ വിലാസത്തിൽ വീടിന്റെ, ഫ്ളാറ്റിന്റെ നമ്പരോ, നിരത്തിന്റെ പേരോ എന്നല്ല നാടിന്റെ പേരുപോലും ഇല്ല. ആർക്കും ഏതു നേരത്തും കടന്നുവരാവുന്ന ആഗോള ഇടങ്ങളിൽ ശ്രീധരന്റെ കർത്യതയെത്ത നിർണ്ണയിച്ചിരുന്നത് പത്രമാധ്യമങ്ങളായിരുന്നു. പത്രങ്ങൾ സൃഷ്ടിക്കുന്നത് ഒരു ദേശ പൗരനെയാണ്. എന്നാൽ നവമാധ്യമങ്ങളുടെ കടന്നുവരവോടെ പരസ്പരം കണ്ടുമുട്ടാതെയുള്ള ഒരു പുതിയ കർത്യതയെത്ത



ഇവ രൂപപ്പെടുത്തി എടുത്തു. തികച്ചും ഗ്രാമീണനായ ഒരു സാധാരണ മലയാളി ഇത്തരമൊരു കർത്യത്വരൂപീകരണത്തിലേക്ക് എത്തുന്നത് നൂതനത്തിൽ നമുക്ക് കാണാൻ സാധിയ്ക്കും. സ്വന്തമായി ഒരു ഹോട്ട്മെയിൽ വിലാസം ഉണ്ടായതോടെ അയാളുടെ ദിനചര്യയിൽ ചില മാറ്റങ്ങൾ സംഭവിച്ചു. രാവിലെ ഉണർന്ന് പല്ലും തേച്ച് ചായ കുടിച്ച് പത്രവുമായി ഇരിക്കുന്നതിനുപകരം ഉണർന്ന ഉടനെ നേരെ കമ്പ്യൂട്ടറിനു മുന്നിൽ ചെന്നിരിക്കുന്ന സ്വഭാവം വന്നു. ആദ്യം തനിക്ക് എന്തെങ്കിലും സന്ദേശങ്ങൾ ഉണ്ടോ എന്ന് തിരക്കിയതിനുശേഷം യാഹൂവിലെ ഒരു സൈറ്റിൽ പ്രവേശിച്ച് അന്നത്തെ വാർത്തകൾ വായിച്ചറിയും, അതിനുശേഷം ചായ, പല്ലുതേപ്പ് അവസാനമായി.<sup>(10)</sup> ഒരു സാധാരണ പൗരനിൽ പ്രതീതി ലോകത്തിന്റെ സാധീനം ഉണ്ടാക്കിയ മാറ്റങ്ങളാണിത്. ഒരു വ്യക്തിയുടെ ശീലങ്ങളെ പരിവർത്തിപ്പിച്ച് അയാളെ ഇല്ലാതാക്കി മാറ്റുന്ന കമ്പോള യുക്തി ഇതിനുണ്ട്. ഇവിടെ അഗ്നി തന്റെ ജീവിതകഥ വെളിവാക്കുകയല്ല മറിച്ച് ശ്രീധരൻ അക്ഷമയും ആകാംക്ഷയും വർദ്ധിപ്പിക്കത്തക്ക വിധമാണ് അയാൾ തന്റെ ഓരോ ഇ-കത്തും സംവിധാനം ചെയ്തത്. അഗ്നിയുടെ സന്ദേശത്തിനുവേണ്ടി കണ്ണും നട്ടിരിക്കുന്ന ശ്രീധരനോട് വളരെ സമർത്ഥനായ ഒരു പത്രാധിപരെ പോലെയോ തുടർക്കഥയെഴുത്തുകാരനെപ്പോലെയോ ആണ് അഗ്നി പലപ്പോഴും പെരുമാറുന്നത്. കഥ രസം പിടിച്ചു വരുമ്പോൾ ബാക്കി അടുത്ത സന്ദേശത്തിൽ എന്ന് പറഞ്ഞ് അയാൾ പെട്ടെന്നു തന്നെ സംസാരം നിർത്തും.

ഇന്റർനെറ്റിലൂടെ അഗ്നിയുടെ സന്ദേശങ്ങൾ വായിച്ചറിയുന്ന ശ്രീധരൻ. അയാളെ തിരിച്ചറിയാൻ ഒരു ഫോട്ടോ ആവശ്യപ്പെടുന്നു. വീട്ടുപേരോ, കൈയൊപ്പോ പോലുമില്ലാത്ത തന്നെ തിരിച്ചറിയുന്നതിനുള്ള ചിത്രം ഒരു അനാവശ്യകതയാണെന്ന് അറിയിച്ച അഗ്നി, ശ്രീധരൻ പരിഹാസിച്ചിരിയുടെ പശ്ചാത്തലത്തിൽ മനുഷ്യ മുഖത്തിന്റെ ഒരു കാർട്ടൂൺ ചിത്രം ഇ-മെയിൽ അയച്ചു കൊടുക്കുന്നു. സാങ്കേതികതയുടെ ആധുനിക മുഖം ഒരു പച്ചമനുഷ്യനെ പല്ലിളിച്ച് പരിഹസിക്കുന്നതായാണ് ഇതിൽ നിന്ന് വായനക്കാരൻ മനസ്സിലാക്കുന്നത്. ഇത്തരം അയുക്തികതയിൽ അഗ്നി തന്റെ കഥ അവസാനിപ്പിക്കുമ്പോൾ നൂതനം എന്ന നോവലും അവസാനിക്കുകയാണ് ചെയ്യുന്നത്.

ഇന്റർനെറ്റിന്റെ ആദ്യകാലമാണ് നൂതനം എന്ന നോവലിന്റെ പശ്ചാത്തലം. കേരള സമൂഹം സൈബർ ഇടങ്ങളിൽ അഭിരമിക്കുന്നതിന് വളരെക്കാലം മുൻപേ ഇത്തരം ഒരു മാധ്യമത്തിന്റെ ശക്തമായ സാധീനത്തെക്കുറിച്ച് എം. മുകുന്ദൻ തിരിച്ചറിഞ്ഞിരുന്നു. ടെക്നോളജി പുതിയകാല മനുഷ്യനെ യാത്രികനാക്കി മാറ്റുകയും



അപമാനവീകരിക്കുകയും ചെയ്യുന്നുണ്ട് എന്ന യാഥാർത്ഥ്യം ഈ നോവലിലൂടെ മുകുന്ദൻ പ്രഖ്യാപിക്കുന്നുണ്ട്. മുകുന്ദൻ ഇവിടെ പരമ്പരാഗത മാധ്യമങ്ങളെ പിൻതള്ളിക്കൊണ്ട് സാങ്കേതിക മാധ്യമങ്ങളെ തന്റെ നോവലിന്റെ പരിധിയിലേക്ക് കൊണ്ടുവരാൻ ശ്രമിക്കുകയാണ് ചെയ്യുന്നത്.

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ഡോ.ആർ.രാജേഷ്  
 അസോ.പ്രൊഫസർ & ഹെഡ്  
 എൻ.എസ്.എസ്. കോളേജ്, പന്തളം  
 Mail Id -rajeshpilappuzha@gmail.com  
 Mob: 9961320446



नई बौद्धिक - धारा के प्रवर्तक लक्ष्मीनारायण मिश्र: व्यक्ति एवं रचना

Prof. Kumara Nageswara Rao  
HOD of Hindi  
Sri Y.N.College (A)  
Narasapur- ,W.G.Dist. A.P.

जयशंकर प्रसाद के बाद हिन्दी नाटक के विकास में लक्ष्मीनारायण मिश्र जी का योगदान अत्यंत महत्वपूर्ण है। मिश्रजी ने प्रसाद युग में नाटक लिखना आरंभ किया और प्रसादोत्तर युग के एक प्रमुख नाटककार बन गए। अपनी साधना के आरंभिक चरणों में लक्ष्मीनारायण मिश्र जी भी छायावादी युगीन संस्कारों से प्रभावित थे किन्तु बहुत शीघ्र ही उन्होंने , - भावुकता और छायावादी प्रभाव से मुक्ति पा ली। नई बौद्धिक धारा का प्रवर्तन कर लक्ष्मीनारायणमिश्र ने हिंदी नाटक को विकास की नूतन दृष्टि और नई दिशा दी है। ऐसे महान नाटककार का जन्म सन् 1903 उत्तर प्रदेश के आजमगढ़ जिले के बस्ती नामक गाँव में हुआ। आपके पिता का नाम पंडित कमला प्रसादमिश्र तथा माता का नाम श्रीमती सहोदरा था। मिश्रजी के पिताजी देशभक्तिनिर्भीकता तथा पारिवारिक परंपरा के वातावरण में पालित हुए। धार्मिक , विश्वासों तथा संस्कारों में इनकीमाता पोषित हुई। ऐसे सुसंस्कृतसंपन्न तथा स्वदेश सेवी , देशभक्ति , परिवार में जन्म लेने के कारण श्री लक्ष्मीनारायणमिश्र के व्यक्तित्व में अस्तिकता निर्भीकता तथा स्वाभिमान का संचार हुआ। धर्मनिष्ठ माँ की गोद में पौराणिक कथाओं को सुनते रहे और माँ का प्यार पाने के साथ साथ भारतीय संस्कृति का संस्कार भी पाते रहे।

मिश्रजी ने काशी हिंदू विश्वविद्यालय से बी.ओर इलाहाबाद विश्वविद्यालय से कानून .ए. में स्नातक की उपाधि प्राप्त की। आपने कर्मयोद्धा की तरह अपनी साहित्य साधना निरंतर गतिशील रखी और वे जीवन में खरे उतरते गये तथा अपने कृतित्व से साहित्य तथा समाज में गौरव प्राप्त किया। आपने अपने लेखकीय व्यक्तित्व से समकालीन रचनाकारों को विशेष रूप से प्रभावित किया है। सांस्कृतिक समन्वय व नवीन यथार्थवादी विचारधारा की अभिव्यंजना की दृष्टि से उनकी रचनाएँ हिंदी नाटक को नई दिशा एवं दशा प्रदान की। वाक्चातुर्य की कला में आप अद्वितीय हैं। अपने विचारों के बल पर मिश्रजी ने समकालीन लेखकों पर अपने अमिट प्रभाव को छोड़ दिया है।

पंडित लक्ष्मीनारायणमिश्रजी का व्यक्तित्व बहुमुखी एवं विराट है। उनके निजी व्यक्तित्व में उनकी ईमानदारी और मानवतावादी दृष्टि स्पष्टतः परिलक्षित होती है। यथार्थ के धरातल पर मानव जीवन के विविध पक्षों को समझने तथा तटस्थ होकर विभिन्न समस्याओं पर विचार करने की अदम्य शक्ति रखने के कारण मिश्रजी के व्यक्तित्व का सामाजिक पक्ष अत्यंत सुदृढ़ प्रतीत होता है। ईमानदारीदेशभक् ,संवेदनशीलता ,तिपरंपरागत मान्यताओं व भारतीय संस्कृति में ,



भौतिक एवं आध्यात्मिक उत्कर्ष द्वारा सांस्कृतिक क्षेत्र में समन्वय स्थापित ,राष्ट्रीयता ,आस्था करने का संकल्प और परिवेश के प्रति सजगता के कारण मिश्रजी का व्यक्तित्व बहुमुखी एवं विराट बन गया है।

लक्ष्मीनारायणमिश्रजी में अगाध पांडित्य तथा प्रचंड प्रतिभा का विरल योग है। कवित्व तथा तर्क शक्ति का मणिकांचन संयोग है। जिन लोगों ने इन के व्याख्यान के अजस्र प्रवाह को देखासुना है वे दाँतों तले उँगली दबाकर संस्तवन करते हैं। एक सप्ताह में नाटक की रचना का - कुत्तल जनक तथा विस्मयकारी कार्य उनकी इसी शक्ति का द्योतक है। मिश्रजी राष्ट्रीय विचारधारा के कहर समर्थक हैं। आप में राष्ट्रीयता कूट कूट कर भरी है। छात्रावस्था में ही इसके लक्षण स्पष्ट हो चुके थे। राष्ट्रीय आंदोलन के दिनों में आप सन् 1943 में शत्रुचर बनाकर 1943 आजमगढ जेल में नजरबंद कर दिये गये थे। इन के नाटकों में राष्ट्रीयता की जो अभिव्यक्ति हुई है उसके कारण कुपित विदेशी सत्ता ने कई बार इनको सताने का कुचक्र रचा।

मिश्रजी भारतीय संस्कृति के महान अनुगमन कर्ता हैं। भारतीय संस्कृति में उनको अपार श्रद्धा है जिसका प्रतिफलन उनके ऐतिहासिक और सांस्कृतिक नाटकों में देखा जा सकता है। उनके ऐतिहासिक नाटकों का अधिकांश कथानक मौर्यगुप्त तथा श्रृंग वंश का काल है जिस में , साहित्य और कला अपने चरमोत्कर्ष पर थी। अपने गौरवपूर्ण इतिहास तथा ,भारतीय समाज संस्कृति पर अपार श्रद्धा होने के कारण ही मिश्रजी भारतीय संस्कृति के महान अनुगमन कर्ता हैं। 'वत्सराज' और 'अशोक' जैसे नाटकों में हमें लेखक की सांस्कृतिक निष्ठा का परिचय मिलता है। 'गरुडध्वज' नाटक में उन्होंने इतिहास के बिखरे सूत्रों को संजोकर तथा अपनी कल्पना का आधार लेकर जिस कथानक का सृजन किया है वह संभव ही है आगे चलकर ऐतिहासिक तथ्य के रूप में प्रतिष्ठा पा सके।

नाटककारकाव्यकार व अनुवादक के रूप में लक्ष्मीनारायणमिश्र ने ,एकांकीकार , अधुनिक हिंदी साहित्य को सुसंपन्न बनाया है। प्रसादोत्तर युगीन हिंदी रचनाकारों में लक्ष्मीनारायणमिश्रजी का प्रमुख स्थान है। मिश्रजी की आरंभिक रचनाएँ जो स्फुटमुक्त तथा , इंदु तथा ,श्री शारदा ,त्यागभूमि ,विशाल भारत ,समय समय पर लिखे गये लेखों के रूप में थीं प्रभाव आदि पत्रिकाओं में प्रकाशित होती रहीं। मिश्रजी की साहित्य साधना का श्रीगणेश कवि के की श्री शार 1921 सन् ,रूप में हुआ है। नवंबद्धा में प्रकाशित मिश्रजी की एक कविता का अंश इस प्रकार है -

विमल अभ्रके वातायन से  
झिलमिल हो प्रतिपल में।  
तारा गण थे झाँक रहे ज्यों  
सुविमल कमल सलिल में।



प्रकृति - मंचपर थिरक रही थी

उषा नटी नमित सी।

मित्र - आगमन सुखद - प्रतीक्षा

) करती हुई श्रमित सी ।।(

इसके बाद मिश्रजी ने 'अंतर्जगत' नामक एक कविता - संग्रह की रचना सन् 1925 - की। इस काव्य की कुछ पंक्तियाँ यहाँ पर दी जाती हैं

अंतर्जगत की वरुण - कहानी

कहना मुझको आता,

यह बहिरंग जगत मेरी

आँखों को तनिक न भाता।

वह अनादि व्यापक प्रकाश नित

रहता मेरे मन में

उसकी केवल एक किरण

करती प्रकाश जीवन में। )2(

बाद में मिश्रजी ने सन् 1935 'सेनापति कर्ण' नामक महाकाव्य की रचना की। सेनापति कर्ण हिंदी के सर्व श्रेष्ठ वीर रस के प्रबंध काव्यों में से एक है। इस में कर्ण के चरित्र की पुनःप्रतिष्ठा महाभारत की घटनाओं और चरित्रों में नए धरातल पर जीवन मूल्यों की खोज-पौरुष और विवेक की प्रतिष्ठा है।

मिश्रजी के नाटकों को चार भागों में विभाजित किया जा सकता है -

1. समस्या - नाटक :-

1. संन्यासी	1927 सन्
2. राक्षस का मंदिर	1932 सन्
3. मुक्ति का रहस्य	1932 सन्
4. राजयोग	1934 सन्
5. सिंदूर की होली	1934 सन्
6. आधीरात	1936 सन्

2. ऐतिहासिक - नाटक :-

1. अशोक	1926 सन्
2. गरुडध्वज	1945 सन्
3. वत्सराज	1950 सन्
4. दशाश्र्वमेध	1950 सन्
5. वितस्ता की लहरें	1953 सन्
6. वैशाली में वसंत	1955 सन्



7. धरती का हृदय 1961 सन्
3. पौराणिक - नाटक :-
  1. नारद की वीणा 1946 सन्
  2. चक्रव्यूह 1954 सन्
  3. चित्रकूट 1961 सन्
  4. अपराजित 1965 सन्
4. जीवनी :-
  1. कवि भारतेंदु 1949 सन्
  2. मृत्युंजय 1957 सन्
  3. जगदगुरु 1958 सन्

एकाँकी :-

1. अशोकवन 1950 सन्
2. प्रलय के पंख पर 1951 सन्
3. कावेरी में कमल 1952 सन्
4. भगवान मनु और अन्य एकाँकी 1953 सन्

- हिंदी नाटक साहित्य को अनुवादक के रूप में भी पंडित लक्ष्मीनारायणमिश्र का योगदान विशिष्ट रहा है। उन्नीसवीं शताब्दी के उत्तरार्द्ध में यूरोप में इब्सन ने जिस मौलिकता और बौद्धिक - चेतना को लेकर पाश्चात्य नाटक - साहित्य को नई वैचारिक दृष्टि प्रदान की है। इब्सन की रचनाओं से प्रभावित होकर लक्ष्मीनारायणमिश्रजी ने यथार्थवादी और बौद्धिक - चेतना एवं रंगमंचीय नवीन दृष्टि से स्वाभाविकता और अभिनेयता पर विशेष बल देते हुये हिंदी नाटक के क्षेत्र में पदार्पण किया। लक्ष्मीनारायणमिश्रजी ने इब्सन के दो प्रमुख नाटकों - 'द पिलर्स आफ सोसाइटी' और (समाज के स्तंभ) 'ए डाल्स हाडस' का हिंदी रूपांतरण प्रस्तुत (गुडिया का घर) - किया है। इन के अलावा मिश्रजी ने गाँधी अभिनंदन ग्रंथ में संकलित समस्त अंग्रेजी कविताओं का हिंदी रूपांतरण प्रस्तुत किया है। इस प्रकार हिंदी साहित्य के प्रतिभावान रचनाकार लक्ष्मीनारायणमिश्र ने काव्यअनुवाद आदि साहित्यिक विधाओं पर अपने सर्जक ,एकाँकी ,नाटक , व्यक्तित्व की छाप छोड़ दी।

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3. आजकल - मार्च 1999
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## COST MANAGEMENT PRACTICES IN AN UNORGANISED SECTOR IN HYDERABAD

**Dr Md Sadat Shareef**

Associate Professor of Commerce  
Directorate of Distance Education  
Maulana Azad National Urdu University, Gachibowli,  
Hyderabad, Telangana, India

### Abstract

Business is an economic activity, profit is motive of business. Every business men decide to get minimum rate of profit which is motivate the entrepreneurs. Profit get after payments of all expenses. Large scale businessmen can pay the expenses very easy. Unorganised Micro entrepreneurs face lot of problems for payment of expenses. Competition with organised sector is very challenge to the micro entrepreneurs. Unorganised businessmen's runs their business according to the situation of a day as well market situation. Vegetable sellers, Fruit Sellers, Fresh Jawar Rooti Makers, Fresh meals centres on footpath, Tiffin centre, Small cloth sellers on footpath, Plastic sellers on the footpath are the some important unorganised micro entrepreneurs. Weather conditions, festivals, public holidays, days of the weeks, School timings, area of residence, are some important factors which directly affect the business. Most of the micro entrepreneurs put their business on the road side or near to residence area or specific market area where need not to pay rent. They save some other expenses also. Due to cut of expenses profitability increase. They use the law of demand in their business. Due to cut of expenses price of commodity also decrease and it helps in increase the demand. People of the near to market prefer to purchase from low price. This research paper is to be critically analysed "Cost Management Practices in an unorganised Sector in Hyderabad"



**Key words.** Unorganised Sector, Micro Entrepreneur, Business Transactions, Demand and Supply, Price expectations, Purchasing Capacity.

### **Statement of the Problem**

Cost management is a method of reducing operating or production expenses in order to provide less expensive products or services to consumers. It is the process management uses to analyze its production and streamline its operations to keep costs low and manage expenses in the future. Cost management is the main focus of managerial accounting that helps a firm forecast future expenditures in an effort to reach their budgeting goals. This process is divided into three main phases: Planning, Implementation, and Final analysis.

Cost management practices helps to reduce labour cost and can easily adaptable to the changes in business conditions. Cost management practices facilitate the determination of price and the preparation of estimates, quotations and tenders. It enables the management to take special pricing decisions such as pricing during depression, price at which additional order can be accepted. Thus, Costing has become an essential tool of management. It helps the management from the stage of decision making to the final stage of execution and control.

Cost control aims at achieving the target of sales. Cost control involves setting standards. The firm is expected to adhere to the standards. Cost control emphasis is on past and present. Cost control is applied to things which have standards. It seeks to attain lowest possible cost under existing conditions. Cost control is a preventive function. Cost control by management means a search for better and more economical ways of completing each operation. Cost control is simply the prevention of waste within the existing environment. Cost



control is the procedure whereby actual results are compared against the standard so that waste can be measured and appropriate action taken to correct the activity.

### **Management Practices**

Cost management practices helps to reduce labour cost and can easily adaptable to the changes in business conditions of Steel companies, and also facilitate the determination of price and the preparation of estimates, quotations and tenders. Cost management practices helps to the management of Steel companies to control the cost and also minimize the wastages for the purpose of to maximize the profit of Steel companies. Cost management practices of Tata Steel Limited and Steel Authority of India Limited is satisfactory level.

Profit is main motive of business. It can be achieved by adopting business policy as well as strategy. Small business required low investment and they get sufficient profit. Cost of production can be divided in to direct and indirect expenses. These expenses paid by the industrialist who produce the goods. Retailors and micro entrepreneurs direct sold the goods to the customers. Travelling maintenance electricity cleaning are some expenses which is paid by the owner of the business. He can also adopt the cost control and reduction policy for controlling the cost. Micro entrepreneurs invest low amount on their business. They satisfy with getting low profit also. Different factors effect on their business. Weather conditions, school timings, working official days, public holidays, seasons, market conditions etc are some factors that effect on micro entrepreneurs.

### **Significance of the research study**

Small and Micro entrepreneurs are very near to the residence areas. People of the area very known to the



entrepreneurs. Cost is very important factor for fixing the price. Price also impact on the demand. Prices can be decrease by controlling the cost. Micro entrepreneurs sell the direct useful goods to the customers. Cost of production is not in a hand of small entrepreneurs. They can control indirect and maintenance expenses by adopting proper policy. Unorganised business cannot pay the huge expenses. Decoration is not requiring hence they get benefit with cost control. Cost control and reduction is more important factor for getting sufficient profit. Locating unnecessary expenses and controlling them is very best for controlling cost. Variable and semi variable expenses are part of cost of production. Cost of production can be control in large scale industries by adopting new technology and scientific way.

### **Review of Important works**

The study made by **Rajiv Bhatt., (2011)** revealed that “the cost overrun happens due to (i) delayed payment from client or contractor, (ii) delayed supply of materials and decisions, (iii) delayed possession of site, (iv) inflationary increase in material rates, (v) Revised estimate”.

**Ahmedabad., (2012)** From the experience he had, The Director (Contract), Indian Military Engineering Service, revealed that final account and Audit Management is the most important stage of Cost Management. From this the contractor as well as client can know the lapses committed and how the improvement can be made so that same lapses are not committed in future projects.

According to **Harrow., (U.K) (2013)** Director (CEO), Britannia Academy of IT and Planning Ltd., London Cosmos College, “public building projects in India suffered cost overrun and additional funds are provided to complete them. Cost management undermines social benefit cost values in building projects to minimize costs by axing first the social benefits. India has brilliant audit manpower in world. However, the



quality of audit is poorest in the world. The stakeholders greed and averse to computer system have further deteriorated our audit quality in India. There is a vacuum of the role play by cost and works engineer in building projects as the Indian Department of Company Affairs appoints statutory auditors from nontechnical field which supersede in audit objection. So, Chartered Works and Cost Engineer must be appointed in all the large Projects”.

**Virendra KR. Paul and Dr. V. Thiruvenkadam., (2014)** say that “Cost Related Processes after Practical completion should be done by the process owner i.e. The Project Manger such as (i) Defect rectification and completion formalities, (ii) preparation of final account of time, (iii) updating lost cost report, (iv) preparing complete final account and issue relevant final certificate, (v) feedback on Cost performance assessment”.

**Shubham Balip, and others (2014)** explain the cost control in their article “Cost Control Methods Used In Construction Projects”. They discuss on cost control process and characteristics of Poor budgeting practices, Failure to plan sufficient contingency budget, Failure to correctly estimate research and development activities. Failure to consider the effects of inflation on the cost of materials or labour

According to **Khaled EI-Rayes and Amr Kandil., (2015)** the traditional two-dimensional time-cost trade off analysis to an advanced three dimensional time cost quality trade off analysis as a multi objective genetic algorithm provides the capability of quantifying and considering quality in construction optimization.

According to **Ahmedabad., (2016)** the Director (Contract), Military Engineering Services, “the total cost management of construction projects is possible only when all the players in the field i.e. the client, the contractor, the architect, the design engineer, the quantity surveyor and the site engineer / project manager are conscious of cost management of project and

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perform their functions effectively. A lapse on the part of any single component will result in delay of project and increase in cost”. The Director (CEO), Britannia Academy of IT and Planning Ltd., London Cosmo College.

**Hanow, UK (2017)**, has revealed that normally the cost overruns occur if the project manager is unable to control the construction activity efficiently. Further he added that the savings in cost management are possible if Project Management team implements the construction with diligence and care by dropping the components of infrastructure that are otherwise valuable as social amenities.

**D.S. Sachdev., (2018)** has suggested that “the Fast Track completion is to be followed by increasing use of management techniques such as CPM/PERT, value analysis, standard costing, budgetary control etc., for improving the physical performance and reducing cost”.

**Sach-deva and Umesh Sharma., (2019)** in their study, concluded that the materials management which includes procurement, inventory shop fabrication and field servicing needs special attention for cost reduction.

### **Research Gap:**

Research is conducted to full fill the research gap on the topic **Cost Management Practices in an Unorganised Sector in Hyderabad**

### **Objectives:**

Following are the main objectives of the research paper.

1. To study on important cost factors of micro entrepreneurs’
2. To know the impact of cost factors on profit of the business.
3. To analyse the cot performance of an unorganised sector.

### **Methodology and Data Analysis:**

On the basis of objective data is collected with the help of questions and discussion by adopting simple random sampling



method in different areas of the Hyderabad. Simple statistical tools used for analysing and findings.

**Table No 1.  
Sample Size**

Gender	Male	Female	Total
No of Respondents	70	30	100
Percentage	70%	30%	100%
Total			

*Source: Primary Data collected by researcher*

Above table shows the sample size. Out of hundred sample seventy per cent Male and thirty per cent female entrepreneurs are selected.

**Table No.2  
Sample Size**

Type of Business	Vegetable Seller	Fresh Meals Sellers.	Clot h and Plastic items	Fruit Sellers	Fresh Juice	Fresh JawarRoti	Total
Men	20	10	20	10	10	----	70
Women	---	10	10	---	-----	10	30
	20	20	30	10	10	10	100

*Source: Primary Data collected by researcher*



Above table shows the sample size. Total hundred samples are collected out of which seventy per cent are male and thirty per cent are female micro entrepreneurs. Data is collected from six types of unorganised micro entrepreneurs who run their business on the foot path or road side or public market areas. These entrepreneurs are very suitable for objective of the research. Fresh meals sellers arrange the food on table on the road side by adopting safety precautions for health in lunch time. Fresh juice like sugar cane sellers fix a machine and travel from street to street. Fresh jawarrooti makers arrange their mobile shop on corner of the road or on the cart. Evening time is very suitable for this business. Cloth and plastic items sellers arrange their shop on the road side or on the van and travel from one area to another area. Vegetable sellers arrange the fresh vegetable on bike or cart or set on the road side in the morning. Some vegetable sellers arrange the vegetable in evening time also.

**Table No.3.**  
**Type of Expenses**

Type of Business	Vegetable Seller	Fresh Meals Sellers.	Cloth and Plastic items	Fruit Sellers	Fresh Juice	Fresh JawarRooti
Rent	No	No	No	No	No	No
Travelling	Yes	Yes	Yes	Yes	Yes	Yes
Electricity	Yes	Yes	Yes	Yes	Yes	Yes
Advertisement	No	No	No	No	No	No

*Source: Primary Data collected by researcher*



Above table shows the types of expenses of a business. Rent, Travelling, Electricity, and Advertisement are most important expenses taken for analysis. It is observe that due to nil rent and advertisement expenses and low travelling and electricity expenses micro entrepreneurs sell on low price and get more profit. Travelling and electricity expenses impact very low on the cost.

**Table No.4**  
**No of Dependence in a business**

Type of Businesses	Vegetable Seller	Fresh Meals Sellers	Cloth and Plastic items	Fruit Sellers	Fresh Juice	Fresh Jawar Rooti	Total
Owners	3	5	2	1	1	3	14

*Source: Primary Data collected by researcher*

Above table show the no of dependence on the business. It is observe that ready food related business provide more employment opportunity. And other business runs by single person. In this business family members involve very easy and need not to take labour from outside. This also helps in controlling cost as well as providing employment opportunity to the family members.

**Table No. 5.**  
**Reasons of success business**

Type of Business	Vegetable Seller	Fresh Meals Sellers	Cloth and Plastic items	Fruit Sellers	Fresh Juice	Fresh Jawar Rooti
Punctuality or Maintain Time of Business	First	First	First	First	First	First



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No extra Cost	Yes	Yes	Yes	Yes	Yes	Yes
Hard work	Yes	Yes	Yes	Yes	Yes	Yes
Family Support	Yes	Yes	Yes	Yes	Yes	Yes

*Source: Primary Data collected by researcher*

Above table shows the success of their business with their Preference. They show that punctuality or maintaining business time is more important factor. This indicates that proper business plan is one of the key factors of success of business. Beside this there are extra charges or cost for maintaining their business. Family support indicates the cooperation among the family members who have their common goal of the business.

### Summing up

Business is an economic activity. Profit is the main objective. Large scale industries adopt new method of production. They sell goods to the whole sellers. Retailors purchase them and sold to the customers. Expenses impact on the fixing of the price. Cost of production, raw material, Wages, rent, advertisement, maintenance, electricity, cleaning etc. are some important expenses. Micro entrepreneurs run their business in unorganised mode and they not paid direct expenses but they paid only travelling and electricity expenses. Micro entrepreneurs are the owners of the business and involve family member in the business. It is best source for providing employment opportunity to the needy people. They can improve with providing proper skill development trainings. Most of the micro entrepreneurs are adopts their family business.



They run their business according to the suitable time of the business. Proper policy of cost control and reduction helps in controlling the cost of production which helps in improving the profitability of the business. Low price motivate the customers and increase the sale.

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