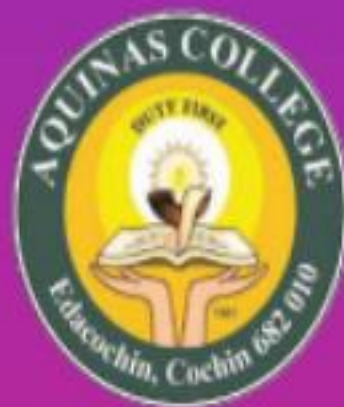


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# **AQUINAS JOURNAL OF MULTIDISCIPLINARY RESEARCH**

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## **EDITORIAL**

*“Language is a process of free creation; its laws and principles are fixed, but the manner in which the principles of generation are used is free and infinitely varied. Even the interpretation and use of words involves a process of free creation” - Noam Chomsky*

The norms of language are perpetually evolving because there is a constant need to convey novel concepts and creativity. Research provides the input that creativity requires, and language becomes the blood of the soul, into which thoughts run and out of which they grow (Oliver Wendell Holmes). In the vibrant tapestry of academic exploration, the threads of knowledge from various disciplines intertwine to weave a richer understanding of our world. We believe that the most innovative and impactful insights emerge at the intersections of different disciplines, where perspectives merge, and ideas converge. Through this convergence, we have the opportunity to tackle complex challenges with creativity, rigour, and nuance.

We are extremely delighted to present the ninth issue of the Aquinas Journal of Multidisciplinary Research. Our journal serves as a beacon for those who seek to transcend disciplinary boundaries and embrace the interconnectedness of human inquiry across a spectrum of disciplines. From the natural sciences to the social sciences, from engineering to the humanities, we welcome contributions that challenge conventional thinking, spark new conversations, and inspire novel approaches to research and practice. In a world where challenges transcend traditional boundaries and new frontiers of knowledge emerge, the importance of collaboration across disciplines cannot be overstated. Through the exploration of intersections and the synthesis of ideas, we aim to foster a culture of collaboration and innovation. Our platform provides a space for scholars and researchers to engage in meaningful dialogue, share groundbreaking discoveries, and inspire new avenues of exploration.

We extend our heartfelt thanks to the eminent contributors who have enriched this journal with their research findings. We would also like to express our sincere gratitude to the peer review committee for their meticulous evaluation. We would also like to take this opportunity to thank the editorial board, who contributed immensely to the success of our journal. We invite you to join us on this exciting journey of discovery. Together, let us embark on a collective quest to unravel the mysteries of the universe, illuminate the complexities of the human experience, and forge a brighter future for generations to come.

### **Editors:**

**Lt Dr. Joseph John, Principal**

**Dr. Tania John, Assistant Professor and HOD, Department of English**

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# Bee-Inspired Backpropagation Algorithm for Down Syndrome Detection

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## ABSTRACT

This paper presents a novel approach for predicting Down syndrome using the Artificial Bee Colony - Backpropagation algorithm within a neural network framework. An extra copy of chromosome 21 causes Down syndrome, a genetic disorder that results in various intellectual and developmental disabilities. Early detection is crucial for effective management and intervention. Our methodology leverages facial expression images from diverse datasets to detect Down syndrome. Key facial features are extracted using a compact geometric descriptor, and these extracted features are then normalized and used to train a neural network via the Backpropagation algorithm. The proposed model demonstrates high accuracy, achieving a classification performance of 98.14%. This study underscores the potential of using advanced machine learning techniques for early and accurate prediction of Down syndrome, offering significant improvements over traditional diagnostic methods.

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## 1. Introduction

Nowadays, healthcare systems are being restructured with innovative technologies like machine learning and artificial intelligence to offer more intelligent and efficient healthcare services. Recent advancements in information technology, including wireless communication systems, the Internet of Things, big data, and wearable computing, are increasingly being utilized in the healthcare field. Specifically, various intelligent healthcare systems are being developed using big data and mobile computing devices to provide expert services. However, the increase in medical data leads to challenges in managing, storing, and processing this information. This paper introduces an intelligent prediction and classification system for healthcare, utilizing feature selection based on density with the Artificial Bee Colony (ABC) algorithm for Down syndrome (DS) [1].

Nature is a significant source of inspiration for solving complex problems in computer science because it demonstrates a diverse, dynamic, robust, and complex set of phenomena that always find optimal solutions while maintaining a perfect balance among components. This concept underpins bio-inspired computing. Nature-inspired algorithms are metaheuristics that mimic natural processes to solve optimization problems, heralding a new era in computation. Over the past decades, considerable research efforts have been focused on this area. Despite being a relatively young field, the impressive results have broadened the scope and applicability of Bio-Inspired Algorithms, exploring new areas of application and creating more opportunities in computing. This work provides a broad overview of the Artificial Bee Colony algorithm, a biologically inspired optimization algorithm [2].

The proposed intelligent system excludes inappropriate or redundant features before constructing the ABC-based classifier. The method has three

phases: preprocessing, feature selection, and classification. When compared to existing methods, the proposed intelligent system significantly outperformed other methodologies in classification accuracy while using fewer features. In the human body, genes store genetic codes, and all inherited traits are associated with these genes, which are grouped into structures called chromosomes. Typically, each cell contains 23 pairs of chromosomes, with each parent contributing half. However, if a person has a partial or full copy of chromosome 21, it results in Down syndrome, which leads to intellectual disability, reading impairment, developmental delay, and other medical abnormalities. There is no specific treatment for Down syndrome [3] [4].

Therefore, early detection and screening are crucial for preventing Down syndrome. This work uses facial expression images for Down syndrome detection. A compact geometric descriptor is employed to extract facial features from the image set. The Artificial Bee Colony algorithm is applied to gather the required data sets for classification. The extracted information is then normalized and used to train a Neural Network using the Backpropagation algorithm.

This paper proposes an algorithm to detect the likelihood of Down syndrome through the analysis of fetal facial characteristics. Facial points are localized, and the intercanthal distance is calculated. Using these calculations, the proposed algorithm detects the chance of Down syndrome. Recognizing Down syndrome involves considering the intercanthal distance—the space between the inside recesses of the eyes. Individuals with Down syndrome often have an increased intercanthal distance, known as telecanthus. Other common features include small palpebral fissures, the distance between the lateral and medial canthus of the eyes, a flattened nose, and a small mouth. In this proposed method, facial landmarks are detected, and a geometric descriptor is built using these landmarks.

## 2. Methodology

The proposed work operates in three stages: preprocessing, feature selection (FS), and classification. The preprocessing stage is crucial as the database may contain redundant and noisy data. During this stage, various processes are performed, such as data cleaning, filling in missing values, and removing excessive data, since these issues can degrade performance. In this work, a few key features are selected through the feature selection process. The wrapper method is used to select the best subset of features by repeatedly generating different sets until the optimal subset is identified. Once the optimal feature vector is obtained, the ABC-based classification approach is employed to classify the data. This combination of density-based feature selection and the ABC algorithm enables accurate prediction and diagnosis using medical data. The proposed ABC model achieves high classification performance with fewer features, ensuring optimal performance measurements [5].

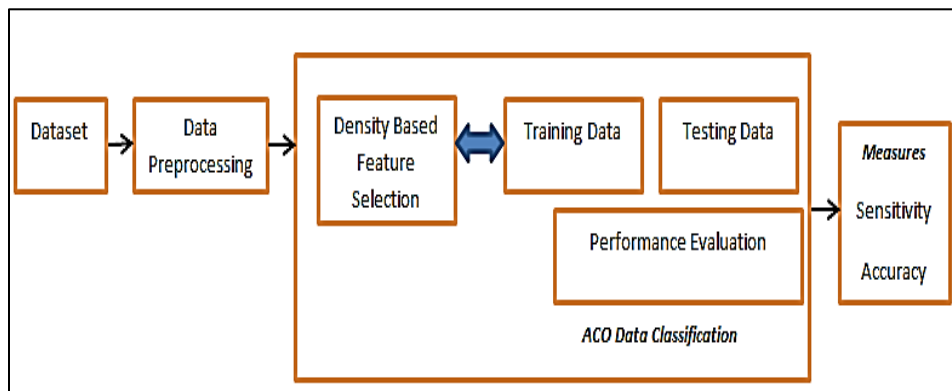


Figure 1. Block Diagram of Proposed System

### 2.1 Pre-processing

To achieve effective performance at a low cost for data mining processes, the quality of the data must be high. Missing values in the dataset should be filled

in comprehensively. In certain cases, when continuous features are present, methods can be coordinated to create discrete qualities. Each instance may contain some noisy and missing values. To enhance the quality of medical data, the original data undergoes preprocessing.

The suggested algorithm employs the following processes to select optimal features: After completing the preprocessing of the dataset, the next step is to organize the input data into groups. Density-based feature selection is then applied, choosing a set of features in each iteration. A subset of the optimal features from the raw dataset is identified as the most important for the classification procedure. This heuristic approach estimates the value of features, operating on the assumption that a feature is considered good when each class has minimal overlap with other classes. For the classification task, the ABC algorithm is utilized to extract classification rules, leveraging the behavior of ant colonies and data mining techniques [6].

## **2.2 Artificial Bee Colony Optimization**

The Artificial Bee Colony Optimization (ABC) algorithm is popular due to its flexibility, simplicity, and ease of implementation. It has been successfully applied to many engineering and optimization problems. The algorithm simulates the intelligent searching behavior of bees, involving employed bees, onlooker bees, scout bees, and food sources. The teamwork between these bees helps find the best food sources [7] [8].

Employed bees search randomly for new food sources and return to the hive to share information about the nectar amounts by dancing. The duration of the dance corresponds to the amount of nectar available. Onlooker bees observe the dance and choose high-quality food sources based on the performance. An

employed bee becomes a scout when a food source is abandoned, starting a new random search. In the ABC algorithm, the number of employed bees equals the number of food sources, and the number of onlooker bees matches the number of employed bees, meaning half of the bee colony consists of employed bees [9]-[11]. The generalized form of ABC is discussed in algorithm shown below.

### **Algorithm**

1. Start
2. Population Initialization;
3. Distribute employed bees for a new food source;
4. Evaluate the fitness function to recollect the best food source;
5. Onlooker bees phase;
6. Calculate Probabilities for Onlookers;
7. Scout Bees Phase;
8. Remember the finest-realized solution so far;
9. While (until cycle = Maximum Cycle Number), stop the algorithm;
10. Otherwise, go back to Step 2;
11. Stop.

### **3. Results and discussion**

In this study, we selected images from the Dartmouth Database of Children's Faces, including both male and female images with distinct facial expressions. These images were captured spontaneously from various backgrounds, angles, and distances, showing different head poses, facial expressions, and occlusions. The images were then tested, verified, and compared to solutions using other prominent classifiers.

The proposed methodology consists of four stages: (i) facial detection, (ii) feature extraction, (iii) feature reduction, and (iv) classification. The study observed that as the number of iterations increased, the error value decreased. The ABC - Backpropagation algorithm was used to train the classified parameters, and

MATLAB was employed for training and testing. Figure 2 shows the performance of the system, and Table 1 compares various methods for DS recognition based on accuracy rates (in percent). Seventy percentage of the data is used for training, 15% for testing, and 15% for validation. For the training 7-15-1, the ANN structure is applied.

The accuracy of the system is calculated using the expression,

$$Accuracy = \frac{TP + TN}{TP + TN + FP + FN}$$

Table 1- Accuracy Comparison Table

| Method               | Number of images | Accuracy     |
|----------------------|------------------|--------------|
| SVM                  | 48               | 97.90        |
| LBP                  | 107              | 95.30        |
| EBGM                 | 86               | 68.70        |
| <b>ABC- Proposed</b> | <b>127</b>       | <b>98.14</b> |

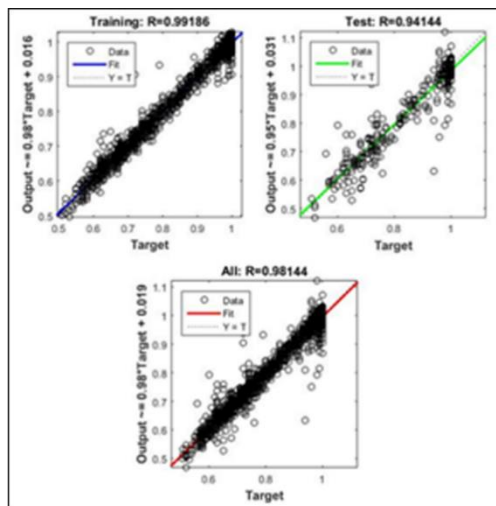


Figure 2. NN performance – Regression analysis

#### 4. Conclusion

An ABC optimization-based technique is used for the early detection of Down syndrome is proposed. There is no proper treatment for Down syndrome; so its early detection is indispensable and necessary. The proposed technique is based on facial identification and localization of facial points of the fetus. By computing the length between these points, the proposed algorithm predicts the chance for Down syndrome. Facial identification is performed with the help of ABC and neural network training is performed with the help of MATLAB. Further, it is possible to increase the accuracy by increasing the number of training iterations and selecting more sensitive facial localization points.

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## Synthesis & Characterization of Pure and Green-Synthesized Sillenite-based Bismuth Ferrite and its Silver-Doped Variant

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### ABSTRACT

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Multiferroics are currently attracting considerable attention - they are promising materials for new types of devices. The current paper presents a basic overview of multiferroic materials in general, but it is mainly focused on one particular multiferroic material-Bismuth ferrite (BiFeO<sub>3</sub> or BFO). BFO is a material that is both magnetic and strongly ferroelectric at room temperature. As a result, it has had a great impact on the field of multiferroics. Pristine and Silver substituted BiFeO<sub>3</sub> samples were synthesized using soft chemistry procedures and green synthesis methods. The phase purity was confirmed using X-ray Diffraction and surface morphology was observed using Scanning electron microscopy.

UV-Vis Absorption characteristics were also analysed.

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## Introduction

Multiferroic materials offer potential solutions for developing next-generation technologies such as multistate memory devices, magnetoelectric sensors, and energy efficient electronics. Although current technologies incorporate both ferro-electric and magnetic materials for a long time, no known materials display these properties at room temperature. Multiferroics represent a class of materials that possess two or more ferroic orders, such as ferroelectricity and ferromagnetism simultaneously at or near room temperature. Perovskite and related compounds are widely investigated because of their multiferroic, photocatalytic and magnetic properties, which are useful for applications in thin-film capacitors, non-volatile memory, nonlinear optics and photoelectrochemical cells. One of the most promising multiferroic materials is the perovskite bismuth ferrite ( $\text{BiFeO}_3$ ), as it shows the coexistence of both ferroelectricity and antiferromagnetic order.

Bismuth Ferrite is one of the well-known perovskite, widely investigated now a days because of their simultaneous coexistence of ferroelectric and anti-ferromagnetic order parameters in the perovskite structure, which are useful for applications in non linear optics, thin film capacitors, photo electrochemical cells, non volatile memories etc. [1, 2].

$\text{BiFeO}_3$  (BFO) is one of the few multiferroics that has Curie and Neel temperatures above room temperature. The ferroelectric properties appear in  $\text{BiFeO}_3$  below ferroelectric Curie temperature  $T_C = 1100\text{K}$  whereas the antiferromagnetic ordering together with weak ferromagnetic moment appear below the Neel temperature  $T_N = 643\text{K}$ . It is the only material that is both magnetic and a strong ferroelectric showing multiferroic property at room temperature. Magnetoelectric coupling is realized at room temperature and such coupling is strongly enhanced by proper doping [3, 4].

Bulk bismuth ferrite can be described as a rhombohedrally distorted ferroelectric perovskite with the space group  $R3c$ . BFO magnetic structure showed that each  $Fe^{3+}$  spin is surrounded by six antiparallel spins on the nearest Fe neighbours that is, a G-type antiferromagnet. As bulk  $BiFeO_3$  is a room-temperature ferroelectric, it has spontaneous electric polarization directed along one of the  $[111]$  directions of the perovskite structure [5, 6].

### **Materials and Methods**

All the reagents were of analytical grade and used without further purification. Synthesis was carried out by a soft chemical route using bismuth nitrate, ferric nitrate, nitric acid and carboxylic acid (tartaric acid / oxalic acid) as source materials. In a typical experimental procedure 0.1 M of  $Bi(NO_3)_3 \cdot 5H_2O$  and 0.1 M of  $Fe(NO_3)_3 \cdot 9H_2O$  were prepared separately in 100 ml deionized water. Nitric acid was added to both solutions until it became saturated. These solutions were mixed together. 1 M of tartaric acid solution was added drop wise until a yellow precipitate was formed. The reaction mixture was stirred using a magnetic stirrer. Then the solution was heated at a temperature of about  $100^{\circ}C$  to  $120^{\circ}C$  for 3 hours till the residue was completely burned. A brownish red sol was obtained.

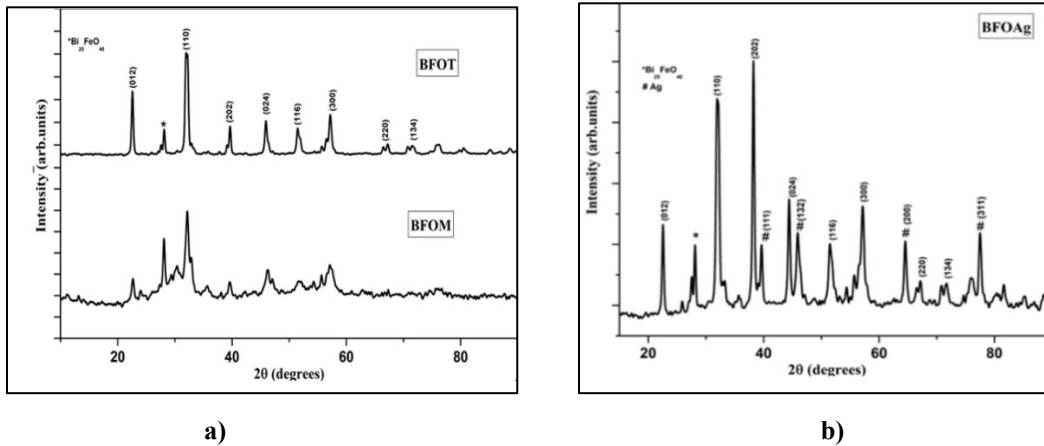
The green synthesis method was employed using *Moringa oleifera*. 30 g of dried *Moringa oleifera* leaves was immersed in 300 ml of boiled deionized water (DI- $H_2O$ ) and kept at  $50^{\circ}C$  for about 1 hour and 45 minutes. About 50 ml of the natural plant extract was used to dissolve 3 g  $Bi(NO_3)_3 \cdot 9H_2O$  and  $Fe(NO_3)_3 \cdot 5H_2O$  each. The precursors were dissolved in a natural extract without any addition of heat or chemicals, then covered with foil and kept at room temperature for 18 hours. Noticeably, the formation of the bismuth-iron complex was observed. The solution was dried at  $100^{\circ}C$  in an oven, and the remaining residue was collected, and crushed into a fine powder.

The structural phase formation is confirmed using Rigaku D-Max X-Ray Diffractometer and morphology was analysed using scanning electron microscopy. UV-Vis Absorption spectra revealed the variation in bandgap of the synthesized samples.

## **Results and Discussions**

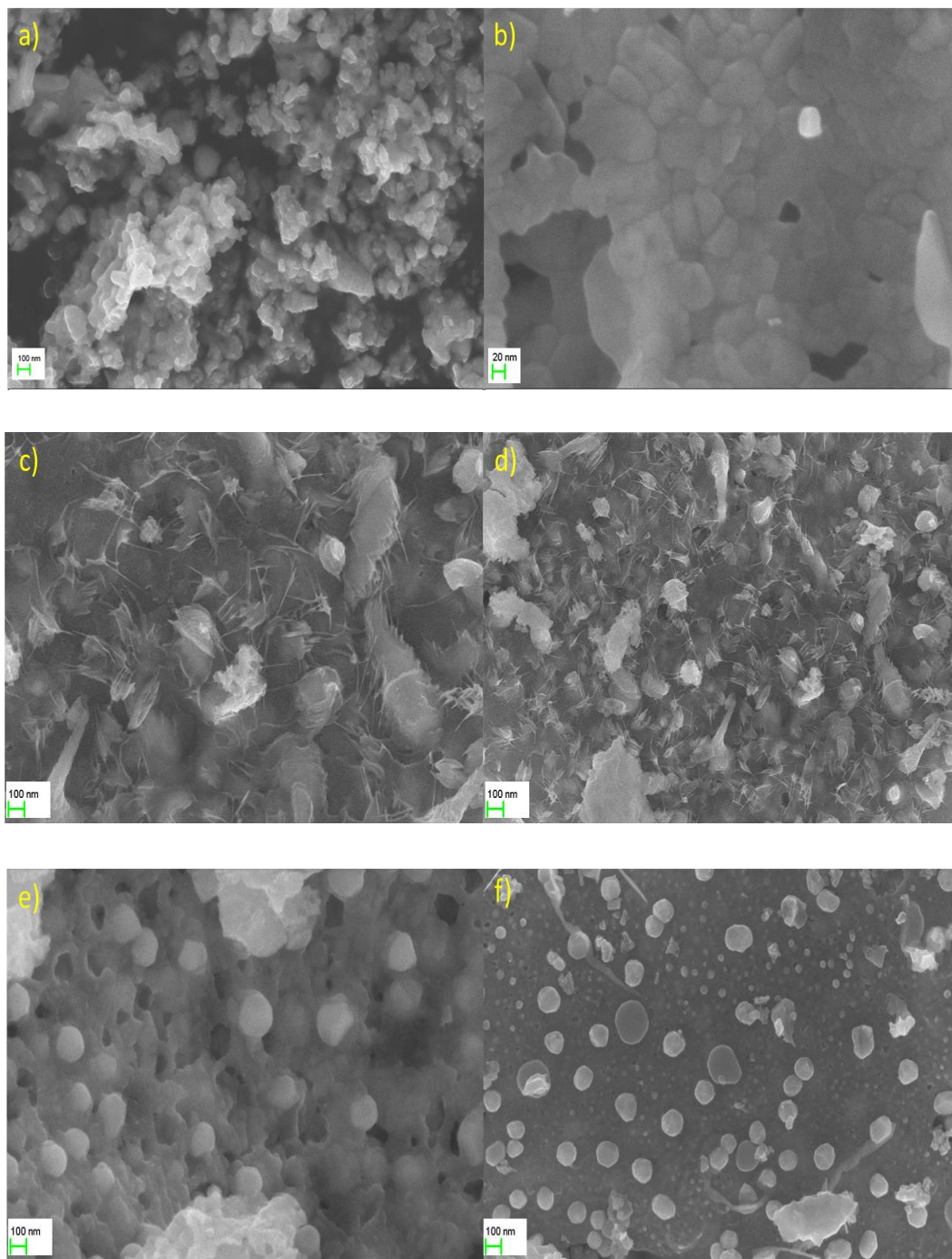
### **Structural Characterization**

The phase formation is confirmed from the X-Ray Diffraction pattern obtained using Rigaku D-Max Cu  $K\alpha$  X-Ray Diffractometer. The perovskite structure is clearly visible from the peaks and the graphs obtained were compared using the ICDD file. Synthesis using tartaric acid yielded phase pure  $\text{BiFeO}_3$  (BFOT) with minute impurity peaks (Figure 1a). This clearly indicates that low temperature preparation of  $\text{BiFeO}_3$  is well assisted by tartaric acid. Green synthesis was adopted to synthesize another set of samples, BFOM (Figure 1a). The XRD of BFOM revealed impurity peaks with a slightly amorphous phase. Silver was added in stoichiometric proportions to the reaction mixture of the sample prepared using tartaric acid, which yielded the sample BFOAg (figure 1b). The particle size of BFOT and BFOM calculated using Debye Scherrer equation is found to be of the order of 15nm while that of BFOAg is around 30 nm. Generally, BFO are non-magnetic at room temperature due to its antiparallel alignment of Fe ions spins and cycloidal spin structure. After the formation of Sillenite ( $\text{Be}_{25}\text{FeO}_{40}$ ), the inclusion of sillenite phase can introduce strain into the BFO crystal lattice. It can modify the magnetic exchange interaction between Fe ions, potentially altering the antiferromagnetic alignment and impacting the magnetism to BFO.



**Fig 1: X-Ray Diffractogram of a) BFOT and BFOM and b) BFOAg.**

Scanning Electron Microscopy images display grain formation with clear grain boundaries for all the samples. The images used in identifying the phases are based on qualitative analysis or by crystalline structure. The SEM micrographs show the grain becomes well defined and the grain boundaries are clearly visible in the samples prepared using a 1:1 molar ratio with tartaric acid as a chemical agent (figure 2 a & b). It shows the clear grain boundaries with the scale 100 nm and 20 nm. The SEM image of sample BFOM clearly shows the fibre-like structures given that had an amorphous phase due to the presence of impurities (figure 2 c & d). The images of third sample with silver nitrate (BFOAg) show that two types of clear grains with white and grey coloured boundaries. The white circles are the silver nanoparticles, which are surrounded with grey circled BFO particles (figure 2 e & f).

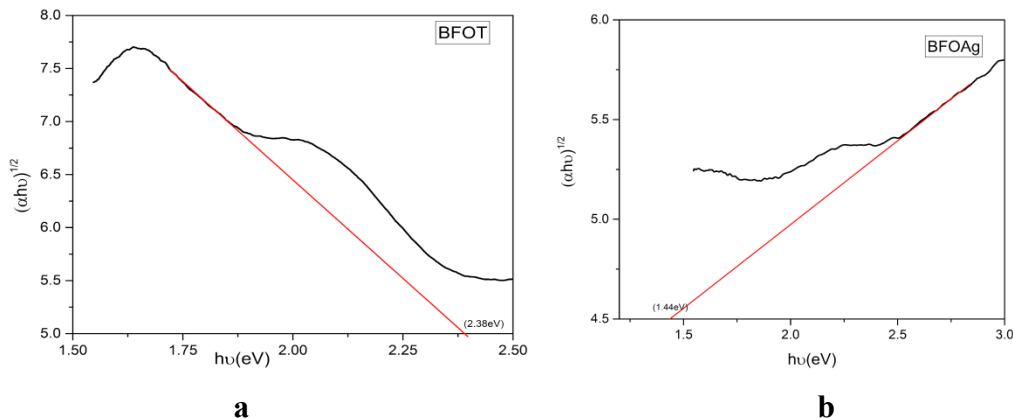


**Figure 2: Scanning Electron Micrographs of a) & b) BFOT, c) & d) BFOM, e) & f) BFOAg**

## Absorption Studies

UV - Visible spectral analysis used to measure the absorbance of the samples over a range of wavelength. It identifies the change in energy band gap through a tauc plot; initially, the energy band gap of BFO is about 2.2 to 2.8 eV.

The Tauc plot is plotted between the absorbance along the Y- axis and photon energy (converted from wavelength) along X-axis. The energy band gap is obtained by projecting the tangent of the linear area towards X-axis. For direct allowed transitions,  $n=1/2$  and for indirect allowed transition,  $n=2$ .



**Figure 3: Absorption spectra of a) BFOT and b) BFOAg**

The energy band gap is obtained by extrapolating the tangent of the linear area towards X-axis. From this, the band gap of the sample made with tartaric acid (BFOT) is 2.38 eV and for the sample with silver nitrate (BFOAg) it is 1.44 eV. The variation in bandgap is reported to be caused by the oxygen vacancy near the band edge. When the crystalline size increases, the energy band gap decreases, which is evident from XRD. Thus, the shift in the energy band gap might be attributed to the phase transformation.

### **Schottky Effect and Absorption Spectra**

The introduction of Ag particles to BFO may lead to the formation of Schottky barrier, which improves the charge separation and modifies the absorption spectra. It may induce the Schottky effect in the samples. It increases the structural strain of the material. Formation of the defects results in the enhancement in resistive and polarization switching. It may influence the behaviour structure of the material at the interface, potentially affecting the Schottky effect. This Schottky effect induces the charge transfer and electronic properties at the Silver – Bismuth Ferrite leading to the changes in the absorption spectra. This gives bandgap modification. Schottky effects make shifts in the peak positions of absorption spectra. Also, it can make some changes in the intensity of absorption. It is potentially leading to a reduction in bandgap and extending the absorption edge into the visible region, improving the ability to absorb sunlight.

### **Conclusion**

The importance of multifunctional devices and materials are increasing at a very fast pace. Bismuth ferrite has captivated the interest of scientists all over the world due to its multifunctional ability and multiferroic properties making it a potential candidate for memory applications. In the current study one of the main objectives was to overcome the challenge of synthesizing phase-pure Bismuth Ferrite (BFO). We selected sol-gel method which is reported to require minimal resources and gives better results. Tartaric acid was used as a chelating agent, after trying out various options for better reaction product. The project also envisaged the utilization of green synthesis methods for the preparation of BFO using the extract of Muringa Oleifera leaves as the chemical agent. Metal incorporated nanomaterials have been an area of interest for various multifunctional applications. In this regard Silver substituted BFO was also synthesized for further

characterization. The structural characterization confirmed the phase of BFO. The particle size increases from 15nm to the order of 30 nm when Silver is added. We analyzed the grain formation with clear boundaries for all the samples. The absorption studies revealed a reduction in energy bandgap of Silver doped Bismuth ferrite indicating the variation in electronic properties. A metal-semiconductor composite like structure formation is also observed in the SEM which can be further studied for possible Schottky effect-like properties. The bandgap reduction can also be used for potentially enhancing its performance in applications like photovoltaics, photocatalysis and other optoelectronic devices.

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## An Overview on Quantum-Driven Machine Learning

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### ABSTRACT

Quantum computing is an advanced field that combines principles from computer science, physics, and mathematics to create computers that use quantum mechanics for processing information. Unlike classical computers, which use bits as the basic unit of data, quantum computers use qubits that can represent multiple states simultaneously. This allows them to solve certain complex problems much faster than traditional computers. Quantum computing has the potential to revolutionize areas such as cryptography, materials science, and artificial intelligence by providing solutions to problems that are currently too challenging for classical systems.

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## 1. Introduction

Quantum computing is a multidisciplinary field that combines elements of computer science, physics, and mathematics to utilize quantum mechanics for solving complex problems faster than classical computers. This field encompasses both hardware research and application development. Quantum computers can solve certain types of problems more quickly than classical computers by leveraging quantum mechanical effects like superposition and quantum interference. Applications where quantum computers can provide a speed boost include machine learning (ML), optimization, and physical system simulations. Potential future use cases might involve portfolio optimization in finance or the simulation of chemical systems, addressing problems currently impossible for even the most powerful supercomputers.

At the core of quantum computing are qubits, the quantum equivalents of classical bits. Unlike classical bits, which are either 0 or 1, qubits can exist in a superposition of both states simultaneously, exponentially increasing computational possibilities. Quantum entanglement, another fundamental quantum principle, allows qubits' states to be correlated regardless of the distance between them. These properties enable quantum computers to perform parallel computations on an unprecedented scale, offering significant advantages for specific computational tasks. The hardware side of quantum computing involves developing quantum processors, which are highly sensitive and require precise conditions to maintain quantum coherence. Quantum gates, similar to classical logic gates, manipulate qubits and create quantum circuits. Researchers are exploring various physical implementations, such as superconducting circuits and trapped ions, to build stable and scalable quantum systems.

In application development, quantum algorithms are crucial. Algorithms like Shor's for factoring large numbers and Grover's for searching unsorted databases showcase the quantum advantage over classical algorithms. As researchers work to mitigate decoherence and errors, quantum error correction mechanisms become essential for developing robust quantum algorithms. Despite significant progress, quantum computing is still in its early stages, facing challenges like maintaining qubit coherence for extended periods and scaling up systems to handle more qubits reliably. As advancements continue, the potential impact of quantum computing on fields like cryptography, materials science, and artificial intelligence becomes more evident, heralding a new era in computational capabilities. The multidisciplinary nature of quantum computing highlights its transformative potential, offering novel solutions to problems considered insurmountable by classical computing methods.

## **2.1 Qubit**

A qubit is the fundamental unit of information in quantum computing, similar to the role of bits in classical computing, but with distinct differences. Classical bits are binary and can only be in a state of 0 or 1. In contrast, qubits can exist in a superposition of both 0 and 1 simultaneously, thanks to the principles of quantum mechanics. In classical computing, a bit represents an electronic signal that is either on or off, corresponding to values of one or zero. However, a qubit, governed by quantum mechanics, can be in multiple states at once through superposition.

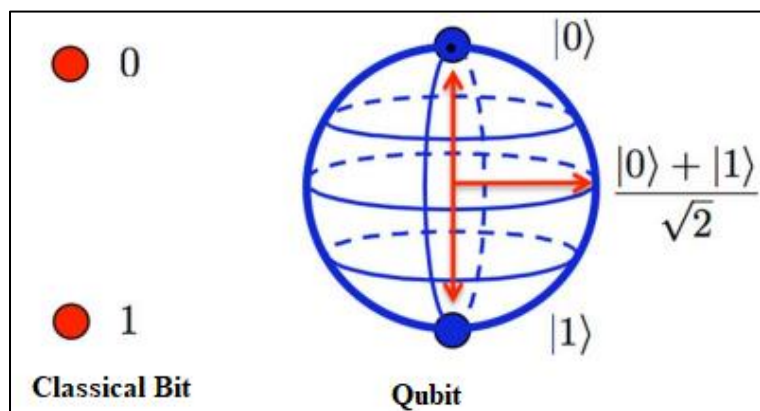


Figure 1: Difference between a classical bit and Qubit.

## 2.2. Quantum Computer

A quantum computer is a computational system that harnesses principles from quantum mechanics to process and store information. Unlike classical computers, which use bits to represent either 0 or 1, quantum computers use quantum bits, or qubits, which can exist in multiple states simultaneously thanks to the phenomenon of superposition. This unique property allows quantum computers to perform complex calculations and solve specific types of problems at exponentially faster rates than classical computers. Additionally, quantum computers exploit principles such as entanglement and quantum interference to enhance their computational capabilities. Developing quantum computers requires a multidisciplinary approach, integrating concepts from physics, computer science, and mathematics. This innovation holds the potential to revolutionize various fields by tackling problems currently beyond the reach of classical computing methods.



Figure 2. Google's groundbreaking Quantum Computer

### **Quantum Machine Learning (QML)**

Quantum machine learning uses the power of quantum mechanics and quantum computing to make machine learning faster and better than what we achieve with the everyday computers we use. Quantum computers, built on the strange laws of quantum physics, can store and process much more information than tablets, smartphones, and even the most powerful supercomputers in use today.

Quantum machine learning uses algorithms run on quantum devices, like quantum computers, to enhance, speed up, or support the work done by classical machine learning programs. Also known as quantum-enhanced machine learning, this approach leverages the powerful information processing capabilities of quantum technologies to improve and accelerate machine learning models.

While classical computers have limited storage and processing capacities, quantum computers offer exponentially greater storage and processing power. This enables them to analyze massive data sets much faster than classical methods. Consequently, quantum machine learning utilizes this immense processing power to accelerate and enhance the development of machine learning models, neural networks, and other forms of artificial intelligence (AI).

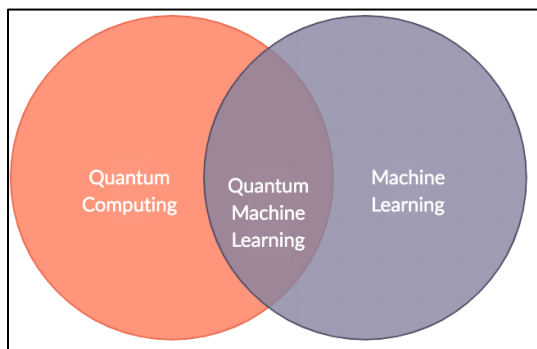


Figure 3. QML

There are four strategies for how to combine machine learning and quantum computing, based on whether one considers the data was created by a classical (C) or quantum (Q) system, and whether the computer that processes data is classical (C) or quantum (Q).

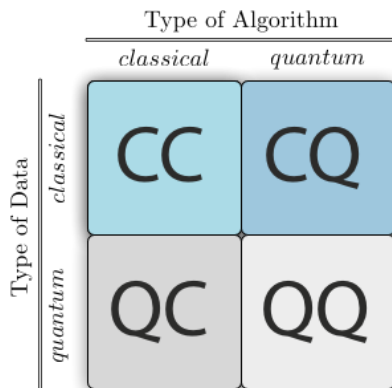


Figure 4. Four different ways to combine quantum computing with machine learning

The scenario CC refers to data that is processed traditionally. This is the conventional method of machine learning, but in this context, it involves approaches derived from quantum information research. Tensor networks designed to address quantum many-body processes have been used to train neural networks. Additionally, there are various 'quantum-inspired' machine learning algorithms with varying degrees of quantum theoretical foundations.

The scenario QC explores how machine learning can assist quantum computing. For example, if we want a complete description of a computing device's state from a few measurements, we can analyze the measurement data using machine learning. Machine learning has several applications in identifying quantum states generated by a quantum source or manipulations performed in a quantum experiment. The scenario CQ uses quantum computing to analyze conventional datasets. Classical computer observations, such as images and text, are provided to a quantum device for evaluation. The primary goal of the CQ approach is to develop quantum algorithms for data mining. The community has proposed various solutions, which may be adaptations of traditional machine learning models to work with quantum algorithms or entirely new creations inspired by quantum computing.

The final scenario, QQ, examines the processing of "quantum data" by a quantum device. This can be interpreted in two ways. The data may come from a quantum experiment involving a quantum system, with the experimental measurements input into another quantum computer. Alternatively, a quantum computer may simulate the behavior of a quantum system and then use this system's state as input for a QML algorithm performed on the same computer.

## **Conclusion**

In conclusion, Quantum-Driven Machine Learning represents a transformative approach to data processing and analysis, leveraging the unique capabilities of quantum computing to enhance traditional machine learning methodologies. By utilizing the principles of quantum mechanics, such as superposition and entanglement, quantum-driven machine learning offers the potential for exponential increases in processing power and efficiency. This innovative field not

only promises to tackle complex problems beyond the reach of classical computers but also paves the way for new advancements in artificial intelligence and data science. As research and development continue, Quantum-Driven Machine Learning is poised to revolutionize various industries, providing unprecedented solutions and insights in the realm of computational intelligence.

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## **A Comprehensive Review of Applications of Graph Labeling: Focus on Graceful, Harmonious, Leech and Radio Labelings**

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### **ABSTRACT**

This study investigates the concepts of graceful, harmonious, leech and radio labeling of graphs and explores their applications in various domains. The role of graph theory in real life and the importance of graph labeling techniques in graph theory and related fields are investigated. In this survey I have collected the applications of the four graph labeling techniques: precisely graceful, harmonious, leech and radio labeling. The objectives of this study are to analyze the known results and properties of graceful, harmonious, leech and radio labeling schemes, to find out the research gaps in these fields and to examine their practical applications in real-world scenarios. It is anticipated that this survey will inspire further inquiry and innovation in this area, leading to the discovery of more results, solutions to the open problems in these areas, development of more efficient algorithms and the applications of graph labelings in more fields of practical importance.

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## 1. Introduction

A graph is a mathematical structure consisting of nodes called vertices connected by edges [1]. Any real-life situation in which living or non-living objects are connected or related can be mathematically modelled as a graph. For example, electrical circuits, mobile networks, social media networks, GPS maps, road networks, chemical bonds, neural networks in the human brain etc can be modelled as graphs.

Graph labeling is defined as assigning integer values to vertices or edges or both vertices and edges of a graph subject to certain conditions, and the integer values assigned are called labels [2]. Graph labelings are widely classified into three which are:

- Vertex Labeling
- Edge Labeling
- Total Labeling

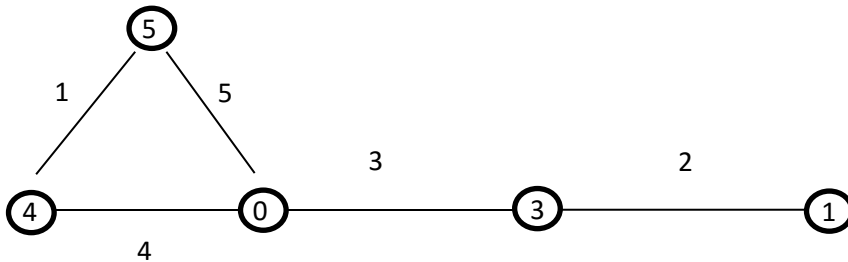
If we are assigning values to vertices, then the labeling is called vertex labeling. If we are assigning values to edges, then the labeling is called edge labeling. If we are assigning values to both vertices and edges, then the labeling is called total labeling [2].

Graph labeling was first introduced in 1966 by Alexander Rosa in the international symposium on Graph Theory held at Rome. He introduced four types of labeling in his paper ‘On Certain Valuations of the Vertices of a Graph’ published in 1967 namely  $\alpha$ - valuation,  $\beta$ - valuation,  $\sigma$ - valuation and  $\rho$ - valuation [3]. This  $\beta$ - valuation proposed by Rosa was later renamed as graceful labeling by Solomon Golomb in 1972 in his paper ‘How to number a Graph’ [4]. In the following years, more than 200 graph labeling techniques were presented in more than 3000 papers published till now. Almost all of these graph labeling techniques

and the updated research work going on in the field of graph labeling are available in ‘A Dynamic Survey of Graph Labeling’ by J. A. Gallian in the *Electronic Journal of Combinatorics*, first published in 1997 and frequently getting updated.

### Graceful Labeling

**Definition:** A graph labeling in a graph with  $m$  edges is called Graceful Labeling if the vertices of the graph are assigned values taken from  $\{0, 1, 2, \dots, m\}$  in such a way that it induces an edge labeling in which the edges are assigned the modulus value of the difference of the labels given to the end vertices and these edge labels must be precisely  $1, 2, 3, \dots, m$ . If such a labeling exists in a graph, the graph is said to be a Graceful graph [3] [4].

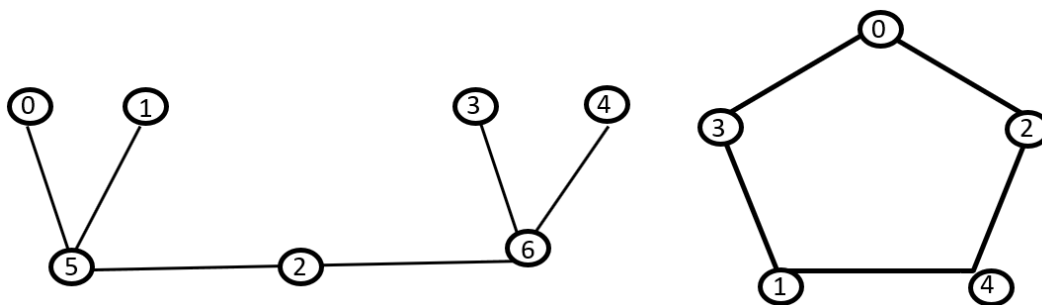


Ringel & Kotzig almost 55 years ago proposed a conjecture that “All Trees are Graceful” [5] popularly known as “Graceful Tree Conjecture” (GTC), which has not yet been proved. Researchers have already proved some partial results such as “All paths are graceful” [3] and “All combs are graceful” [6], but still there are gaps in that research area. Initially, the gracefulness of several classes of trees was established by Rosa in 1966. Since then, researchers are trying to find out more graceful classes of trees. Among them, some of the trees that are known to be graceful are: paths, caterpillars, symmetrical trees, spider trees, lobsters, star, firecrackers, banana trees etc. [6] Trees of diameter at most five [7] and trees with

up to 35 vertices have also been shown graceful [8]. Yet, knowing the gracefulness of all these classes of trees is still not enough to conclude that all trees are graceful.

### Harmonious Labeling

**Definition:** In a graph with  $n$  vertices and  $m$  edges, harmonious labeling assigns distinct integer values to vertices precisely  $0, 1, 2, \dots, (n-1)$  and an edge  $uv$  is assigned the label  $[l(u)+l(v)] \bmod m$  (where  $l(u)$  denotes the label given to the vertex  $u$ ) in such a way that the edge labels are also distinct and are precisely  $0, 1, 2, \dots, (m-1)$ . A graph is called harmonious if it is possible to define a harmonious labeling for the graph [9].

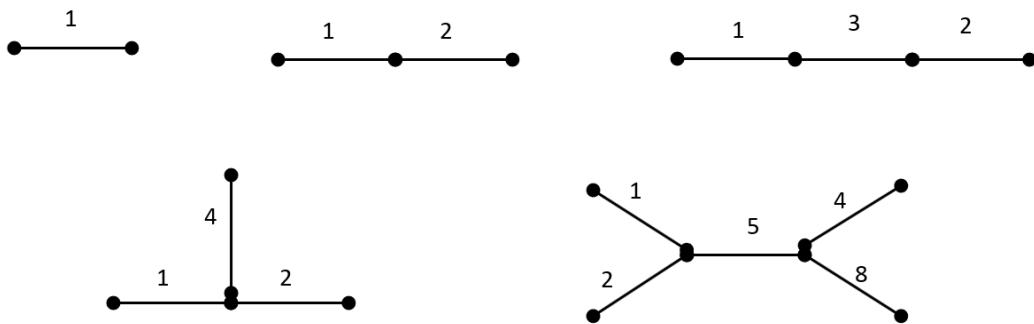


**Harmonious labeling** was introduced by Ron Graham and Neil Sloane in 1980. Graham and Sloane had proved that caterpillars are harmonious [9]. Aldred and McKay used a computer to show that all trees with at most 26 vertices are harmonious [10]. Graham and Sloane had themselves proved that all wheels  $W_n$  are harmonious, the cycles  $C_n$  are harmonious if  $n$  is odd [9]. The complete graph  $K_n$  is proved to be harmonious if  $n \leq 4$  [9]. The Graham–Sloane Conjecture, better known as the Harmonious Labeling Conjecture (HLC), proposed by Graham–Sloane in 1980 asserts that “every tree admits a harmonious labeling” [9] which has not yet been proved and the conjecture still remains open.

## Leech Labeling

**Definition:** Since trees are connected acyclic graphs, there exists exactly one path between any two vertices so that there are exactly  $nC_2$  paths in a tree with  $n$  vertices. If all the edges in a tree are labelled by distinct positive integer values in such a way that all the  $nC_2$  paths in the tree get distinct path weights precisely  $1, 2, 3, \dots, nC_2$  then the labeling is called a Leech labeling where the weight of a path is the sum of labels of the edges in that path [11].

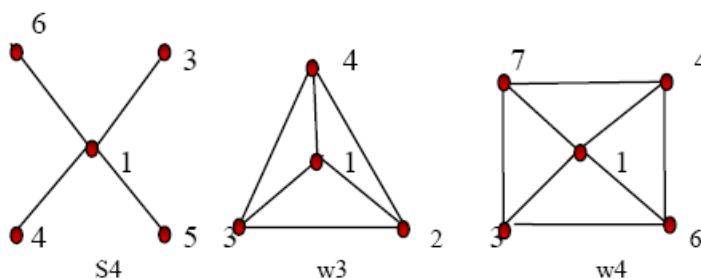
**Leech labeling** was introduced by John Leech in 1975 for labeling trees. Not all trees admit leech labeling. If there exists a leech labeling for a tree, then that tree is called a Leech tree.



The paths  $P_2$ ,  $P_3$  and  $P_4$ , the star  $K_{1,3}$  and the bistar  $B_{2,2}$  are proved to be leech trees [11]. But no other trees are yet proved to be Leech trees. “Does there exist any Leech tree other than the known 5 Leech trees?” is still an open problem. If we could find out an upper bound for the number of edges or order for an arbitrary Leech tree, we could conclude that there exists only a finite number of Leech trees, which will be an answer to another open problem.

## Radio Labeling

**Definition:** For a vertex  $v$  of a connected graph  $G$ , the eccentricity  $e(v)$  is the distance between  $v$  and a vertex farthest from  $v$ . The minimum eccentricity among the vertices of  $G$  is its radius  $\text{rad}(G)$  and the maximum is its diameter  $\text{diam}(G)$ . By a labeling of a connected graph  $G$ , we mean an injection  $f: V(G) \rightarrow \mathbb{N}$ ; while a radio labeling is a labeling with the added property that  $|f(u) - f(v)| \geq \text{diam}(G) - d(u, v) + 1$  for every two distinct vertices  $u, v$  of  $G$ . [12].



The radio number  $\text{rn}(f)$  of a radio labeling  $f$  of  $G$  is the maximum label assigned to any vertex of  $G$ . The radio number  $\text{rn}(G)$  of  $G$  is  $\min\{\text{rn}(f)\}$  over all radio labelings  $f$  of  $G$ . A radio labeling  $f$  of  $G$  is a minimum radio labeling if  $\text{rn}(f) = \text{rn}(G)$ .

**Radio labeling** was introduced by Chartrand, Erwin, Zhang, and Harary in 2001, inspired by the regulations of channel assignment of FM radio stations [12]. They have found bounds for the radio numbers of cycles and paths. The exact values for the radio numbers for paths and cycles were reported by Liu and Zhu [13]. Researchers have given the bounds and exact values of the radio number of many classes of graphs, but still there are gaps in this research area.

## Some Applications of Graph Labeling

### 2.1 Application of Graceful Labeling in Communication Networks

An important application of graceful graphs in the field of communication networks is MPLS (Multi Protocol Label Switching) technique. MPLS is a data-carrying technique that enhances the speed and efficiency of network traffic flow. It uses labels to make forwarding decisions, bypassing the need for complex routing table lookups. Labels are assigned to packets, and at each hop, these labels are swapped to route the packet to its destination. Graceful labeling is highly useful in the forwarding of packets with greater efficiency since it avoids the label swapping operation and it makes packet forwarding protocol independent. Graceful labeling enhances MPLS by providing a structured and efficient way to assign and manage labels, optimize path calculations, simplify label swapping, and improve network scalability and management. This systematic approach can lead to faster and more reliable packet forwarding, ultimately enhancing the overall performance of the network. [14].

## 2.2 Application of Harmonious Labeling in Channel Transmitting Stations

In the network of transmitting stations, each transmitting station must be able to communicate with certain others to whom it is linked in the network. The total bandwidth available is divided into  $e$  channels, where  $e$  is the number of links in the network. Each transmitting station  $x$  is assigned a number  $l(x)$  from  $Z_p$ , the **finite field of integers modulo  $p$** , which forms a field with  $p$  elements  $Z_p = \{0, 1, 2, \dots, (p-1)\}$  and when  $x$  and  $y$  communicate, they use the channel number  $l(x)+l(y)$ . If this numbering is harmonious, each channel is assigned to exactly one link [9].

## 2.3 Application of Leech Labeling in Electrical Circuits

When two resistors are connected in series, the total resistance will be the sum of the resistances of the two resistors. If a circuit is modelled as a graph in which each edge contains a resistor and the weight of the edge is defined as the

corresponding resistance, then the weight of a path will be the sum of the resistances in that path. Imagine a situation in which we have  $n$  resistors each with resistances  $1, 2, 3, \dots, n$  which when connected in series, will yield the sum of resistances. If the circuit is a tree, there will be exactly  $nC_2$  paths in it, and in addition, if the circuit is a Leech tree, the path weights are exactly  $1, 2, 3, \dots, nC_2$  where  $nC_2$  is very much bigger than  $n$  when  $n$  is large. So the existence of the Leech tree provides a method for constructing  $nC_2$  resistances using  $n$  resistors. [11]

#### **2.4 Application of Radio Labeling in Channel Assignment of FM stations**

Given a set of transmitters, each station is assigned a channel (a positive integer) such that interference can be avoided. The smaller the distance between stations is, the stronger the interference becomes, and hence the difference in channel assignment has to be greater. Here each vertex represents a transmitter and any pair of vertices connected through an edge corresponds to neighbouring transmitters. Here the kind of labeling used is Radio labeling which is proved to be an efficient way of determining the time of communication for sensor networks. Here the network is considered a chain graph in which every sensor planted in the network is a vertex communicating at time  $t$ , where  $t$  is radio channel assignment. It was found that the random dump of junk in the network then the radio labeling has the property of having “consecutive” channel assignments - close time frames far away from each other. Channel labeling can be used to determine the time at which sensor communicate. [15]

### **3. Conclusion**

In this survey, we have explored the diverse applications of graceful labeling within the realm of graph theory, with a particular emphasis on communication networks. The concept of graph labeling, introduced over half a

century ago, has evolved significantly and now encompasses various types such as graceful, harmonious, and leech labeling. Graceful labeling, in particular, has shown substantial potential in enhancing the efficiency of communication networks through applications like MPLS (Multi-Protocol Label Switching) and channel assignment in transmitting stations. Additionally, the harmonious and leech labelings offer unique solutions in network addressing and circuit design, respectively.

Despite significant progress, several open problems remain, such as the Graceful Tree Conjecture, Harmonious Labeling Conjecture, and the exploration of new Leech trees. These unresolved questions highlight the ongoing research opportunities within the field of graph labeling. As we continue to advance our understanding, the practical applications of these labeling techniques will undoubtedly expand, offering innovative solutions in network security, data management, and beyond.

The survey underscores the importance of graph labeling as a fundamental tool in both theoretical and applied mathematics, driving improvements in various technological domains. Future research is expected to further unveil the untapped potential of these labeling methods, paving the way for more robust and efficient systems across multiple disciplines.

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## An Overview of Various Feeding Methods for Rectangular Microstrip Patch Antennas

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### ABSTRACT

This paper outlines various feeding techniques for microstrip antennas. Five distinct methods, including microstrip line feed, coaxial feed or probe coupling, proximity coupling feed, aperture coupling feed, and coplanar waveguide feed, can be used to excite microstrip antennas. There are two types of excitation techniques: contacting and non-contacting.

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## **I. Introduction**

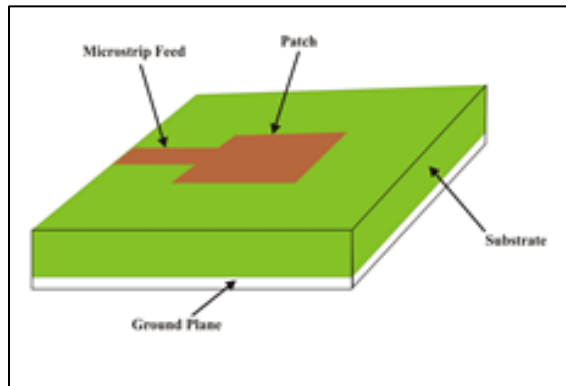
A microstrip antenna is made up of a planar, resonant radiator that is parallel to the ground and has a thin dielectric layer separating it from the plane. Low-profile antennas could be necessary in high-performance applications where weight, size, cost, performance and ease of installation are constraints. It is possible to employ microstrip antennas to satisfy these specifications [1] - [4]. Microstrip antennas come in a variety of forms, including printed slot, microstrip travelling wave, microstrip patch, and microstrip dipole antennas [5]- [7]. There are many different ways to feed the microstrip patch antenna, but they can be broadly classified into two groups: contact (direct) and noncontact (indirect) feeding techniques. The transmission line and radiating patch are directly connected in the contact approach. The characteristic impedance of the antenna and the feedline of the radiating patch must match. Microstrip feeding and coaxial feeding techniques are two examples of how the feedline position is selected to guarantee proper matching. However, energy is delivered through electromagnetic coupling in the non-contact approach. Non-contacting feeding techniques include coplanar waveguide feeding, proximity coupling, and aperture coupling.

## **II. Different feeding techniques of microstrip antenna**

### **2.1 Microstrip feeding**

This technique uses a microstrip transmission line to feed the patch antenna. The patch antenna and the microstrip line are often connected to one end of a coaxial cable. The conducting strip is narrower than the patch's width. This is one of the simplest ways to power a microstrip antenna with electromagnetic power. In this instance, the antenna and feed line are etched concurrently on the same substrate surface. Because it modifies the coupling between the feed line and the antenna

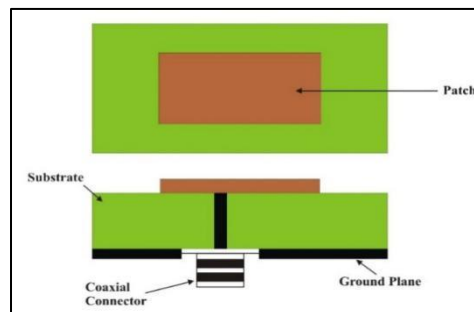
element, the tiny movement in the feed location affects the resonance frequency. The microstrip feeding arrangement is shown in Fig. 1.1.



**Fig. 1. Configuration of microstrip feeding.**

## 2.2 Coaxial probe feeding

It's a quick and easy way to feed a basic patch. The coaxial feed, also referred to as the probe feed, is a highly common way to feed Microstrip patch antennas. The coaxial connector's inner conductor extends through the dielectric and is connected to the radiating patch, while the outer conductor connects to the ground plane. The flexibility with which the feed can be positioned inside the patch to improve the input impedance is the main advantage of this type of feeding system. Fig. 2 shows the configuration of coaxial probe feeding.



**Fig.2 Configuration of coaxial probe feeding.**

### 2.3 Aperture feeding

In this kind of feed technology, the ground plane divides the radiating patch from the microstrip feed line. The patch and feed line are linked through a slot or aperture in the ground plane [8]. The coupling that enhances the result for wider bandwidths and higher return losses will depend on the size of the aperture, including its length and width. Lower cross-polarization is achieved because the coupling aperture is typically centred beneath the patch due to the symmetry of the design. Spurious radiation is minimised since the ground plane divides the patch from the feed line. Fig. 3 shows the configuration of aperture feeding.

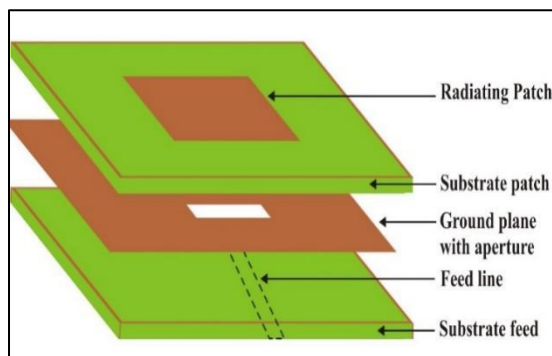


Fig. 3 Configuration of aperture feeding

### 2.4 Proximity feeding

The radiating patch is positioned on top of the upper substrate, the feed line end is positioned underneath the patch, and the feed line is sandwiched between the two dielectric substrates [9]. There is a capacitive coupling between the microstrip and patch. Although two layers increase bandwidth and lessen spurious radiation, correctly aligning the patches may be difficult. Fig. 4 shows the configuration of the proximity coupled feeding method.

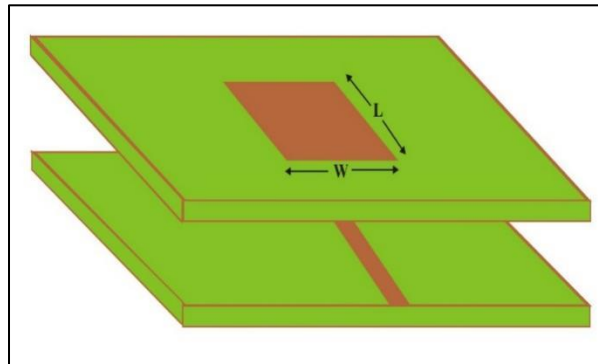


Fig.4 Configuration of proximity coupled feeding method.

### 2.5 CPW feeding

One type of planar transmission line structure is the coplanar waveguide. The CPW is the feeding, where the signal is carried by the centre strip and the ground side-plane conductor. The wide-band properties of the CPW fed slot antenna are an advantage. Therefore, the most efficient and promising antenna for wideband wireless applications is the CPW fed slot antenna [10]. Fig. 5 shows the configuration of the CPW feeding method.

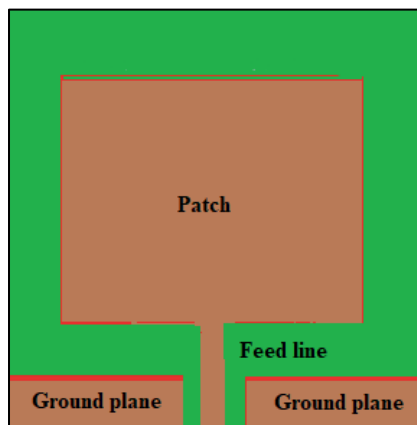


Fig.5 Configuration of CPW feeding method.

### III. Conclusion

Various feeding techniques for microstrip antennas were presented in this paper. Five distinct methods, including microstrip line feed, coaxial feed or probe coupling, proximity coupling feed, aperture coupling feed, and coplanar waveguide feed, were presented, and the configuration of each technique was studied.

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## Verses of Resilience: Poetry of Illness and Hope in Pandemic Times

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### ABSTRACT

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The human world always finds ways to tackle and overcome crises of any dimension, disease or war, employing various strategies in everyday life. The COVID-19 pandemic, a crisis of harrowing proportions, has unprecedentedly affected the human world in the present decade. Such a large-scale pandemic is many people's first experience in contemporary times. People resorted to different strategies to survive and navigate through the trauma of the pandemic. Those in quarantines, though sheltered, had to find means to socialise from a complete shutdown of all social contacts. Those with literary interests shifted to poetry and writing as comfort and consolation. Poetry became a means of personal expression, a source of solace and comfort, and a means to ventilate the tragedies happening in the wake of COVID-19—the everyday, extraordinary, overwhelming, mundane, depressing, and exciting acquired life through poetry. Writing poetry during the pandemic was incredibly transformative. It raised hopes and the desire to overcome the crisis for a better tomorrow. It became a powerful medium to heal oneself and held the potential for change in the future.

The pandemic crisis has given birth to narrative strategies that absorb the spirit of the current tech savvy times. The internet has become the favourite medium for expressing one's creativity and tackling the gloom of the current scenario. Poetry became a coping mechanism in times of pandemic distress. Facebook and Instagram posts were the acceptable modes of poetry communication and the trend continues even today. Many active poetry communities with poets round the globe found time to air their poems composed during lockdowns and quarantine spells. The present paper is an exploration of the poems of illness and hope that translate the trauma of the chronically ill and look into the lives of those living with chronic illness.

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Lockdowns and quarantines during COVID-19 pandemic pushed the common people indoors for disturbingly long periods that they had to find alternative tactics to overcome the gloom of the confined spaces. The public institutions encroached into homes through the internet, leading to the erasure of the public and the private divide. Social life restricted to technological interventions, took a toll on the psychological well-being of the quarantined.

The most vulnerable sections included people suffering from mental ailments or life-threatening diseases, people of low-income groups, children and senior citizens. The COVID-19 pandemic continued unabated for a couple of years ever since its onset in early December 2019. The state-level imposition of precautionary measures also included social and physical distancing, which had serious implications for the affected. Many lost their jobs, leading to financial insecurity. Being shut down in the confines of the domestic environment also resulted in frustration, low energy levels, loneliness, and fear. The psychologically distressed had mental health issues that included anxiety, depression, schizoid tendencies, suicidal thoughts and body harm.

The problems of isolation and illness for prolonged periods had to be overcome before the psychological and economic collapse of the home. The state support to tide over dire economic stress solved immediate financial problems to an extent but the mental distress from the lack of social communication had to be tackled by turning towards oneself and one's dear and near ones. Social media and telephone were helpful platforms to keep in touch with friends and kins. Indoor physical activities like exercising, playing games, learning something new, outdoor activities like gardening and maintaining social distance, all helped people to stay active and better connected.

Meeting people of similar interests is one of the best methods to forget and overcome the discomfort, agony and dissatisfaction of confinement. People with literary inclinations find personal expressions through writing as a relief and an unleashing of creative spirit. Poetry is a medium to express deeps within; the hidden worlds unexamined come to the fore. It is the creation of a complete world of love, anxiety, and fear to take one to heights of exhilaration, to purge one from worries and fears, and to embolden in moments of anxiety.

Nyemaster maintains “Writing poetry can help you let go of what’s holding you down, experience gratitude for the life you were given, explore what this person of you is all about, and let you fly as high as your creative spirit will take you” (Nyemaster ix). This is true of writing everyday poems. Poetry captures life as it is, a true and honest expression of the heart. The focus will be completely on self-expression in response to the happenings around, both ordinary and extraordinary. “Poetry, (is) literature that evokes a concentrated imaginative awareness of experience or a specific emotional response through language chosen and arranged for its meaning, sound, and rhythm” (Nemerov).

Writing illuminates the writer’s thoughts, releases pent up emotions, sanctifies the heart with honest responses. It is worthwhile spending time on poetry both reading and writing however frivolous it may seem. Crisis makes people fragmented, alienated thoughtless and non-responsive. Deliberately thought out and planned everyday actions help one to overcome crises in life. Many found writing and reading poetry during pandemic as a comfort, a means to ruminate and be philosophical, and listen to poems of others facing the same plight. The poems of the everyday are not just portrayal of the commonplace and the ordinary but sometimes verge on the revelatory.

Pandemic writing is not a new phenomenon and there are several instances of writing on various pandemics in the past. Boccaccio's 1353 *Decameron* makes use of frame story narration where a few young men and women narrate a hundred independent stories of their choice. The participants in order to escape plague run away to a village near Fiesole. The narrated stories form an impressive pandemic collection, of insights and excitement.

Albert Camus' 1947 *The Plague* is a metaphorical take on epidemics that ravage any city. In Oran, a fictional plague ridden city in Algeria, Camus situates different characters to cope with the epidemic, particularly the central figure, Dr. Bernard Rieux, 35 years old, who stands up as a true physician selfless for the suffering masses, to alleviate their difficulties and grievances and emerges as a symbol of hope. He connects the physical and the psychological to interpret the harm caused by a pestilence. Pestilences also aggravate the growth of corrosive ideologies like totalitarianism, fascism, or a belief system taking fanatic dimensions. *The Plague* becomes a means to find meaning in one's lives through kind and benevolent actions.

The COVID times led to the mushrooming of reading projects, an unexpected blessing amidst pandemic blues. Books provided entertainment, a temporary oblivion from reality, and free travel in the imaginary world of fiction and poetry, especially when physical travel was ultimately denied during lockdowns. They were companions of comfort during quarantine and recuperation time for those with illness. People even resorted to free reading of out-of-copyright books by various digital providers.

The COVID crisis generated several responses from the public, including social extension programmes to support the less privileged. People pitched in with public support to feed the hungry and medical support to the ill. Others found other

means to lessen the impact of COVID-19 through writing poems of hope. Steven Kiama Ambrose from Sudan has a poem of hope on the UNICEF webpage titled “COVID-19.”

It reads like this:

COVID 19 is my name  
I know no boundaries or lanes  
No celebrity can match my fame  
Like a roaring flame I engulf all on my path  
The poor and the rich both feel my wrath  
\*  
You have a common enemy in me  
So, lower your guns and focus on me  
Lower your rank, tribe, ethnicity and focus on me  
For can't you see, can't you see?  
I know off no hierarchy  
My presence brings fear and anarchy. (Ambrose)

Ambrose points out grimly the need to overcome the barriers of rank, tribe and ethnicity as COVID maintains no distinctions in afflicting people irrespective of class or creed. He hints at the bitter truths people learnt during COVID. He continues,

I break the unbreakable  
I'll break your economy  
I'll break your faith.... (Ambrose)

His predictions have already come true when we understand the collapsed economies across the world in countries like Sri Lanka. “The IMF estimates that the global economy shrunk by 4.4% in 2020. The organisation described the decline as the worst since the Great Depression of the 1930s. Different sections were badly hit, with millions losing jobs and many companies turning bankrupt” (Jones et al.). But all is not lost. The pandemic also taught people to learn from mistakes. Ambrose continues:

As you suffer because of me  
Also try and learn from me and your mistakes  
As I go down the books of history  
Still there's more to come  
Maintain the togetherness  
And there will be no harm  
Share the little you have  
Before I strike and leave you with none. (Ambrose)

The Scottish satirist Armando Iannucci expresses his anger and confusion in the mismanagement of the COVID situation that occurred round the globe, which led to large scale loss of life and livelihoods. His “Pandemonium” is a mock heroic epic drawing on Greek myths and religious verse. Iannucci says in an interview:

“Mock” may imply comedy, but I knew when I was writing it, that the last thing I wanted to mock or make amusing was what people endured. Instead, it’s a rather fast and furious distillation of my mixed emotional response to the past year and a half, including, I suppose, all the anger and confusion I felt at our leaders’ catastrophic handling of the first eight months or so of the pandemic. I didn’t want to write a polemic, though; more an expression of bewilderment and regret. (“Armando Iannucci’s epic Covid poem”)

Iannucci is anxious to see that the world is in the hands of the leaders who have the political clout to do anything. They are compared to the all-powerful Greek gods in myths. The title is drawn from Milton's *Paradise Lost*. Most of the fictitious characters are modelled on real-life figures that make up his covidscape. Orbis is a reference to the then British Prime Minister.

Orbis Rex was he known on high  
By all the Gods, "World King" by birth and plan,  
Though the Gods, sensing men would stall in fear  
Of his breeding, transformed "Orbis" to more earthly "Boris"  
Spurring love and laughter from us on hearing  
This more mortal name. (qtd. in "Armando Iannucci's epic Covid poem")

The satirist Iannucci also makes a dig at two leading billionaire investors and philanthropists who joined together to provide "affordable state-of-the-art medical technology" around the world, especially in third-world countries. The writer makes a veiled hint at the ever-versatile anti-Soros smear campaign and a target of several pro-Trump conspiracy theories.

Take us bravely to that source of all our woe  
A wet and withered bat in Wuhan, or, some say,  
A bat-lab nearby, carelessly venting bat juice to the world  
While, 'tis equally true, Pharma and/or Bill Gates,  
In league with Illuminati lizards  
Hid poisoned cameras in our breath  
So we could spray their malice drop by drop  
Like spoken mist, as from a tower of Babel  
Or like that other mighty shaft, the mast of 5G

(For, yes, I near forgot, 5G is another cause,  
Since everyone has seen it said,  
Where G is for George, and 5, to all, is clearly S,  
The sign of the malevolent serpent Soros, it is true.)  
And all is truth, for truth also can mutate,  
Into twenty truths, and spawn twenty variants more,  
Once uttered, slotting into any gaping void of sense  
And fitting it like a fisting fact. (qtd. in “Armando Iannucci’s epic Covid  
poem”)

The lab leak theory surrounding COVID is another conspiracy theory raising connections with Wuhan lab accident. The allegation is based on Prof. Shi Zhengli’s – (a researcher at the Wuhan Institute,) report that her team had identified eight coronavirus strains found on bats in the mine in China in 2015. (Covid Origin)

A project titled *Poetry and Covid* funded by the UK Arts and Humanities Research Council, University of Plymouth, and Nottingham Trent University has published some insightful pandemic poems and other contemporary classics. Anne Taylor in her poem “What I know,” writes the agony of social distancing and the stigma associated with a contagious illness.

That it’s hard not to take it personally when people avoid you like the  
plague.

That a word, or a smile, or saying hello with your eyes can make all the  
difference. (Poems, From Ovid to Covid)

She also worries over the daily challenge of face- to-face open communication that masking poses in COVID times.

Jessica Jost-Costanzo tries a euphemistic comparison of the white marks of a lung-infected patient to clouds, raising the hope that matters may be dealt with less seriously to avoid the panic of the pandemic in the given lines:

They are just little white marks on the scan,  
and they are floating shapes  
that make me think of clouds—  
clouds that look like funny things,  
cute things. (Poems, From Ovid to Covid)

Linda Casper's poem titled "At the Twenty Four Hour Crematorium" is full of pathos when she grimly points out the unrelenting march of death in the height of the pandemic.

In towns like Delhi, to deal with the pandemic at its height  
Crematoria work all day and night  
Wrapped in shrouds, ready to burn, maybe with flowers draped on top  
Bodies of loved ones are brought here non-stop. (Poems, From Ovid to Covid)

Ledbury Poetry Festival Online provided a platform for Poetry of the Lockdown where many acclaimed poets came online to express their bizarre COVID experiences. Julie Sheldon expresses disagreement when people comment that COVID has put everyone on the same boat.

'We're all in the same boat' they say  
But I would disagree  
So many different sailing crafts  
Upon this stormy sea. (Garner)

COVID experience is unique to every individual. It is an irony of life that the rich may not be that affected in a crisis, whereas the poor pay a higher cost to survive in a hostile world. COVID, for the poet is a voyage in different vessels. Some travel in ocean liners, some speed in motorboats, some struggle on their battleships, some huddle in their lifeboats, and some drift around in their open rafts and “some haven’t found their sea legs yet.” She ends the poem with a couple of questions.

Could you throw them a life belt?  
Or a paddle or an oar?  
Perhaps you could help guide them  
A bit nearer to the shore. (Garner)

The last two lines reverberate the growing concern and demand of the present – to keep up our humanity in times of covid. A humanitarian revolution is the runoff of the crisis giving way to new value systems having serious implications on the economic and political systems. Poetry also has its share in giving hope each and every day. Poems have become spaces for relief and escape especially in these telling times.

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## Unveiling the Invisible: An Analysis of Caste Visibility in Select Hindi Films

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### ABSTRACT

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The powerful medium of cinema has the potential to reflect cultural norms, and social issues and influence public discourse through storytelling. Bollywood is known for narratives that include musicals and drama, glitz, and glamour that often depict a world that is far from reality. Recent films in Bollywood show a shift from conventional narratives to films that discuss complex social issues like gender identity and caste. This article attempts to explore the representation of caste in select Hindi films, focusing on *Geeli Pucchi*, *Kathal: A Jackfruit Mystery* and *Newton*. The narratives of these films delve into the intersectionality of caste, gender and social justice.

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Film is a powerful medium that reflects cultural norms, social issues, and collective aspirations. Films reflect the values and belief systems of contemporary societies. Beyond entertainment, films have the ability to provide insight into the human condition and foster empathy across diverse audiences. They also play an important role in shaping public discourse. Films have a significant impact on society. “A film is pictures, a film is words, a film is movement, a film is drama, a film is music, a film is a story, and a film is a thousand expressive aural and visual details” (Ray 3). The visual and auditory elements that films possess are powerful tools in the process of storytelling. “As a cultural product and medium, film could be viewed as an important medium for meaning making. Cinema and film are embedded within culture and therefore a complex and interesting relationship exists between film, culture, ideology and the audience” (Cloete1).

The Indian film industry is a microcosm of the cultural and linguistic diversity of the country. It comprises a variety of regional film sectors, including Bollywood (Hindi), Tollywood (Telugu), Kollywood (Tamil), Mollywood (Malayalam), and Sandalwood (Kannada). The Oxford Dictionary of Film Studies defines:

Bollywood as a large body of commercial films produced in post-Independence India, usually made in a variant of the Hindi language and enjoying huge popular appeal throughout the Indian subcontinent, elsewhere in Asia, throughout Russia, and in parts of the Middle East, as well as in Indian diasporas in South Africa, the Caribbean, the US and Europe. The term Bollywood, a media coinage with initially patronizing connotations, is a conflation of Bombay (now Mumbai), the production centre of most of the films and Hollywood. Bollywood films typically incorporate a masala, a mix of genres, with musicals, melodrama, romance,

action, mythologicals, and social dramas predominating. (Kuhn and Westwell 41)

The popular narrative of Bollywood is predominately musicals filled with characters from higher castes and the wealthy upper-class strata of society. A major share of Bollywood movies is a far cry from reality. Only some Bollywood films deal with societal issues like gender inequality, environmental degradation, and caste dynamics. Mainstream Hindi films are usually escapist musical entertainers, often characterized by glitz and glamour. Subaltern protagonists are rarely shown in mainstream Hindi film narratives. Hindi cinema has faced severe criticism for its lack of proper representation and exploration of caste dynamics within its narratives. Marathi film *Sairat* directed by Nagaraj Manjule, is a critically acclaimed and commercially successful film that deals with caste as its core aspect. When this film was remade in Hindi, they shockingly omitted the caste aspect and presented the story solely as a love story between rich girl and poor boy. The popular narratives of Hindi films tend to overlook the complexities of caste, class, and other critical social dynamics.

The word ‘Subaltern’ stands for ‘of inferior rank’ or status. Subordinate, hence, of rank, power, authority and action. In other words, it refers to the subordination of class, caste, gender, race, language and culture. It also indicates to those groups in society who are subject to the domination of the ruling classes. In general, subaltern classes include peasants, workers and other groups who have been denied access to ‘hegemonic’ power. (Kashikar 3)

Over the years, Hindi cinema has faced severe criticism for its distorted and prejudiced representation of caste dynamics in its narratives. The complexities of caste dynamics are poorly projected in popular Bollywood movies. We rarely see a

Dalit protagonist in mainstream Hindi films. Even when Dalit characters are shown in popular films, they are depicted as submissive, helpless, and muted. In addition, the narratives within the cinematic realm tend to overlook subaltern female characters, rendering them almost invisible. Dalit characters in Bollywood have typically been portrayed as oppressed people who struggle for dignity while dealing with ill treatment from upper-caste counterparts. Another common criticism faced by movies featuring subaltern characters is that those movies tend to present subaltern narratives through the lens of privileged upper-caste characters. The distorted portrayal of subaltern characters tends to perpetuate harmful stereotypes. However, cinematic representation of subaltern characters is gradually changing, challenging the conventional narratives and bringing forth more nuanced and authentic stories.

Subaltern characters are central to the narratives of the three chosen films. *Geeli Pucchi* (2021), *Kathal -A Jackfruit Mystery* (2023), and *Newton* (2017) distinctly defy the perpetuation of stereotypes surrounding subaltern characters, effectively offering a refreshing departure from the norm. *Geeli Pucchi* is part of the Netflix anthology *Ajeeb Daastaans* directed by Neeraj Ghaywan and produced by Karan Johar. *Kathal -A Jackfruit Mystery* is a Hindi-language satirical comedy written by Ashok Mishra and directed by Yashowardhan Mishra. *Newton* is directed by Amit V. Masurkar and produced by Manish Mundra.

The narrative of *Geeli Pucchi* weaves the story of the strange relationship between two complex female characters: Bharti Mondal, a queer Dalit, and Priya Sharma, a traditional upper-caste Hindu. Konkana Sen Sharma and Aditi Rao Hydari play the roles of Bharti and Priya, respectively. Priya, too, is queer in her sexual orientation, but she is not ready to accept it and considers it wrong. The setting of *Geeli Pucchi* takes place in an unspecified small town. The plot primarily

unfolds in a factory. The factory is shown as a rugged and rough space dominated by male workers. The initial scene of the film introduces Bharti's character in blue overalls. The composition, where Bharti is the only woman amidst raw-boned, rough men, emphasizes her isolation and the challenge of asserting herself in a male-dominated environment. She is surrounded by blue and brown drums. The blue colour is often associated with Ambedkar's Dalit movement. The colour blue serves as a powerful visual motif, reinforcing the connection to her subaltern identity as well as Bharti's personal and political struggle.

Priya Sharma joins as a data operator in the same office where Bharti Mondal is a manufacturing worker. Bharti had the qualifications and aspired to get the position of data operator in the factory. Despite excelling in the interview, Bharti's aspirations to attain the desired position were crushed by her superiors in the factory. Bharti confronts her superior directly, as she refuses to suffer injustice in silence. The reason her superior state did not select Bharti was her lack of training in Excel and Tally. Undeterred, Bharti repeatedly questions her boss until he gets uncomfortable. It is evidently shown that her caste stands as a significant barrier to achieving her dream job. Later, Priya asks Bharti her surname during their first interaction, aiming to discern her caste. Bharti tells Priya that her surname is 'Banerjee' instead of 'Mondal'. All her life, Bharti has been judged and rejected because of her caste. The pause before Bharti's response brilliantly captures the heavy burden of anxiety that marginalised individuals feel. This fear leads Bharti to introduce herself as 'Bharti Banerjee' and not as 'Bharti Mondal,' as a protective measure against potential discrimination.

Priya is portrayed as submissive and dependent, often seeking societal approval for her survival. Bharti, on the other hand, emanates a sense of liberation. She is both independent as well as assertive. Priya is confused regarding her queer

identity. She views being queer as a flaw that requires correction. She lacks the strength to accept her identity. Contrary to this, Bharti stands firm regarding her queer identity. Bharti boldly asserts her identity and rejects the need for societal validation of her sexual orientation. “Look, there’s no defect in us that needs to be fixed. Listen, you will have to own your truth. That’s the only way you can be happy. I’ve accepted my truth” (01:29:55-1:30:57). Being an upper-caste Hindu, Priya had a privileged and sheltered upbringing that has made her a person who lacks the courage to make her own choices. In a particular scene where Priya’s mother-in-law helps her drape a saree, she is advised to be cautious regarding her friendship with Bharti. “Be Cautious about who you mingle with. Your father-in-law will be a head-priest next year” (01:26:17-01:26:19). Priya has internalised caste privileges and biases. Priya proudly embraces her caste name. She is happy with her identity as Sharmaji’s daughter-in-law. In a casual conversation with Bharti, she says, “Sharmaji’s daughter-in-law can’t be seen walking in the streets” (01:15:48) which explains her choice to use a scooter even for short distances to maintain the image.

In film analysis, the examination of figure behaviour is of crucial significance since it significantly affects character development, narrative structure, and visual language. This analytical discipline addresses the behaviours of people and even animals within a given visual setup, considering their postures, body language, facial expressions, and the choreographed dynamics of their interactions. In *Geeli Pucchi*, Bharti wears casual shirts and exhibits masculine traits. Her style is not conventionally feminine. In most scenes, her hair is loosely tied in a bun, which can be best described as unkempt. It is suggestive of her carefree demeanour, reflecting her indifference towards societal norms. Bharti’s body language is that of a resolute woman. She fearlessly questions the injustices perpetuated by those in authority. She was hopeful about her friendship with Priya. She thought Priya would stand apart from the rest of the upper-caste people. But this perception

shatters during the office celebration of Priya's birthday. Priya refuses to invite Bharti to be part of the birthday celebration. It becomes evident that Priya is also an individual who possesses deeply ingrained caste ideologies. Bharti faces various instances of humiliation from her colleagues and bosses, but she boldly resists these demeaning situations. However, it is not workplace ill-treatment that shatters Bharati. Priya's rejection after Bharti disclosed her caste affects her. The narrative concludes by adding grey tones to both characters as Bharti cunningly manipulates Priya to secure her dream job as a data operator. During Bharti's interactions with her superiors, she is never given a chance to sit in front of them; she remains standing while conversing. However, at the end of the movie, when she successfully lands the data operator position she wanted, we see Bharti sitting in the Superior's cabin confidently.

In the popular narrative of Hindi cinema, upper-caste male characters are usually the protagonists. It is from their viewpoint that the story unfolds. It is usually their struggles or their struggle against society's wrongdoers. However, *Kathal-A Jack Fruit Mystery* defies this norm by placing a Dalit female character, Mahima Basor at the forefront. Sanya Malhotra essays the role of Mahima Basor. She is a dynamic and smart police inspector. She not only steers the narrative but also brings forth a powerful social commentary on contemporary issues through the prism of comedy. The plot evolves as Mahima investigates the theft of two Uncle Hog jackfruit, from a local MLA Pateria's house. This quirky premise serves as a lens through which the film satirically highlights the public fixation on seemingly trivial occurrences, ignoring graver societal problems. Mahima Basor emerges as a mastermind, cleverly redirecting her efforts towards solving the case of a missing girl. She proudly owns her Dalit identity and emanates self-respect and confidence.

Mahima Basor's characterization challenges traditional hierarchies by holding

a position of authority despite her marginalized caste background. Mahima's subordinate officers are all upper-caste Hindus. Their professional relationship shows a reversal of conventional power dynamics and ingrained social prejudices. Mahima is in love with her subordinate Havaldar Sourabh who belongs to the upper caste. Unfazed by caste prejudices, Mahima raises her voice against injustices. Her interaction with MLA who belongs to the upper caste shows instances of caste discrimination. When inspector Mahima reaches MLA Pateria's home to enquire about missing Jackfruit, MLA Pateria angrily tells her to step back. He shouted at Mahima as she was about to step on his carpet with her shoes. This reaction reflects his contempt and prejudiced attitude towards her. After Mahima leaves, MLA's wife harshly comments on her audacity to walk in so boldly, and MLA Pateria instructs his wife to sanctify the spot where Mahima stood (14:01 - 14:07). Mahima as a subaltern protagonist defies the conventional portrayal of Dalit woman characters in mainstream Hindi cinema. She showcases professional competence and personal integrity. The following conversation between Mahima Basor and Mr. Pandey highlights the deep-seated caste prejudices that Mahima faces and how she overcomes them with her authority and rectitude.

Pandey: Amiya? She's a seasoned thief. She'd steal berries and fruits from orchards. These lower caste folks just cannot do without thievery. Did I say anything wrong, madam?

Mahima Basor: What's your name, Mister?

Mr. Pandey: Brahmadata Pandey.

Mahima Basor: Can you read what's on this badge?

Mr. Pandey: I cannot read or write Madam.

Mahima Basor: No wonder. Mr. Pandey, it reads 'Mahima Basor -Inspector'.

I don't steal. Rather I send thieves to prison. (01:05:01 - 91:07:16)

In the movie *Newton*, Rajkumar Rao essays the role of Newton, a government official from marginalised caste. Disliking his original name Nutan Kumar put by his parents, he changes it into Newton. The plot centres on Newton being appointed as Presiding Officer to conduct elections in the Naxal dominated areas of Chhattisgarh. The film is notable for its exploration of subaltern representation through diverse characters. Firstly, the Presiding Officer Newton, who even though he belongs to a marginalised community, represents authority and power. He is honest and fearless, all prepared for executing his official duties at any cost. In the film, a compelling interaction between Newton and his Electoral Instructor played by Sanjay Mishra highlights the nuanced nature of honesty.

Electoral Instructor: Newton, you know your problem?

Newton: My honesty?

Electoral Instructor: No. Your arrogance about your honesty. Newton, your honesty is not doing the world a favour. It is expected of you. Honesty makes the heart lighter, less burdened. (14:45 -15:08)

Secondly, the Booth-level Officer Malko Neetam, portrayed by Anjali Patil. Malko Neetam is a strong-willed tribal woman dedicated to the upliftment of the Gond tribe. Her character embodies hope and resilience, striving for the betterment of the tribal community. Thirdly, the subaltern representation is vividly shown through the plight of Gond tribes in the Naxal-controlled areas of Chattisgarh. The villagers are completely alienated from the election process and ignorant of the operation of the electronic voting machine. The movie sheds light on the paternalistic and manipulative attitudes of the authorities towards the subaltern villagers. The CRPF officers, led by Aatma Singh essayed by Pankaj Tripathi, compel the villagers into voting for the sake of presenting a facade of democratic

participation to a foreign reporter, rather than genuinely empowering the villagers to make informed choices. The following conversation between Newton and Aatma Singh on the day election underscores Newton's unwavering belief in the significance of election process. For him every vote counts, like all other Indian citizens, Gond tribes also deserve to have their voices heard despite the alienation.

Newton: There are 76 voters who live around here. Their votes are important.

Aatma Singh: Mr Newton, they don't care about the elections. They're illiterate villagers and the Maoists have ordered them not to vote. I'll give it to you in writing, no one will vote.

Newton: Write it down then. I'll submit it to the Collector's office. (23:38 - 25:12)

The films *Geeli Pucchi*, *Kathal -A Jackfruit Mystery* and *Newton* have subaltern characters in the foreground. Unlike other popular mainstream escapist Hindi films, narratives of these films challenge the traditional power dynamics and offer a platform for marginalised voices. *Geeli Pucchi* makes use of complex characters and evocative visual elements to present the intersectionality of caste and queer identities. Bharti in *Geeli Pucchi* is portrayed as a strong queer dalit woman whose resilience enable her to survive in a caste conscious society. *Kathal -A Jackfruit Mystery*, centres on a Dalit female police officer who navigates her professional role with competence and honesty. Through the characterisation of Mahima Basor, the narrative subtly critiques caste prejudices. *Newton* represents the story of a principled government officer who belongs to a subaltern community. He strives to conduct free and fair elections in a remote, conflict-ridden area, highlighting the challenges and complexities of democracy in marginalized

communities. These three films attempt to defy conventional representation of the subaltern as passive and muted. Bharti, Mahima Basor and Newton Kumar are all presented as resilient, bold and hard-working.

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## Ghosts of Memory: Transgenerational Trauma and Identity Crisis in *The Remainder*

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### ABSTRACT

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*The Remainder* is a narrative interwoven in memories of three generations and reflects on the burden of the past on the younger generations. The paper focuses on Transgenerational trauma and Postmemory in the novel by illuminating the idea that when memories are transferred by the survivors to the next generation, they not only fail to create the effect expected by the former but also become an emotional baggage devoid of tangible experience. Their trauma is rather to escape such idealised memories which they cannot relate to and ascertain self-identity.

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“I’ve learnt to tame my nostalgia (I keep it tied to a post far away), and besides I didn’t choose to hold on to this memory. It was the fifth of October 1988 but it was my mother, not I, who decided that the date would never be forgotten” (Zerán 65). The victims of a violent history can hardly recline into a comfortable present, as they often cannot oblige themselves out of the clutches of the past. However, the transmission of such experiences through narratives involving personal encounters is considered complicated in its rendition. According to Gabriele Schwab in *Haunting Legacies: Violent Histories and Transgenerational Trauma*, the psychic core of such violence includes what has been repressed in inaccessible psychic recesses. Such a tendency also results in a refusal to mourn the lost object by rather keeping it alive inside and thus becoming the living dead. The haunting quality is evident even before the process of transference of the legacy occurs.

“Victims fall into a melancholia that embraces death-in-life...violent histories generate psychic deformations passed on from generation to generation across the divide of victims and perpetrators” (Schwab 3). The experience of such violence might be in a state of hibernation in the unconscious, only to be passed on as mental ailments to the next generation. In post-conflict societies, transition or reconciliation is a daunting task. It is also seen that the children of the victims do not want to obliterate or conceal the legacy but rather have a sense of allegiance. The struggle on the site of memory is multiple, especially in that it invigorates traumatic past. Memory is not an unmediated process but considered as a selective practice of reproduction of the past, dependent on the individual who intends to remember. The burden on the present generation is not only limited to an incompatibility with the past, which is not a personal experience and therefore distant but also that it can be constantly repudiated by subjective perceptions of the narrative. Moreover, such individuals have to constantly revisit these narratives

such that their own past doesn't eclipse the transmitted knowledge, often at stake of their identity. The paper intends to comprehend such "Grey zones of memory" (2), borrowing the phrase from Daniela Jara, which digress from official memory of the past to individual and subjective.

Marianne Hirsch addresses the notion of post memory in her work, "The Generation of Postmemory: Writing and Visual Culture after the Holocaust". A traumatic memory cannot be categorised as part of the sequential memory and therefore continues to exert a force of foreignness. Such untamed memories when handed down to the next generation are beyond levels of comprehension since there is an absence of firsthand witnessing. Hirsch observes that memory that is received from others through narratives, photographs, souvenirs, and memoirs is distinguished from what is remembered by the victims through personal experience. This understanding augments the necessity of classifying such memory with the adjective 'post' that points towards the delay temporally. According to her, it is the "consequence of traumatic recall but (unlike post traumatic stress disorder) at a generational remove" (26).

Marianne Hirsch underlines the fact that even when there isn't a personal connection to traumatic events such as slavery in America, racism in Africa, wars in Vietnam, violent uprisings in Chile, Argentina and various genocides, there is a vertical and horizontal transfer of the effects upon larger humanity. There is also a concern expressed on how the memories of survivors can be trapped after the latter has left, which she phrases as "past's passing into history". In her work *The Generation of Post memory* she vocalises her concerns by saying, "How in our present, do we regard and recall what Susan Sontag has so powerfully described as "pain of others?" What do we owe the victims? How can we best carry their stories

forward without appropriating them, and without unduly calling attention to ourselves, and without, in turn having our own stories displaced by them?" (26).

The narratives, photographs or survivors themselves are such a powerful presence in the life of the current generation that the transfer of memory is consistent and often becomes consequential to their identity. So the connection established with the past is not an act of recall but a creative act that involves imagination. In such cases, there is a displacement of one's self, experience and consciousness with whatever is received. The situation is more complicated by the inherent incapacity of trauma to be fully comprehensible.

The very use of the term "memory" is debatable, as other writers such as Gary Weissman and Helen Epstein oppose the concept of intergenerational transfer of an entity like 'memory' and claim that it cannot be transmitted. Hirsch rather situates it in an affective force that inserts itself as a binding force between the two generations.

Two decades of military rule in Chile ended in 1990, which entailed, as claimed by many, the darkest saga of human atrocities. Writers such as Isabel Allende, José Donoso, Pedro Lemebel, Carlos Franz, Helen Spoon and James Watson have condemned the regime and violence through their works. However, Alia Trabucco Zerán emerges as a contemporary writer, verbalising the traces of the past focussing on the generation who are forced to remember a past that they have not experienced. As a writer born in Chile in 1983, Zerán conveys the disturbances acutely. *The Remainder* is her debut novel, translated into English by Sophia Hughes.

The novel revolves around the inner conflicts and thereby identity crisis faced by Iquela and Felipe. An array of other characters is named but only three

characters namely, Paloma, Claudia and Gran Elsa appear to be delineated in the novel. The younger generation exhibits ignorance, indifference and acts of distancing from the recollections of their parents or relatives but there is nevertheless a struggle to establish connection with the living, which seems impossible without being a participant in their memories. The sense of their identity is intrinsically rooted in such tales and the journey of emancipation is not linear. The paper intends to read the novel from the perspective of a Postmemorial position understanding the complexity of Transgenerational communication of traumatic experiences.

The chapters in the novel are numbered in the reverse order, starting from eleven to zero and parentheses are used instead of chapter titles, indicating an absence of usual structural elements. The parenthesis is discussed inside the novel on two occasions by one of the two narrators, Iquela. Felipe's grandmother, Elsa on her visit to Iquela's house finds the latter and comments on how she has grown up and then becomes silent, about which the young Iquela observes "her voice and then the longest silence, a parenthesis that held no words" (98). The later instance is when Iquela finds the body of Ingrid Aguirre and imagines it to be taken to her mother hoping to finally establish a the link in their relationship as mother and daughter, she says "and only then within the perfect parenthesis of our interwoven bodies, would I open my mouth to tell her 'Mother, I've done all this for you'" (160). The parenthesis appears as a missing link in the relationship between the generations, which is to be filled by memories that cannot be communicated and even if attempted would fail in its purpose.

The second narrator, Felipe, spots the dead in the streets and engages in a mission of apocalyptic maths to arrive at a perfect number on the death toll that would help him answer Pinochet's atrocities. He wants to arrive at a zero in order

to reconcile the death toll with the actual sum of the dead. The neurotic mission only ends with the encounter of the corpse of Paloma's mother.

Throughout the novel, we find that as children, both Iquela and Felipe play games that inflict pain on themselves, which is their method to know real physical pain. Felipe can also be seen taking pleasure in killing a pet parrot in a scene by first plucking its feathers and then tearing its flesh with a fork and searching for its lost voice. Only when he buries it there is a pang of fear suggesting the external manifestation of his psychic disorder. Such acts of brutality can be seen to continue throughout his childhood.

Being orphaned, Felipe lives with his grandmother during his early days and then in Iquela's house, where he finds himself an outsider. Iquela's mother is forced to give him shelter as her husband, Victor, had made a mistake muttering Felipe Arrabal's name, resulting in the murder of Felipe's father by the coup. Although Iquela visits her mother, Consuelo, thrice in a week, she can be seen aloof from a real association. She cannot relate to her mother's and father's older selves, Claudia and Victor, because for her they are Consuelo and Rudolfo, which unfortunately her parents cannot come to terms with. Paloma is equally distant from her parents. The older generation clings to their memories, photographs, and stories, which their children cannot relate to in any possible manner. They strive to link themselves to these stories and can be seen frequently authenticating the memories with the facts and dates.

However, there is an underlying desire among the three children to discover themselves, separated from the histories of the participants. Iquela, who has never travelled out of Santiago, finds the journey to Argentina most relishing and there is a strong desire not to discover the body of the deceased so as to prolong her stay in

freedom from the imposed images and stories. Felipe absconds with the body of Ingrid but only to set it ablaze in the mountains. He says as he is amidst the fire “ I have to scream as I blaze, as I gave birth to myself, as the flames give life to me I have to scorch the air with my voice, with my final howl, my final sum, minus one, minus one, minus one ” (128).

They are shaped by a child’s confusion and responsibility, by a desire to repair, and by the consciousness that her own existence may well be a form of compensation for unspeakable loss. Loss of family, home, and a sense of belonging and safety in the world “bleed” from one generation to the next” (Hirsch 34). So the pain experienced by the later generation is adequately genuine. However, there is also an aim exhibited to escape from this traumatic experience. These memories are never nostalgic for the succeeding generations. Though the trauma is experienced from narratives, the felt consequences of it are different from those of their parents or grandparents. While the participants fuel their identity with these memories, the younger generation struggles to define their identity outside these memories to which they feel disconnected. So their journey is to find a way out of the past imposed upon them. Such a journey can only be successful when they confront an experience that they can relate to or find newer experiences that can define their essence again at the cost of breaking the cycle of trauma.

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## Remediation and Graphic Medicine: New Frontiers in Medical Humanities

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### ABSTRACT

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Graphic medicine has turned into an inalienable part of the medical humanities. This opens a new reading of works bearing the label with the theory of remediation, a concept closely aligned with new media theory. This paper examines the transformative potential of graphic medicine, exemplified by the book *My Degeneration* by Peter Dunlap-Shohla, as a genre that employs comics to convey medical narratives, in remediating traditional medical pedagogy. This inquiry emphasises how crucial creative methods in narration are to developing a in the evolving realm of medical humanities.

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Any assumption on the supremacy of conventional forms in literary narratives is disproved with the transience of the former. As such, there are myriad outgrowths that broadly circumscribe the idea of literature. Graphic novels stand testament to the concept of remediation, a theory propounded by Jay Boulter and Richard Grusin. The term is gratuitously employed in the realm of new media, wherein graphic novels could be included in the former's fringes. Graphic novels or graphic comics currently constitute a new frontier in medical humanities, which is a "multidisciplinary field that embraces the study of medicine through the lenses of literature, history, philosophy, the social sciences, and the arts in the context of applied medicine and bioethics" (Goyette and Fairey 2024). This facet of the discipline ultimately plays a conducive role in comprehending disability narratives as a part of remediation.

Postmodernism is often credited with the dismantling of established narrative forms, especially with the desegregation of high and low forms of literature. But in the case of graphic narratives, there is a much more linear growth of cause and effect. A "gradual vanishing of storytelling in more highbrow forms of literature around 1980 and thus the mismatch between supply and demand" (Baetens 29-31) furthered the meteoric rise of other forms of expression, especially graphic narratives, since they stand as iterations resulting from a fusion of the visual and textual arts. Though remediation is an apparent direction for graphic narratives (as it is in concordance with new media hyphenations), the subaltern status of disability and how its derivatives take a backstage in dominant forms of expression pose a presumption of the latter's exclusion in remedial narratives. However, this fallacy is arrested by the presence of disability narratives that are not only in concordance with the principles of new media narratives but also as yardsticks for the contemporary state of narratives.

A precise exemplification of the convergence of graphic medicine and remediation can be found in *My Degeneration* by Peter Dunlap-Shohl. Graphic medicine is a series of books that “reflect the value of comics as a resource for communicating about medicine and health. For healthcare practitioners, patients, family members, and caregivers dealing with illness and disability, graphic narratives enlighten complicated or difficult experiences” (“Graphic Medicine”). This particular title by Peter Dunlap-Shohl elucidates an autodiegetic narrator’s experience with Parkinson’s disease.

Defined often as a syndrome, Parkinson’s is a disease that is scantily represented in literature. There are outliers, such as Rohinton Mistry’s *Family Matters* (2002) and John Harding’s *What We Did on Our Holiday* (2000). The former demonstrates a protagonist suffering from the affliction, and the latter, a father character central to the plot. Moreover, the geriatric tag attributed to the disease downsizes the scope of large-scale representation. These novels are themselves irregular in the vast body of literature. Penny Batchelor, a disabled author claims that there are no statistics regarding the presence of disabled characters in literature. She points out that it was only recently “that a publishing company, Penguin Random House, began to include disability in its staff survey. Yet with disabled authors and disabled characters there’s nothing” (Batchelor). The purpose of this inquiry shall and never will be quantitative. But the interdisciplinary spectrum of medical humanities demands such an unorthodox ambling.

The lacuna in conventional literature and quantitative figures reflect the necessity for remediation through a new media form like the graphic novel. Remediation is nothing but “the way in which one medium is seen by our culture as reforming or improving upon another” (Bolter and Grusin 59). This improvement ostensibly morphs towards graphic medicine, and ultimately, with a

specimen like Peter Dunlap-Shohl's *My Degeneration*. As a meditation on the author's personal downward spiral into Parkinson's, there have been creative advantages in *My Degeneration* that level the field of formalistic creativity. Dunlap-Shohl retired as a leading cartoonist from one of America's leading dailies, *Anchorage News* and is also "the leader of the Anchorage Parkinson's Disease Support Group" ("Peter Dunlap-Shohl"). The book is Dunlap-Shohl's own microcosm of raw effusion, a radial perspective of Parkinson's disease, from a cartoonist's perspective. There is a visible difference between a regular account and a hybrid presentation. "Although graphic pathographies are often thematically similar to standard textual accounts of illness, their powerful visual messages convey immediate visceral understanding in ways that conventional texts cannot" (Green and Myers 574). In short, graphic narratives are at an invariable advantage as they remedy all the limitations of the text. Art and imagery combined with textual information overpowers the narrative. This act of remediation casts new dimensions on the representation of disability.

Clinical journeys constitute a core element in Dunlap-Shohl's account of Parkinson's disease. His personal conflict with the disease is represented as a conversation reminiscent of the knight and the Grim Reaper in the *Seventh Seal*. The author is facing a battle against an insurmountable opponent. However, there is no dreary deference to the disease from the cartoonist. All such fastidious pessimism is excised in the initial pages. For instance, the narrator contemplates suicide when he faces the initial diagnosis. It is humorously presented and the whole act of deciding to get eaten by a bear is illustrated as a farce. Dunlap Shohl uses visual effects to depict the tremors characteristic of Parkinson's disease. Jagged lines and motion lines vividly convey the uncontrollable shaking, making the symptom more tangible and understandable for readers. To explain the feeling

of rigidity and loss of control, the author uses metaphors like being trapped inside a malfunctioning robot. These visual metaphors make abstract symptoms more relatable and easier to comprehend. To express the emotional impact of his diagnosis, Dunlap Shohl uses a metaphorical image of falling into an abyss. This stark visual effectively captures the despair and fear associated with receiving a life-altering diagnosis, translating deep emotional turmoil into a powerful visual metaphor. However, the narrative does not shy away from expressing the gravity of the affliction. The narrative includes detailed personal anecdotes, such as dealing with the side effects of medication or the emotional toll of the disease. These stories humanize the medical condition, making it more than just a set of symptoms and treatments.



Fig 1

Historically speaking, graphic narratives were more or less targeted towards an adolescent audience. Furthermore, it was remedial dialogues like “Graphic Medicine” that opened new frontiers towards interdisciplinary measures in medical humanities. They also hold an educative purpose, because stories could “remind students that the vast body of scientific knowledge they are trying to master will

one day help real people” (Green and Myers 576). It is a fascinating piece of history that graphic medicine is not entirely a twenty-first century thought. In 1889, Sir Prescott Howett, FRSC, the then chairman of St George Hospital, spoke at lengths “of the extreme value of drawing and painting to the medical man, not only for the actual results produced, but also, if seriously followed, on account of the value of the training” (“The British Medical Journal” 1052). In fact, the 1889 article itself is entitled “The Graphic Arts in Medicine.” The novelty of contemporary graphic medicine, however, is its efficacy. It is stated as a tried and experiment area that wears an interdisciplinary badge of success without much in terms of caveats. “During clinical and residency years, graphic pathography’s can reinforce that healing a patient entails more than treating a body” (Green and Myers 576). This dual faced outcome from a visual narrative is the perfect case study of a remedial output.

An ideal outlook for graphic narratives would be to perceive them as an improvement on the not so nascent field of medical humanities. The term as such is not a twenty-first century invention. It would be almost accurate to place medical humanities parallelly with postmodernism. But the process distended in a rapid fashion only in the 80s. The *Journal of Medical Humanities* was founded in the year 1980, a huge stepping stone in the grand entanglement of the humanities and medical science. “As the medical humanities have widened their reach, one theme has persisted from the early years: professional and human crisis has spawned the search for meaning and introspection about life, illness, recovery, human suffering, the care of the body and spirit, and death” (Wailoo 202). A conservative look into the conception of graphic medicine in the realm of medical humanities stems towards the ideal of humanising the clinic. This is also a point of convergence for the theory of remediation and medical humanities. Foucault had indeed made it

apparent that medicine “must no longer be confined to a body of techniques for curing ills and of the knowledge that they require; it will also embrace a knowledge of healthy man, that is, a study of non-sick man and a definition of the model man” (Foucault 34). But it is not a healthy man who narrates in graphic medicine, but an afflicted man, whose long-established career came to an untimely halt with a neurological diagnosis. In Peter Dunlap-Shohl the cartoonist, there is a clear departure from the normativity within disability narratives: healthy people writing about the disabled and disability.

*My Degeneration* is essentially a component of a larger statement that developed within the arena of medical humanities. Graphic medicine as a term found its origin in Dr Ian Banks, a physician and cartoonist combined. This new development in the medical humanities needed an outlet to represent its new ideas. In 2015, doctor Banks and several colleagues published a manifesto that embellished the status quo of the discipline and its prospective potential that could arise in the future. As a pioneering text that also came in the form of a graphic comic/novel the manifesto attempted to look “at the shifting iconography of illness and the power of self-representation” (Alamalhodaie et al. 351). A higher state of remediation is effective communication. A medium can be used to improve the efficiency of its predecessor. However, it cannot be used as a carte blanche with a cent percent win rate. Newspapers did not go redundant in the age of internet, and there is no need to polemise that the days of the regular text are counted. Coexistence is the way forward. Graphic medicine, is a booster capable “of enhancing effective communication through the direct, collaborative involvement of patients, practitioners, and artists” (Alamalhodaie et al. 351). A work like *My Degeneration*, captures a lot of secondary objectives through its existence. Dunlap-Shohl demonstrates a pattern within a framework of graphic narratives. It is not a

doctor's narrative, and the patient is not a marginalised subject, but a person with agency. The language becomes simpler, straightforward, and illustrated with the professional craft of a cartoonist equipped with the requisite knowhow of a disease that is personally altering him.

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## The Literary Affinity between the Two Great Warriors of the World: Bhishma of the *Mahabharata* and Achilles of the *Iliad*.

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### ABSTRACT

The interconnectedness of Sanskrit and Greek is no new topic of discussion for language learners owing to its Indo-European lineage. The etymologies, sounds, and shifts are all a matter of reflection, though; the readers will be filled with amazement to ponder over the literary parallelism in Achilles and Bhishma. The unveiling of the cultural and mythological traits of different countries through literature and art is an all-time favourite of literary nerds. Written during the 4<sup>th</sup> and 5<sup>th</sup> centuries BCE, *the Mahabharata* plays a vital role in shaping the cultural and traditional values of India. Despite its origin in Greek literature in the 8<sup>th</sup> century BCE, *Iliad* also reminisces about Hellenic history and identity. This paper attempts to acknowledge the affinity between the two great warriors from two different mythological contexts. Bhishma, the Indian mythological hero, is assumed to be the Greek counterpart of Achilles in their divine birth and death, upbringing, and significant parentage. Both resemble each other in their chivalrous lives, physical invulnerability, moral conflicts, and the powerful voice they have on their respective crews.

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The *Mahabharata* and the *Iliad* are the two great epic poems engraved on the mythological halo of literature. Regardless of their unique treatment of context and culture, both texts hold significant universal aspects of human experience, keeping aside their structural and thematic resemblance. If the *Mahabharata* narrates the events of the Kurukshtra War and how it exerts its influence upon the lives of Pandavas and Kauravas, *Iliad* discusses the hostility between the Greeks and the Trojans. The Sage Vyasa begins his epic by unfolding the lineage of King Shantanu and the river Goddess Ganga, their progeny Bhishma, whereas Homer's narrative starts with a quarrel between Achilles and Agamemnon. Both attribute their similarity in manifesting war, vengeance, divine involvement, and the like. A comparison between the heroes of the epics reveals several similar elements that make the spectators doubt the Grecian Homer's influence upon the Indian Vyasa. The main characters' lineage, birth, training, marriage, and even some quantitative figures are a matter of wonder. The heavenly-mortal parentage and birth of both Achilles and Bhishma as the youngest and eighth child bore the interconnectedness of two different epics from two different countries that lie miles away from each other, with two unique classical languages. How is that possible? Keeping aside the answer to this question and the many differences that Achilles and Bhishma exhibit, let us examine the other indistinguishable elements they share in the saga of war.

To begin with, the parentage and divine lineage of both Bhishma and Achilles put the reader into a marvelously chaotic question of how two different epics on two different continents depict such a similar story line. A mortal being born at the consummation of one celestial body and a king. Achilles was the son of the mortal named Peleus, king of Myrmidons and Thetis, a Sea Nymph. Thetis bore seven children all of whom perished due to her attempts to immortalize each one of them. Thetis wanted to protect her son Achilles from die young; she immersed him in the river Styx, which granted him invulnerability. "Thetis dipped Achilles in the

waters of the Styx, holding him by his heel, which consequently remained vulnerable, while the rest of the body became invulnerable” (Apollodorous 36).

Goddess Ganga, a river goddess in the Oriental context, drowns her seven children into the water due to a curse and returns her eighth child Devavrata to his father Shantanu. Additionally, his father had given Devavrata a boon of *iccha mrityu*- that he will die when he wishes to. To quote:

...she gave birth to many children. Each new born babe she took to the Ganges and caste into the river, and then returned to the king with a smiling face...Thus she killed seven children. When the eighth child was born and she was about to throw into the Ganges, Shantanu could not bear it any longer...Then she blessed the boy, handed him to his father, the king, and disappeared. (Rajagopalachari 5-8)

The Oriental-Occidental linkage again amazes us with the two great wars fought between Royal families, the *Kurukshetra* and the Trojan. Bhishma Pitamaha, the unmatched warrior was appointed the supreme commander in chief of the *Kaurava* army with his unwavering loyalty and wisdom. His vow of celibacy throughout his life symbolizes his dedication and renunciation to worldly desires. While conquering Troy, our hero Achilles was believed to be the greatest warrior and his ferocious combats threw light upon his unbeatable strength and bravery.

Talking about the allegiance, Bhishma and Achilles struggled and went through the moral dilemma of personal glory, vows, and the concept of honour to a great extent to keep their righteous path. Bhishma finds himself torn between the injustices his team has shown and the inner conflict of combating with his own grandsons. When Agamemnon quarrels with Achilles, he even withdrew from the battle, visibly showing his affinity with Bhishma in several scenes in the epic.

“O Achilles, thy might and thy evil work are beyond the measures of men; for gods themselves are ever helping thee” (Homer 294).

The passing of Bhishma as well as the tragic end of a heroic life of Homer’s Achilles is a poignant and enduring part of each cultural tradition. The legacy of the epic deaths in *Kurukshetra* and Troy and the following grief of the warriors prompt their comrades to seek vengeance on their enemies. Achilles contemplates when Paris shoots an arrow at his only vulnerable spot-his heel. “But when the tenth morn had arisen with light for men, then bear the folk forth the dead, weeping from the tentsand huts” (Homer 21).

On the tenth day of the Kurukshetra war, keeping Sikhandin in front of him, Arjuna attacked Bhishma. When Sikhandin’s darts pierced his his breast, sparks flew from the grandsire’s eyes. For a moment the old warrior’s anger rose like flaming fire and his eyes glared as if to consume Sikhandin. (Rajagopalachari 310)

The choice of death as per his *iccha mrityu* boon, Bhishma’s life and death accord with Achilles’ invulnerability of his heel. One dies young and the other witnesses every stage of life, keeping apart his vow of celibacy.

Further, the *Iliad* and the *Mahabharata* discuss the influence and importance of Bhishma and Achilles in the following scenes of battle. The Greeks dependence on Achilless military expertise is apparent in their frequent loses and the near defeat. Bhishma is no exception. Bhishma’s final words to both the Kauravas and Pandavas had a soothing undertone, though it did not please Duryodhana. Bhishma, valiant and courageous, chooses to die on the bed of arrows; chooses to die once the battle is over. Achilles’ death was a strategic blow to the Greeks, as they lost their most powerful warrior. The intense mourning of his closest comrades and Greeks as a whole proves his spirit of commandership unto

his death. The replica of the deaths on the tenth day of the battle is yet another question of wonder. The respect received by the dead bodies of both the legends marks the thematic similarity of post-death scenes. Karna says,

Veteran grandsire, vanquisher of Parasurama, you lie on the field of battle, struck down by Sikhandin. If you, who had reached the summit of right living and were an embodiment of purity itself, you were the one boat on which the Kaurava princes depended for crossing the flood of their troubles... Turn your gracious eyes on me and bless me, who have accepted the command of the forces. (Rajagopalachari 310)

During the war, Bhishma proves his invincibility and hold on both sides, inflicting heavy losses on the Pandava army singlehandedly and earning the respect and fear of both parties. Bhishma and Arjuna, though rivals, show mutual respect and honor while we see, “Arjuna’s heart was not in the fight. Unwillingly and in great distress of mind, he proceeded to the combat. Bhishma, on the other hand, burnt fiercely like the noonday sun” (Rajagoplachari 308).

Achilles’ indestructible ferocity and prowess stunned the warriors of Greece and Ilium alike. Fate and destiny play a vital role in making the two great epics a tragedy. If Iliad and Achilles manifest the interference of Gods and the recognition of the wrath and vows, Vyasa in his *Mahabharata* depicts the significance of dharma and karma and their due importance in the lives of civilizations to come. After slaughtering Hector, Achilles desecrates his body, showing his deep grief over the death of his dear Patroclus. Whether *Mahabharata* or *Iliad*, Greece or India, the characters’ grief, vengeance and rage are much the same.

Bhishma dies a legendary death ever a mortal did, chooses to lay down his arms and waits for that auspicious moment of winter solstice to leave his mortal

body. Lying down on his bed of arrows shows not only the greatest warrior of the world but also a man strong in his vow who succeeded in watching his land, *Hastinapur* going to the safest hands. The vulnerable heel of Achilles pierced by the arrow of Paris, a devious act that put an end to the life of the hero of the Trojan War.

To conclude, it is evident that Achilles' part in the Trojan War is integral and inevitable, for he leads the epic to its closure. For him, death is just leaving his body from the earth and living eternally in the minds of the Grecians, as an epitome of heroism, valour, honour, and rage. His deeds and words continued to influence the course of the war and *The Iliad* as a whole. His affinity with Bhishma's role in the *Mahabharata*, who is not only the greatest warrior but also a wise counsellor and a champion of righteousness, depicts that the similarities are more relevant than its differences. Both the heroes spread their radiance to the world through their presence in the two great epics—the *Mahabharata* and the *Iliad*.

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## Abjection Unveiled: Exploring Disrupted Lives in *Tears of the Desert*

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### ABSTRACT

This paper seeks to analyse in detail the term “abject” and its various aspects, with a particular emphasis on Julia Kristeva’s theory of abjection as articulated in her book *Powers of Horror*. The paper then examines the ways in which the narrator of the memoir *Tears of Desert*, Bashir, and other characters, such as Sumiah and a group of forty students, bear witness to rape. By examining these harrowing experiences, the paper elucidates how these characters become embodiments of the abject, in accordance with Kristeva’s theoretical framework.

Additionally, the paper offers supplemental perspectives on Kristeva’s concepts, and investigates how the process of becoming abject impacts the characters’ identities and their interactions with society. Through this lens, the analysis aims not only Kristeva’s ideas to the specific context of *Tears of the Desert* but also contributes to a broader understanding of abjection and its relevance to contemporary discussions.

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“Until the lion learns how to write, every story will glorify the hunter” (Maraire 79). As Tim Butcher states, “The genocide in Darfur has found its Anne Frank. The slaughter inflicted on the African people of Western Sudan is one of modern Africa’s darkest episodes but one Darfuri woman, Halima Bashir rips through diplomatic compromise and political double [aiming] to lay bear Darfur’s ghastly reality. [It is] a searingly frank testimonial of a war crime that deserves all our attention” (qtd. in *Tears of the Desert*).

*Tears of the Desert* is the first memoir ever written by a woman, Halima Bashir, who was caught up in the war in Darfur. The memoir is co-authored with Damien Lewis and is about the cruelties committed by the Janjaweed Arab militia against Africans in the Darfur region of Western Sudan. It is a survivor’s tale of a conflicted country, of resilient people, and the uncompromising spirit of a young woman who refused to be silenced. In telling her story to the journalist Damien Lewis, Bashir is making an attempt to inspire the rest of the world to stop bloodshed in Darfur.

The narrator of the memoir, Halima Bashir, grew up in the remote region of Darfur, Sudan, as the daughter of a cattle herder from the Zaghawa tribe. She excelled academically and became the first person from her tribe to study medicine, graduating as a doctor in 2003 at the age of twenty-four. By the time she started practicing medicine, the Janjaweed attacks on black Africans in Darfur had intensified. Volunteering at a local hospital, she treated Africans and Arab patients from both sides of the conflict. After speaking to a reporter about what she witnessed, she was detained and threatened by secret police, forced to sign a statement promising never to speak to the press again. As punishment, Bashir was reassigned to a remote clinic in Northern Darfur. In January 2004, the Janjaweed launched a brutal attack on a nearby school, raping over forty girls and their teacher. Bashir courageously reported this attack to the UN. A week later, she was abducted

by state police, who tortured and gang-raped her as retribution for speaking out. With the assistance of a local named Osman, she managed to escape to her home village. Following her father's death in a Janjaweed raid, Bashir fled Sudan and sought asylum in Britain in 2005, where she penned her memoir with the collaboration of Damien Lewis.

In the light of the above experience, this paper explores the concept of 'abject' and analyses the memoir *Tears of the Desert* with the theory of abjection as a tool put forward by Julia Kristeva in her book *Powers of Horror: An Essay on Abjection*. Etymologically, the term 'abject' is derived from the Latin word 'abjacere.' 'Ab' means 'away' and 'jacere' means 'to throw' resulting in 'to throw away.' 'Abjacere' when converted into English becomes 'abject' which means 'rejected'. The *Concise Oxford English Dictionary* defines abject as "Brought low, miserable, craven, degraded, self abasing." It describes abjection as a "state of misery or degradation" (Obadare Adebani 7). 'Abjection' literally means "the state of being cast off" (Kristeva 21). Kristeva's abject refers to anything that causes disgust. It represents degradation and baseness. The abject is something very close to us, so close that it feels like a part of us. However, it intimidates us and threatens our identity with its constant presence, reminding us of something undefined and unwanted. Remembering this makes us feel inferior, so we are forced to reject it to preserve our identity. We must reject the abject to live, but we need it to exist, creating a conflict where living and existing together becomes impossible. The abject places us in a constant struggle between wanting to live and needing to exist. It shapes our being but disrupts our becoming, where becoming means living a self-created, autonomous identity. The abject exists in a space between acceptance and rejection, causing existential insecurity. It creates a love-hate relationship between being and becoming, existence and life. While it helps form our being, it becomes abject when it threatens that very being. These points clearly support the feelings

going through the mind of Bashir after being raped. She struggled hard to survive in between the subject of rape and the object of rape i.e. the state of abject.

In *Powers of Horror*, Kristeva explores the concept of the abject, focusing on the psychological origins and mechanisms of revulsion and disgust. She uses this concept to describe and explain disruptions in a person's life, particularly moments when they experience a frightening loss of distinction between themselves and objects or others. Kristeva asserts that the abject has a double presence; it exists both within us and within our culture. Abjection is expressed through individual and group rituals of exclusion, helping to establish the boundaries of both the individual and the social body. Kristeva says, "abject is not an ob-ject facing me, which I name or imagine. Nor is it an ob-jest, an otherness ceaselessly fleeing in a systematic quest of desire" (1). Instead it is a reaction to a threatened breakdown in meaning caused by the loss of distinction between subject and object or between self and other. The abject is characterized as being dichotomous "neither subject nor object" (1) both inside and outside, "in-between, ambiguous, composite" (Kristeva 13). "Abject is something rejected from which one does not part, from which one does not protect oneself as from an object" (4). "The abject has only one quality of the object that of being opposed to the I" (1).

Kristeva, in her work *Powers of Horror: An Essay on Abjection* (1982) explains that the abject is "neither subject nor object, the dirt, the improper/unclean" (2). At the beginning of her book, Kristeva illustrates the unclean nature of the abject by describing the feelings we experience when encountering unclean objects. She compares it to the revulsion we feel towards spoilt food, filth, waste, or dung. The aversion and retching response that turn us away from defilement, sewage, and muck highlight our separation from these impurities. She explains that food loathing is the most basic and ancient form of abjection. When she sees or touches the skin on the surface of milk, she experiences a gagging sensation,

stomach spasms, and a bodily reaction that provokes tears and bile, increases heartbeat, and causes dizziness. Kristeva says:

“I” want none of that element, sign of their desire; “I do not want to listen, “I” do not assimilate it, “I” expel it. But since the food is not an “other” for “me,” who am only in their desire, I expel myself, I spit myself out, I abject myself within the same, motion through which “I” claim to establish myself.  
(3)

Here she describes this feeling as abjection. The corpse, a wound with blood and, or the sickly, disturbing smell of sweat, of decay- all these evoke in us a feeling of rejection, which Kristeva defines in relation to the abject or state of abjection.

Kristeva adds that the abjection “disturbs identity, system, order,” that “the one by whom the abject exists is a deject who places (himself), separates (himself), situates (himself), and therefore strays instead of getting his bearings, desiring, belonging, or refusing” (8). From Kristeva’s observations, we can deduce that the main point of her theory is that of liminal space, someone who is “in-between,” “ambiguous,” “composite” (4). This can be exemplified through Miss Sumiah, the teacher who is raped alongside the school girls in the memoir. Unlike the girls, who could narrate what happened to them, their teacher, Miss Sumiah, decided to remain silent about what happened to her. Bashir says:

I knew that she was trying to hide it, and I understood why. Sumiah was married, and she didn’t want her husband to know. She was feeling guilty: guilty that she hadn’t resisted her attackers, fought them off, or died trying to do so. Better to have died and preserved one’s dignity, than to have suffered the soul death of rape – that’s what Massalit, and the Zaghawa, believed. (Bashir 254)

Sumiah felt separated from her identity, and the rape disturbed her identity, system, and order. While being with Sumiah, Bashir was not at all bothered about

her because she had to deal with forty other children who were gang raped along with her, but later, after being gang raped, similar words were echoed by Bashir after she ran away to her home village. After being gang raped by Janjaweed soldiers for reporting about the gang rape of forty children and their teacher to United Nations officials, Bashir was taken to Darfur from Mazkhabad by Osman, who was her guardian at Mazkhabad. While working as a doctor at Mazkhabad, she lived in his house, and he was her distant relative. Osman omitted telling her father about the rape because so many women would try to keep such things a secret. But later she confesses to her father that she felt guilty, as if she had deliberately invited the soldiers on her. The evidence for fear of being treated as an outcast by their community finds echoes, both in Bashir and Sumiah. After being gang raped, Bashir escaped to her native village, where she locked herself up in her house for days, hiding from the world. She says that each of her family members reacted in their own way. Her brothers and father were ready to fight against the injustice done to her. Her mother's response to what had happened was one of emotional collapse. Her brothers and father were ready to fight against the injustice done to her.

In the case of both these women, we can see them in a state between subject and object, i.e., abject. Even though both of them were subjected to rape, they didn't want to be objectified by people around them, so they kept it as a secret within them. Actually, they were victims of war rape (subject of rape), but they have to act as if nothing happened to them (not an object) so their state of mind is that of an abject between subject and object. This exemplifies the state of liminal space, someone who is "in-between," put forward by Julia Kristeva in her book *Powers of Horror*.

Kristeva Avers says in her essay that the abject is someone who is dirty, improper, or unclean. The treatment of the female body as unclean filth and improper can be seen in Sumiah's descriptions of gang rape. While attacking and

raping the teacher and her forty students, Miss Sumiah says, “Before they left, they spat on us and urinated on us” (Bashir 257). Arabs treated them as abjects to make them aware that “Sudan is for the Arabs. It is not for black dogs and slaves” (Bashir 258).

Abject is what is thrown away or rejected, but which never gets totally banished from consciousness in spite of its rejection. In some cases, abjected persons are always border lined because their psyches constantly dance on the boundary between what they have and have not excluded. In this memoir, the Zaghawa people are considered as abjects by Arabs and throughout the novel, Arabs are trying to reinforce a feeling in the Zaghawas about their inferiority. Even when both Sumiah and Bashir were raped, they felt themselves as thrown away or rejected. It is often thought that an entire community feels violated when its female members are violated by the enemy. This idea is particularly relevant to the symbolic meaning of wartime rape, since these military logics see the violation of a woman’s body as symbolising the defeat of a nation. This is in one sense referred to as abjection by Kristeva.

In this paper, various aspects of the term “abject”, the theory of Abjection and its application in the memoir have been examined. The themes addressed in this study are interconnected and can be related to the society around us. We are living in a post-truth world in which we find it difficult to distinguish between right and wrong. History, which was said to be the story of man, shifted its wider meaning and became ‘his’ story. Later, gender became a common denominator to define superiority and inferiority. The dominant forces started operating their power politics on the weaker sections, which resulted in their subjugation. The system of right and wrong was formed later to rule the other. Right always sided with the one who had power, and the people who raised their voice against the injustice of subjugation became the subjects of society. Halima got raped by

Janjaweed soldiers because she reported the incident of gang rape to UN officials. In our society, rape and trauma have started taking up major portions of newspaper columns. We find it difficult to accept what is happening around us. The same is the case with the protagonist of the memoir *Tears of the Desert* Halima Bashir. She finds it difficult to cope with the consequences of war, so she decides to react against the injustices done by Janjaweed Arab militants to her community. She feels it is necessary to bring out what happened to her and her community to prevent further attacks. This resulted in her memoir *Tears of the Desert* co-authored with Damien Gavin Lewis.

In these times too, where attacks towards women are never on the decrease, this article hopes to open a space to reconsider the ideals that govern every society. Despite the campaigns, the way a victim is treated is not much different from the characters in the memoir. Every rape, torture, or such incident may be followed by protests or agitations against it, but time matters. It soon dies out or is replaced by another, and what solely remains is the trauma the victim has undergone. The way a victim is treated could be the same as Kristeva's notion of abject. Another relevant issue is the way narratives are made. If the victim is silenced, chances are that the issue may get distorted by those in power. It is always crucial to ensure that every girl or woman receives the space they deserve. To offer them chances should always be the priority. This paper offers supplemental perspectives on the current debates on women-related issues as well as the collective trauma of war and conflict inflicted on ethnographic zones all over the world.

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## Comparative Study of Consumption and Saving Habits of Keralites and Migrant Workers in Ernakulam District

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### ABSTRACT

This study delves into the spending and saving behaviors of individuals in Kerala, India, specifically examining the disparities between local Keralites and migrant workers. Utilizing a sample of 80 participants, the research employs Chi-square tests to reveal significant associations. The findings indicate that, while both groups prioritize essentials such as food and housing, migrant workers consistently save more each month, amounting to an average of 7450 rupees. Graphs visually represent the distribution of income, allocation of expenses, and financial literacy levels, providing clear insights. Notably, both Keralites and migrants allocate a substantial portion of their income to "Food" and "Housing," with Keralites displaying a greater emphasis on "Education." The study underscores the importance of tailored financial policies for both groups, emphasizing shared financial priorities amidst their unique circumstances.

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## **Introduction**

Over the years, India has seen changes in consumption due to urbanization, a growing middle class, and technology. While people traditionally saved a lot, younger generations influenced by globalization are leaning towards spending more, raising concerns about long-term financial security.

The study focuses on Kerala, a state with a unique socio-economic structure. It compares the consumption and saving habits of native Keralites and migrant workers. Keralites, known for sustainable living, prioritize quality over quantity and value traditional practices. On the other hand, migrant workers, seeking better opportunities, face uncertainties in income and prioritize immediate needs due to the informal nature of their work. The study uses surveys from rural and urban areas to analyze consumption patterns in food, housing, transportation, and lifestyle choices. By understanding the differences and similarities, the research aims to provide insights for policymakers and financial institutions to tailor products and services to the specific needs of Keralites and migrant workers. Addressing factors hindering effective saving practices can contribute to economic growth and stability.

The research aims to uncover the factors shaping their spending patterns, financial behaviors, and savings practices, providing insights into the dynamics of these distinct groups. The study concentrates on the working and living conditions of migrant laborers in Ernakulam, exploring the vulnerabilities and challenges they face. The motivation for this research stems from the noticeable increase in workers from other states across Ernakulam, even in remote areas. Understanding the reasons for this migration and examining their living and working situations is a key aspect of the study. The ultimate goal is to contribute valuable insights into the financial behaviors of both Keralites and migrant workers in Ernakulam District.

Ernakulam district, situated in the southwestern coast of India, is not only a bustling economic hub but also a melting pot of diverse cultures and communities. This diversity is vividly reflected in the contrasting consumption and saving habits of its residents, particularly between the native Keralites and the migrant workers who have come to call this region home. This article delves into the intricate differences and similarities in how these two groups manage their finances, shedding light on their spending patterns, savings behavior, and the socio-economic factors that influence these habits. As Ernakulam continues to evolve as an economic and cultural hub, bridging these differences through targeted policies and initiatives can promote financial inclusion and enhance the overall well-being of its residents, both native and migrant alike.

### **Objectives of the study**

#### **Primary Objective:**

- Analyze and compare the monthly expenditure patterns of Keralites and migrant workers in Ernakulam district.

#### **Secondary Objectives:**

- Identify differences and similarities in how Keralites and migrant workers allocate their income across various expenditure categories, including food, housing, transportation, healthcare, education, and entertainment.
- Assess the level of financial literacy among Keralites and migrant workers in Ernakulam district and examine its impact on their consumption and saving behavior.

## **Review of Literature**

In 2014, a study conducted by Benjamin Zeitlyn and Priya Deshingkar titled “Internal and regional migration for construction work” examined the phenomenon of internal migration for construction labor in developing countries. The working paper evaluates existing literature and indicates that such migration can result in both poverty alleviation and, conversely, exacerbation of poverty.

In 2015, Vijayalakshmi.V conducted a study on “Migrant workers and social security benefits,” which highlighted that the census of India is likely the sole data source available for information on migrant workers in the country. Surprisingly, no government agency maintains records of the movement of migrant laborers or workers within the country. The study found that migrant workers are predominantly employed in the construction sector and are protected by the Interstate Migrant Workmen (Employment and Regulation) Act of 1979.

The research article titled “Consumption Pattern and Its Influence on Lifestyle among IT Professionals in Kerala,” authored by Dr. Lekshmi S. Kaimal, presents a study that examines the consumption behavior and its impact on the lifestyle of IT professionals in the state of Kerala. The study focuses on the burgeoning IT sector, which is known for its modern high-tech jobs that appeal to educated youths due to high salaries and quality working environments.

Dilip Saikia (2015) conducted a study on migrant workers in Kerala, examining their socio-economic conditions, income, consumption, savings pattern, and nature of work. The main reasons for migration to Kerala were identified as poor economic conditions in their native place, better employment opportunities and higher wage rates in Kerala.

Shalina Susan Mathew (2011) analyzed the impact of labour force participation of Indian women on the consumption expenditure of their households. The study found that non-economic factors had a stronger influence on time-saving consumption expenditure in working-wife households compared to non-working wife households.

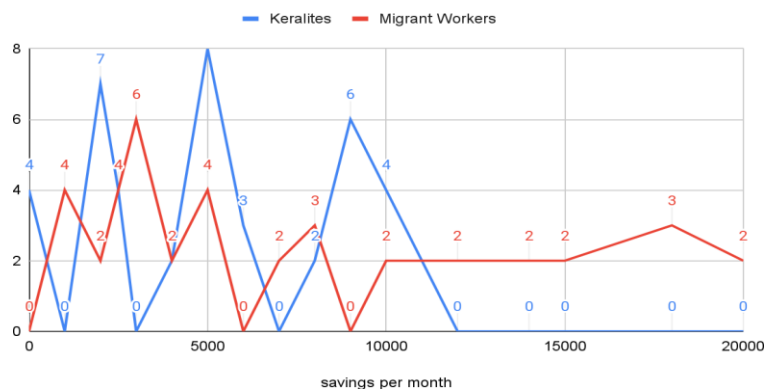
Martin Patrick (2015) examined consumption and saving patterns in urban households, with a focus on the Fishermen Community. Reforms, growth in consumer goods industries, and market-oriented government policies were found to contribute to changes in consumption patterns and increased well-being.

Mr. Firos Khan (2019) studied the saving and investment habits of salaried class people in Kerala. The study emphasized the importance of understanding core investment concepts and conducting a thorough analysis of options to create a portfolio that maximizes returns while minimizing risk exposure.

## **Methodology**

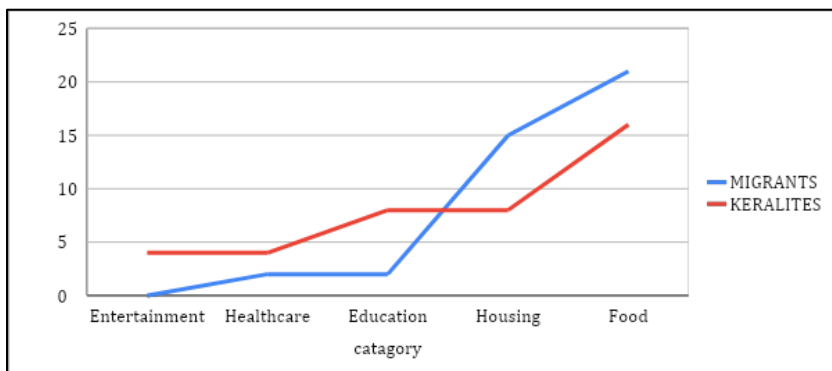
Using simple random sampling, a sample size of 80 participants was selected, including 40 v Keralites and 40 migrant laborers (both male and female) working together in various sectors. Primary data was collected through a well-structured schedule, involving direct visits to participants' work sites and residences. Secondary data was sourced from publications such as books, articles, newspapers, magazines, journals, and websites. The data collected, entirely quantitative in nature, was analyzed and presented through structured tables and graphical representations to fulfill the research objectives.

### Savings Patterns of Keralites and Migrant Workers



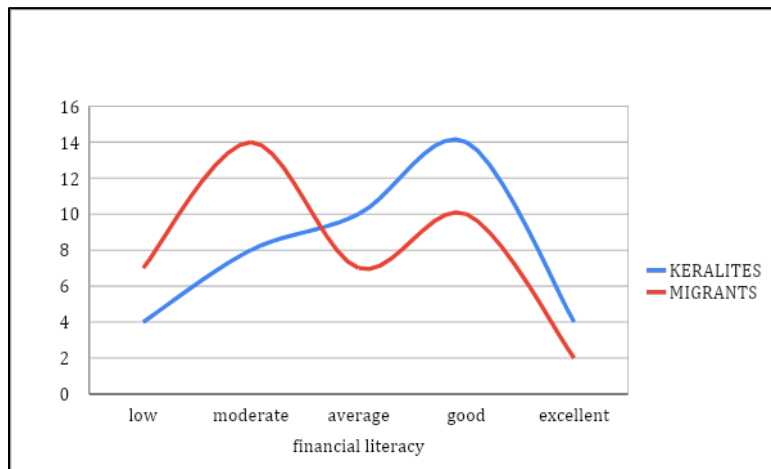
Keralites have a mean savings of 5000 rupees per month, while migrant workers have a higher mean savings of 7450 rupees per month. Saving habits among Keralites are deeply ingrained in cultural norms and economic stability. Additionally, government policies promoting financial literacy have bolstered a culture of saving among the local population. Conversely, migrant workers often face financial constraints due to lower wages and limited job security. Their saving habits are characterized by remittances sent to family members in their hometowns, often through informal channels. Despite these challenges, migrant workers exhibit disciplined savings behavior, driven by the desire to improve their economic circumstances and provide for their families.

### Allocation of Highest Percentage of Income Distribution:



Both migrants and Keralites prioritize basic needs, such as “Food” and “Housing,” which are reflected in their higher allocation percentages. Keralites allocate a larger portion to “Education,” potentially highlighting their commitment to educational advancement and development. Consumption patterns among Keralites, are characterized by a blend of traditional and modern influences. The lifestyle choices of Keralites often prioritize education, healthcare, and leisure activities such as festivals and cultural events. Traditional values emphasize savings for emergencies and future security, leading to a conservative approach towards spending. In contrast, migrant workers in Ernakulam district, hailing from various states across India, often have different consumption priorities shaped by their temporary or semi-permanent status. Their spending tends to focus on essentials such as food, housing, and remittances back to their families. Many live in shared accommodations and participate in communal dining, which influences their expenditure on personal necessities.

### Financial Literacy Distribution



The table suggests that when it comes to understanding financial matters, migrant workers are generally less knowledgeable than Keralites. More migrant workers

fall into the lower levels of financial literacy (low and moderate), while Keralites tend to be in the higher categories (average, good, and excellent).

Financial knowledge, which encompasses the understanding and application of financial concepts and tools essential for making informed decisions regarding personal finances, is a key factor in determining spending and saving habits among both Keralites and migrant laborers in Ernakulam district. This evaluation seeks to examine the current state of financial knowledge among these groups and its effects on their financial practices. Present Situation of Financial Knowledge within the Keralite community, the degree of financial knowledge varies widely, influenced by elements like education, job status, and exposure to financial institutions.

Urban dwellers and those in formal employment typically display higher financial knowledge due to increased access to financial education programs, banking services, and investment opportunities. However, in rural areas and among lower-income populations, financial knowledge might be lacking, marked by a limited understanding of savings options, investment choices, and strategies for financial planning. Migrant laborers, on the other hand, encounter significant obstacles in terms of financial knowledge. Many originate from rural settings with minimal formal education and work in sectors such as construction, hospitality, and domestic services where access to financial education and formal banking services is limited. This deficiency in financial knowledge can impede their ability to make well-informed decisions regarding savings, investments, and the management of their earnings. Effects on Spending Patterns Keralites with higher financial knowledge tend to exhibit more careful spending habits. They are better equipped to manage their finances, allocate funds to essential needs like education and healthcare, and make informed decisions regarding discretionary spending.

Additionally, understanding concepts like interest rates, inflation, and diversifying investments allows them to make wise financial choices, contributing to long-term economic stability and resilience.

Conversely, migrant laborers with lower financial knowledge may find it challenging to manage their spending effectively. Their spending habits often focus on immediate necessities such as food, housing, and remittances, without considering long-term financial objectives or the impact of inflation and fluctuating earnings. This approach can lead to financial instability and difficulty in breaking free from the cycle of low savings and unstable financial conditions. Effects on Saving Practices Financial knowledge plays a crucial role in shaping saving behaviors among both groups. Informed Keralites are more inclined to engage in consistent saving habits, diversify their savings across various financial instruments like savings accounts, fixed deposits, and mutual funds, and plan for future financial goals such as education expenses, retirement, and emergencies. This disciplined approach to saving enhances personal financial security and wealth accumulation over time. In contrast, migrant laborers with limited financial knowledge may resort to informal saving methods or overlook saving altogether. Despite earning income, their lack of understanding about formal savings options and investment opportunities may hinder their ability to accumulate financial reserves and achieve financial independence. This perpetuates a cycle of financial insecurity and reliance on remittances instead of fostering long-term financial stability.

Improving financial literacy among both Keralites and migrant workers in Ernakulam district is essential for fostering inclusive economic growth and enhancing individual financial well-being. Policymakers, NGOs, and financial institutions can play a pivotal role by implementing targeted initiatives such as:

**Financial Education Initiatives:** Launching detailed financial literacy programs designed for various groups, covering fundamental financial knowledge, budgeting, saving, and investment approaches.

**Expanding Access to Official Financial Services:** Encouraging the use of banking facilities, savings accounts, and reasonable loan options to encourage the adoption of formal saving habits among migrant workers and marginalized communities.

**Partnership with Employers:** Working with companies in areas with a large number of migrant workers to offer financial education sessions and support for payroll savings schemes.

**Community Involvement:** Connecting with local communities through events, talks, and online resources to increase understanding of financial planning and management.

**Policy Support:** Advocating for policies that promote financial inclusion, consumer protection, and the development of accessible financial products and services for all residents of Ernakulam district.

By enhancing financial literacy levels among Keralites and migrant workers, Ernakulam district can empower individuals to make informed financial decisions, strengthen household savings, and contribute to sustainable economic development. Investing in financial education today can pave the way for a more financially secure and resilient future for all residents of the district.

## **Conclusion**

In conclusion, the study sheds light on the distinct yet interconnected saving and consumption habits of Keralites and migrant workers in Ernakulam District. The findings highlight commonalities such as a shared emphasis on basic needs, reliance on public transport, and the preference for saving through bank accounts.

However, differences emerge in education levels, job satisfaction, and migration reasons. Migrant workers, despite facing challenges, display a commendable commitment to saving, with higher average savings than Keralites. The study emphasizes the need for tailored policies that address the unique circumstances of both groups, promoting financial literacy, fair labor practices, and creating opportunities for economic growth. Overall, while their backgrounds and experiences may differ, Keralites and migrants share fundamental financial priorities, underlining the importance of informed financial decision-making, stability, and future planning for both communities.

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## Occupational Stress and Turnover Intention among Health Care Workers in Kerala

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| <b>Article Info</b>  | <b>ABSTRACT</b>   |
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| <p><b>Article history:</b><br/>Received Month: Oct. 2023<br/>Revised Month: Jan. 2024<br/>Accepted Month: Mar. 2024</p> <hr/> <p><b>Keywords:</b><br/>Occupational stress,<br/>Turnover intention,<br/>Healthcare workers, Job<br/>satisfaction, Career<br/>prospects.</p> | <p>Occupational stress among healthcare workers has become increasingly significant due to advances in technology, night calls, lack of recognition, and the demanding nature of the healthcare environment. This study explores the factors contributing to occupational stress and their impact on the turnover intention among healthcare workers in Kerala. By utilizing both primary data from 100 healthcare workers through a structured questionnaire and secondary data from various sources, the study identifies key stressors such as lack of career prospects, heavy workload, night calls, and family commitments. The study employs factor analysis and multiple regression to determine the most relevant stress factors and their relationship with turnover intention. Results indicate that factors like lack of career prospects, workload, and organizational climate significantly influence the turnover intention among healthcare workers. The findings suggest that these stressors lead to high occupational stress, prompting many healthcare workers to consider leaving their jobs. Recommendations include implementing stress relief mechanisms, improving communication between management and staff, and creating a supportive work environment to mitigate stress and reduce turnover. The study underscores the need for healthcare institutions to address occupational stress proactively to retain skilled workers and maintain high-quality patient care.</p> |

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## **Introduction**

Advances in technology, night calls, non-recognition, the office environment, organization's attitudes and noncooperation by co-workers, income disparities, a lack of essential facilities, and personal problems are all factors for work stress spreading across all professions, with healthcare workers being particularly vulnerable. The nature of the health sector, the complexity of their service, existing workplace limits, modern-day requirements, the necessity for communication, and full knowledge, demand for communication, and knowledge of advanced inventories in the medical field all cause stress in them, resulting in poor service, absenteeism, dissatisfaction and eventually long leave or resignation. People are well aware of stress, which is sometimes referred to as pressure. They consider it more than the obligation as well as the impact on their health. Although there are several sources of knowledge on stress, we are still unable to comprehend it completely.

Healthcare personnel, like any other member of society, are surrounded by the modern surroundings and electronic devices of the twenty-first century. Computers, smartphones, memory cards, and earphones, among other devices, enslave her/him. Life looks to be more complicated than it has ever been. We are not suited to meet the demands of today's world. Employees in the healthcare sector are constantly under pressure, and because of situations, must work with computers to provide services to patients and manage the organization's accounts among other things. At work, situations put them under a lot of stress. These employees play a critical role in providing high-quality service to the public. They must personally look after everything in the hospital while also discharging their service to the patients with great patience; whatever the situation, they must remain with them, along with the patient's caretakers, while also interacting with other hospital

faculties such as management, doctors, medicine, drivers, and helpers. Apart from that, they must also be equipped with the necessary computer, communication, and medical skills to meet the demands of this technological period. They are more stressed as a result of all of these circumstances. In today's world, professional stress is very frequent. The nurses who work in this sector are always stressed for many reasons. Employees in this healthcare field are dealing with issues such as job stress, coping, and burnout. Occupational stress is undoubtedly more costly to businesses in terms of absenteeism, productivity loss, and healthcare expenditures. Staff conflicts, recruitment and retention initiatives, frequent turnover, and a lack of job opportunities are all factors to be considered.

### **Review of Literature**

**Asuzu (2004)** recognized the effect of the stress from shift work and the coping strategies used by the nurses who were working in the University College Hospital, Ibadan in Nigeria. The study reveals that there are many factors influencing work. The shift work is very stressful. Many coping skills are used to resolve their stress. There is no limitation in age or seniority for the stress. Positive coping skills are used for negative kinds of stress. Some of them use alcohol, and drugs to reduce stress. However, positive coping skills are very essential for resolving stress. Some of the nurses are required to be counselled on positive coping skills. **Boey (1999)** conducted a study on the role of coping strategies and family relationships in decreasing the effect of job stress among nurses.

The result revealed that when the nurses feel work stress, if they use coping methods for the stress, they have high job satisfaction. However, those who reported have less satisfaction with their job, they are less use of coping skills with stress. Family support plays a major role in decreasing stress and improving job satisfaction. **Cohen (1955)** focused on nurses who work in hospital administration

and face work sector stress. This kind of stress can cause a major negative effect on their psychological and physiological health. The result also focused on how stress is significantly correlated with nurses' increased health concerns, depression symptoms and anxiety, interpersonal relationships and job satisfaction. **Donat, Neal & Addleton (1991)** conducted a study to identify the situational sources of occupational stress among employees in hospital settings and found that situational sources such as confusion, anxiety, depression, staff conflict regarding duties, unfair work conditions, lack of respect from co-workers, lack of support from administration, inadequate care, lack of control over treatment decisions, working with the uncooperative residents, and inability to control the behaviour of residents were the eight main factors affecting occupational stress.

**Goleman (1998)** found that the sensitivity of physicians towards the patient's emotions led to more successful treatments as compared with physicians who showed less sensitivity to their patients' emotions. It was also noted that patients generally feel uncomfortable and anxious when they want to visit their physician with less sensitivity. Often, they are unable to ask the questions that they want because of the interruptions by the physician which hesitates the patient to proceed with other questions in mind. Good communication is the key to a good physician-patient relationship. **Karthikeyan & Babu (2015)** studied "Workplace stress in health care workers. Research on selected multi-specialty hospitals in Thiruvarur District of Tamil Nadu" and reported occupational sources of stress as work overload, time pressure, personal income, and difficulty of patients. In addition, a variety of personal family and social factors were also identified as the least stressful stressors. **Schaufeli & Enzmann (1998)** analysed mean burnout scores of various professions, physicians, including nurses and mental health professionals, using more than 70 U.S. studies published between 1979 and 1988.

They found that, compared with physicians, nurses' experience slightly less emotional exhaustion, but much less depersonalization and personal accomplishment.

### **Significance of the Study**

In the modern era, the relevance of the healthcare sector is increasing. The study prioritises low-level healthcare workers and their challenges, which have not previously gained as much attention. Therefore, the study will be a significant attempt at understanding the stress level and turnover intention of health care workers. The findings and valuable insights of the study will enable hospital management and policymakers to adopt necessary measures to reduce the turnover intention among healthcare workers in Kerala.

### **Scope of the Study**

Stress is a common occurrence in everyday life, as well as a natural human phenomenon and an element of human life. Stress is not a problem that only affects one person. The present study focuses on the stress level and influence of occupational stress on the turnover intention among healthcare workers in Kerala.

### **Statement of the Problem**

Stress is an inherent factor present in every profession, even though the degree of stress varies according to the nature of each profession. Health sector employees undergo a high level of stress compared to other professions. Recent studies show that the turnover rate among healthcare workers is increasing. This study aims to find out the factors that lead to job stress among healthcare workers and how occupational stress affects the turnover intention of healthcare workers.

### **Objectives of the Study**

- To assess the level of occupational stress perceived by the healthcare workers.
- To study the influence of occupational stress on turnover intention among healthcare workers.

### **Hypothesis of the Study**

H0: There is no significant relation between stress factors and turnover intention among healthcare workers

H1: There is a significant relationship between stress factors and turnover intention among healthcare workers.

### **Methodology**

Both primary and secondary data were collected for the study. Primary data was obtained from a hundred healthcare workers in Kerala using a structured questionnaire by snowball sampling method. Secondary data were gathered from various sources like articles, government reports and books.

## Analysis and Interpretation

**Table 1.1 Job-related factors and relative stress level**

| Factors                            | LEVEL OF STRESS |            |         |           |                |
|------------------------------------|-----------------|------------|---------|-----------|----------------|
|                                    | Very high level | High level | Neutral | Low level | Very low level |
| Lack of career prospects           | 18              | 35         | 25      | 17        | 5              |
| Morale and organizational climate  | 7               | 26         | 31      | 24        | 12             |
| Having too much work               | 16              | 31         | 29      | 18        | 6              |
| Night calls                        | 21              | 27         | 22      | 24        | 6              |
| Ethical issues                     | 23              | 23         | 20      | 23        | 11             |
| Lack of reward and recognition     | 22              | 26         | 22      | 26        | 4              |
| Family commitments                 | 19              | 30         | 17      | 23        | 11             |
| Inadequate feedback on performance | 11              | 26         | 31      | 23        | 9              |
| Insufficient resources to work     | 22              | 16         | 26      | 28        | 8              |

Source: Primary data

**Interpretation:** The above table shows that 18% of respondents experienced a very high level of stress due to the factor of lack of career prospects. 35% experienced a high level of stress, 25% had a neutral level of stress, 17% had a low level of stress and the last 5% had experienced a very low level of stress. The majority (31%) of respondents had a neutral level of stress concerning the factors of moral and organizational climate. 31% of respondents faced high levels of stress due to the factor of having too much work. In the case of night calls, 21% had a very high level of stress, 27% had a high level of stress, 22% had a neutral stress level, 24% had a low level of stress and 6% had a very low level of stress. 23% of respondents experienced a very high level of stress, the next 23% had a high level of stress, 20%

had a neutral stress level, the next 23% had a low level of stress and 11% experienced a very low level of stress in the case of ethical issues. An equal no. (26) of respondents marked high-level stress and low-level stress in the case of the factor lack of reward and recognition. The majority of respondents marked high levels of stress due to family commitments. The stress level of most of the respondents was neutral for the factor of inadequate feedback on performance. Most people experience low levels of stress due to insufficient resources to work.

**Table 1.2: Analysing the frequency with which workers consider leaving their job**

The data below shows how often the respondents considered leaving their jobs due to high-stress levels.

|           | <b>Frequency</b> | <b>Percentage</b> |
|-----------|------------------|-------------------|
| Always    | 22               | 22%               |
| Usually   | 21               | 21%               |
| Sometimes | 29               | 29%               |
| Rarely    | 19               | 19%               |
| Never     | 9                | 9%                |

Source: primary data

**Interpretation:** The above table shows how frequently healthcare workers consider leaving the job due to high stress levels. From the graph, it is understood that 22% of respondents always, 21% of respondents usually, 29% of respondents sometimes, 19% of respondents rarely, and others never consider leaving the job.

**Table 1.3: mean score of factors relating to stress**

| <b>Factors</b>                    | <b>Mean score</b> |
|-----------------------------------|-------------------|
| Lack of career prospects          | 3.52              |
| Morale and organisational climate | 2.98              |

|                                    |      |
|------------------------------------|------|
| Having too much work               | 3.26 |
| Night calls                        | 3.35 |
| Ethical issues                     | 3.28 |
| Lack of reward and recognition     | 3.33 |
| Family commitments                 | 3.27 |
| Inadequate feedback on performance | 3.08 |
| Insufficient resources to work     | 3.23 |
| OVERALL MEAN SCORE                 | 2.93 |

*Source: Primary data*

**Interpretation:** The table presents the mean scores of various factors related to stress among healthcare workers, derived from primary data. The scores range from 1 (low stress) to 5 (high stress).

Lack of career prospects (3.52): This factor has the highest mean score, indicating that healthcare workers feel significantly stressed by the limited opportunities for career advancement. This suggests a strong need for better career development programs and clearer pathways for professional growth.

Morale and organizational climate (2.98): The relatively lower score for this factor suggests that while the organizational environment does contribute to stress, it is not as significant as other factors. However, it still indicates room for improvement in fostering a positive work culture.

Having too much work (3.26): The heavy workload is a notable stressor, pointing to the need for better workload management and possibly increased staffing to distribute tasks more evenly.

Night calls (3.35): Night shifts are a significant source of stress, highlighting the challenges of irregular working hours in healthcare. Strategies to mitigate the impact of night calls, such as adequate rest periods and support, could be beneficial.

Ethical issues (3.28): Ethical dilemmas are moderately stressful, suggesting the need for clear guidelines and support systems to help healthcare workers navigate these challenges.

Lack of reward and recognition (3.33): The stress associated with inadequate recognition indicates that healthcare workers feel undervalued. Implementing more robust recognition and reward systems could alleviate this stress.

Family commitments (3.27): Balancing work and family commitments is a significant stressor, underscoring the need for policies that support work-life balance, such as flexible working hours and family leave.

Inadequate feedback of performance (3.08): This moderate score indicates that insufficient performance feedback is a stress factor, suggesting the need for more regular and constructive feedback mechanisms.

Insufficient resources to work (3.23): The lack of adequate resources is a notable stressor, indicating the need for better resource allocation and support to ensure healthcare workers can perform their duties effectively.

The overall mean score of 2.93 suggests that, on average, healthcare workers experience moderate stress across these factors. The findings highlight key areas where healthcare institutions can focus their efforts to reduce occupational stress, such as improving career prospects, managing workloads, providing adequate resources, and enhancing recognition and feedback systems. Addressing these factors can help improve job satisfaction and reduce turnover intention among healthcare workers.

**Table 1.4: Mean score of factors relating to turnover intention of workers**

| <b>Factors</b>   | <b>Mean score</b> |
|--|-------------------|
| The frequency with which workers consider leaving their job  | 3.29              |
| How frequently do workers get frustrated when they are not allowed to achieve personal work-related goals? | 3.24              |
| Likelihood of workers to accept another job with the same compensation                                     | 3.17              |
| OVERALL MEAN SCORE   | 3.23              |

*Source: Primary data*

**Interpretation:** The table presents the mean scores of various factors related to turnover intention among healthcare workers, derived from primary data. The scores range from 1 (low intention to leave) to 5 (high intention to leave).

The frequency with which workers consider leaving their jobs (3.29): This factor has the highest mean score, indicating that healthcare workers often think about leaving their current jobs. This suggests a significant level of dissatisfaction and a strong inclination towards job turnover within the workforce.

How frequently do workers get frustrated when they are not allowed to achieve personal work-related goals (3.24): The frustration stemming from not being able to achieve personal work-related goals is a notable factor contributing to turnover intention. This highlights the importance of providing opportunities for professional development and personal achievement to retain employees.

Likelihood of workers to accept another job with the same compensation (3.17): The relatively high score for this factor suggests that many healthcare workers would consider leaving their current job for another one that offers the same level of compensation. This indicates that factors other than salary, such as job

satisfaction, work environment, and career development opportunities, play a crucial role in their decision to stay or leave.

The overall mean score of 3.23 indicates a moderate to high level of turnover intention among healthcare workers. These findings underscore the need for healthcare organizations to address the underlying causes of dissatisfaction that drive employees to consider leaving their jobs. Key areas of focus should include enhancing job satisfaction, providing clear career advancement opportunities, recognizing and rewarding achievements, and improving the overall work environment. By addressing these factors, healthcare institutions can work towards reducing turnover intention and retaining their workforce.

**Table 1.5: Factor analysis**

Factor analysis is conducted to extract the most relevant stress factors among nine factors.

|                                    | <b>Initial</b> | <b>Extraction</b> |
|------------------------------------|----------------|-------------------|
| Lack of career prospects           | 1.000          | .635              |
| Morale and organisational climate  | 1.000          | .319              |
| Having too much work               | 1.000          | .516              |
| Night calls                        | 1.000          | .619              |
| Ethical issues                     | 1.000          | .698              |
| Lack of reward and recognition     | 1.000          | .392              |
| Family commitments                 | 1.000          | .466              |
| Inadequate feedback on performance | 1.000          | .433              |
| Insufficient resources to work     | 1.000          | .273              |

*Source: Primary data*

Factor analysis is conducted to extract the most relevant stress-related factors. After the analysis, the factors such as lack of career prospects, morale and organisational climate and having too much work have been extracted.

### Multiple Regression

The table given below shows the variables entered for conducting regression analysis. In this regression analysis, the dependent variable is the frequency with which workers consider leaving their jobs and the independent variables and stress factors. The dependent variable is in model 1, and the association between variables such as lack of career prospects and frequency of which workers consider leaving their job is studied. In model 2, the association between variables such as having too much work, lack of career prospects, morale and organisational climate and frequency of which workers consider leaving their job is studied.

**Table 1.6: Variables entered for regression analysis**

| Model | Variables Entered  | Variables Removed | Method |
|-------|--|-------------------|--------|
| 1     | Lack of career prospects <sup>b</sup>                                | .                 | Enter  |
| 2     | Having too much work, morale and organisational climate <sup>b</sup> | .                 | Enter  |

Source: computed from primary data

Dependent Variable: How often do you consider leaving?

**Table 1.7 Model Summary**

| Model | R     | R square | Adjusted R square | Std. Error of the estimate | Change statistics |          |     |     |               |
|-------|-------|----------|-------------------|----------------------------|-------------------|----------|-----|-----|---------------|
|       |       |          |                   |                            | R square          | F change | df1 | df2 | Sig. F change |
| 1     | 0.65  | 0.004    | -.006             | 1.245                      | 0.004             | .412     | 1   | 98  | 0.522         |
| 2     | 0.298 |          | .061              | 1.203                      | .085              | 4.474    | 2   | 96  | .014          |

Source: computed from primary data

- a. Predictors (constant). Lack of career prospects
- b. Predictors :( lack of career prospects, having too much work, morale and organisational climate.

**Table 1.8: Anova**

| <b>Model</b> | <b>Sum of squares</b> | <b>Df</b> | <b>Mean square</b> | <b>F</b> | <b>Sig.</b> |
|--------------|-----------------------|-----------|--------------------|----------|-------------|
| Regression   | .639                  | 1         | .639               |          |             |
| Residual     | 151.951               | 98        | 1.551              | .412     | .522        |
| Total        | 152.590               | 99        |                    |          |             |
| Regression   | 13.595                | 3         | 4.532              |          |             |
| Residual     | 138.995               | 96        | 1.448              | 3.130    | 0.29        |
| Total        | 152.590               | 99        |                    |          |             |

Source: computed from primary data

### **IN MODEL 1**

Regression is used to understand whether the factor of lack of career prospects leads to turnover intention among healthcare workers. The variables are tested at a 5% level of significance. As the sig. of model 1 is greater than 0.05 it is clear that the factor of lack of career prospects alone does not create turnover intention among workers.

### **IN MODEL 2**

Regression is used to understand whether the factors of lack of career prospects, having too much work, morale and organisational climate jointly create turnover intention among workers. Here, the sig. is less than 0.05, thus it is clear that these three factors jointly influence workers to leave their jobs. Therefore, we reject the null hypothesis and accept the alternative hypothesis.

### **Findings and Discussion**

- Lack of career prospects, heavy workload, night calls, and family commitments are those factors for which the majority of workers experience high levels of stress.

- Morale and organisational climate, and inadequate feedback on performance are factors for which most workers experience neutral levels of stress.
- Insufficient resources to work is a stress for which the majority of workers come across low levels of stress.
- Most of the respondents sometimes consider quitting their jobs due to high stress.
- The majority of respondents sometimes get frustrated when they are not allowed to achieve personal as well as work-related goals.
- 29 out of the total respondents are likely to accept another job with the same level of compensation.
- From the hypothesis test conducted, it is understood that factors related to stress create turnover intention among workers.

### **Suggestions for the Study**

- The hospitals should arrange proper facilities for interacting with their workers and to find the problems that they face.
- There must be stress relief mechanisms in every hospital.
- The management should monitor the turnover rate of workers on a timely basis.
- Arrange several programs as well as events for reducing the stress level and increasing the motivation level of healthcare workers.

### **Conclusion**

The study leads to the conclusion that most of the healthcare workers consider leaving their jobs due to high occupational stress. The lack of career prospects, night calls, ethical issues, and lack of reward and recognition are those factors with very high levels of stress. And there is only a very low level of stress for the factors morale and organisational climate. In a nutshell, the turnover

intention among healthcare workers can be reduced to a large extent by focusing on those factors that lead to high levels of occupational stress. The hospitals should provide more career prospects, reduce workload, and provide a favourable organisational climate to their employees.

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## Entrepreneurial Attitudes among College Students in Ernakulam: Awareness, Perception, and Motivation

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### ABSTRACT

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The present study attempts to analyze the awareness, perception, and motivational factors of entrepreneurship among college students in Ernakulam district, Kerala. In a quantitative research design, data were collected from a sample of 110 students at the undergraduate and postgraduate levels with the help of a structured questionnaire. The general perception obtained from the findings is that students positively perceive entrepreneurship as a potential career option. They also realize entrepreneurship's challenges, such as monetary constraints and risk factors. This study identifies key motivational drivers as the desire for independence, financial gain, and social contribution. No significant differences between genders were observed in entrepreneurial awareness, perception, and motivation. These findings help understand entrepreneurship education and could be used to design appropriate initiatives that inculcate the entrepreneurial spirit within young people.

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## **Introduction**

The idea of entrepreneurship includes the evolution of a firm from its inception to a profitable endeavor. Although the definition seems simple, carrying out entrepreneurial activities is much more complex. It entails a dynamic journey of risk identification, effective risk management, opportunity identification, and capitalization. The ultimate objective is to create value for the greater good of society and financial gain. (Doran et al., 2018; Kumar & Raj, 2019) revealed that entrepreneurship stimulates countries' economic growth. It implies that an enhancement of entrepreneurs in a country will drive the greater of the society's welfare and poverty alleviation (Halvarsson et al., 2018; Rantanen et al., 2015; Sutter et al., 2019)

To succeed, an entrepreneur has to be able to take an idea, be it a product or a service, and bring it into reality. Such an act will involve a set of abilities, resolve, and readiness to approach uncertainty. They are motivated by a passion for their concepts, which they must launch successfully before meeting individual users' demands.

The concept of entrepreneurship has outgrown the traditional business background and is now a very well-known term. This discipline has captured the interest of policymakers, economists, and university students. Further importance can be acknowledged because it is repetitively mentioned in international seminars and recognized that entrepreneurship directly hits economies, societies, and individuals. Interest from educators has led to its selection as one of the key research areas where it goes beyond the bounded impact of creating new ventures.

Though there is no defined list of traits that defines an entrepreneur, some common characteristics have been identified in successful entrepreneurs. These

traits include a variety of attributes, such as knowledge, skills, motives, mental ability, and the capability to establish well-defined goals. Other very important traits for entrepreneurs include handling confidential business matters, dealing with various people, communicating with others, and marshaling resources. In addition, they have technical expertise, can take risks, and have organizational and administrative abilities. Furthermore, they seek out opportunities actively with persistence, self-confidence, adaptability, and relentless work habits.

Successful entrepreneurs have been termed resilient, problem-solving, and firmly determined persons. Therefore, this study attempts to uncover the attitude towards and perception of entrepreneurship amongst undergraduate and postgraduate students in Ernakulam district in Kerala. We will shed some light on the entrepreneurial potential among the student population through an analysis of their various perspectives across a range of academic disciplines in areas such as commerce, science, and engineering. New policies for data collection from a wide-ranging diversity of students will be implemented for the research to understand what factors bear on acquiring the aspiration of becoming an entrepreneur and the way forward in implementing specific initiatives that would involve the next generation of innovators and business leaders.

### **Review of Literature**

Education is vital in enhancing students' abilities to promote business activities. Kim & Park and Nabi have demonstrated that entrepreneurship education has primary functions. First, entrepreneurship learning activities enable a transfer of knowledge, information, and experience from learning sources to students. Second, entrepreneurship education through field studies will inspire students to be successful people in the future. It is revealed that entrepreneurship education can

explain students' intention to be entrepreneurs through motivation, skills, social networks, and experience.

Entrepreneurship education also exponentially helps individuals acquire resources through knowledge and information transfer. For instance, when taking entrepreneurial learning, students will have the experience to build an engagement with peers to promote a business (Zeng & Honig, 2016). In addition to having a good entrepreneurial experience, students will also obtain critical suggestions regarding business activities. Lastly, motivation from peers, business actors, and teachers will help and support entrepreneurial activities.(Saptono & Wibowo, 2018) and (Ghina et al., 2017) focused on the features determining vocational students' entrepreneurial intention.

Individual characteristics play a significant role in shaping entrepreneurial intentions. Harun found that locus of control (the belief that one has control over one's life outcomes) and entrepreneurial self-efficacy (confidence in one's ability to start a business successfully) were significant predictors of EI among university students. The study conducted by Sahinidis et al. highlighted the potential indirect effect of gender on EI, suggesting that gender may influence EI through its impact on other factors. However, the role of gender remains inconclusive, with some studies reporting gender differences (Ponmani et al., 2014; Sanchez, 2012) while others found no significant effect (Joensuu-Salo et al., 2013).

The environment in which individuals operate also influences their entrepreneurial intentions. Harun emphasized the importance of social networks and access to capital as environmental factors that significantly impact entrepreneurial intentions. (Mushtaq et al., 2011) further underscored the role of

social networks, suggesting that stronger networks among students increase the likelihood of new venture creation.

Demographic and situational factors have also been explored for entrepreneurial intentions. Maino found that prior exposure to entrepreneurial activities through family businesses or employment in small businesses significantly influenced entrepreneurial intentions. Fatoki revealed that previous work experience was positively associated with entrepreneurial intentions among students. However, Khan found no significant influence of various socioeconomic factors (e.g., sex, religion, community, income level) on entrepreneurial intentions among students.

While the prior literature explains the inspirational role of entrepreneurship education, personal traits, and social network, as well as past experiences, it also overlooks how each factor influences the shaping of awareness and perceptions in the minds of college students towards entrepreneurship and hence which are most instrumental in choosing the pursuit of an entrepreneurial career.

### **Statement of the Problem**

In light of government schemes like "Make in India" and "Start-up India," a crucial research inquiry is the awareness level of college students in Ernakulam district about such programmes and entrepreneurship as a career option. What are the reasons for them deciding to pursue or reject entrepreneurship?

In this regard, the present study attempts to find answers to these questions through a comprehensive assessment of the level of awareness and perception of entrepreneurship among college students in Ernakulam district. This study will also probe into the factors that encourage or discourage students from engaging in entrepreneurial activities. This research, therefore, seeks to add to such an

uncovered understanding of the dynamics that will inform the development of effective programs and interventions by policymakers, education institutions, and support organizations toward nurturing an entrepreneurial spirit among young people and developing an active startup ecosystem within the region.

### **Objectives of the Study**

- To assess the level of awareness and perception of college students towards entrepreneurship
- To find out the motivational factors that influence students to take up entrepreneurship

### **HYPOTHESIS**

**Ha1:** There is a significant mean difference between males and females regarding entrepreneurship awareness.

**Ha2:** There is a significant mean difference between males and females regarding the perception of entrepreneurship.

**Ha3:** There is a significant mean difference between males and females regarding the motivational factors influencing entrepreneurship.

### **Research Methodology**

This study adopted a quantitative research design to explore the level of awareness and perception of college students towards entrepreneurship, as well as the motivational factors influencing their pursuit of entrepreneurial ventures. This approach was chosen due to its ability to collect numerical data and statistically analyze relationships between variables, providing objective insights into the research questions.

### **Population and Sampling**

The target population for this study comprised undergraduate and postgraduate students from colleges in Ernakulam District. A convenience sampling method was used to select the sample participants due to accessibility and feasibility considerations. The final sample size consisted of 110 respondents.

### **Data Collection**

The present research adopted an all-inclusive method of collecting data from both primary and secondary sources:

#### **Primary Data Collection**

A well-structured questionnaire was prepared to collect primary information from the 110 responding students. The self-administered, survey-based tool aimed to obtain information about students' level of awareness, perceptions, and attitudes toward entrepreneurship. Besides, the questionnaire also probed into the factors that motivated or discouraged student entrepreneurial activities.

#### **Secondary Data Collection**

An extensive literature review contextualized the primary findings. It provided a solid basis for the research by collecting secondary data from various sources, including academic publications, news and media, and other relevant sources. Such reports, publications, or online sources were consulted to understand the subject better.

### Analysis and Interpretations

**Table 1: Demographic Presentation of the Respondents**

| Measure                   | Values       | Frequency  | Percentage |
|---------------------------|--------------|------------|------------|
| Gender                    | Male         | 29         | 26         |
|                           | Female       | 81         | 74         |
|                           | <b>Total</b> | <b>110</b> | <b>100</b> |
| Age                       | 18-20        | 33         | 30         |
|                           | 21-23        | 62         | 56         |
|                           | Above 24     | 15         | 14         |
|                           | <b>Total</b> | <b>110</b> | <b>100</b> |
| Educational Qualification | UG           | 78         | 71         |
|                           | PG           | 32         | 29         |
|                           | <b>Total</b> | <b>110</b> | <b>100</b> |

(Source: Primary Data)

Table 1 summarizes the demographic profile of the respondents in this study. The sample size was 110, with a 74% and 26% female-male ratio, respectively. An analysis of the age distribution showed the highest proportion, 56%, when participants were between 21-23 years old, closely followed by 30% aged 18-20 years and 14% above 24 years of age. If considered from an angle of educational qualification, 71% were undergraduate students, and about 29% were pursuing postgraduate studies.

**Table 2: Awareness of Respondents towards Entrepreneurship**

| Measure  | N   | Mean | Std. Deviation |
|--|-----|------|----------------|
| Entrepreneurship means owning and managing a business.   | 110 | 4.05 | 1.18           |
| Entrepreneurship is about the application of personal qualities such as creativity, innovation, and imagination in business. | 110 | 4.15 | 1.187          |

|   |     |      |       |
|---|-----|------|-------|
| Entrepreneurship can be learned from your curriculum only.                  | 110 | 2.77 | 1.366 |
| Entrepreneurs should be backed by high educational qualifications.          | 110 | 3.02 | 1.306 |
| The basic requirement of entrepreneurship is finance.                       | 110 | 3.25 | 1.497 |
| I'm aware of the various entrepreneurial support schemes of the government. | 110 | 2.88 | 1.513 |
| I'm aware of the procedures for commencing a new business.                  | 110 | 3.08 | 1.533 |

(Source: Primary Data)

The survey identified the 110 respondents' awareness of the various aspects of entrepreneurship. While identification with the basic nature of entrepreneurship, which means owning/ managing a business and applying personal qualities, received a strong agreement with a mean of 4.05 and 4.15, respectively, the perception that it can be learned merely from the curriculum disagreed with a mean of 2.77. There was moderate agreement that educational qualifications are important to entrepreneurs and finance for entrepreneurs, with means of 3.02 and 3.25, respectively. On the other hand, knowledge of government support schemes and procedures for starting a business was quite low, with means of 2.88 and 3.08, respectively.

The standard deviations in the table indicate an extremely wide range of opinions on the part of the respondents about different dimensions of entrepreneurship. The higher standard deviations of statements that reflect learning entrepreneurship solely from curriculum  $SD = 1.37$ , the importance of educational qualifications  $SD = 1.31$ , need for finance  $SD = 1.50$ , awareness about government support schemes  $SD = 1.51$ , and awareness about procedures to start a business  $SD = 1.53$ , show a greater range in the opinions or experiences among the respondents

on these aspects. In contrast, the lower standard deviations for statements about the fundamental nature of entrepreneurship (SD = 1.18 and 1.19) reflect a greater consensus and, thus, a more common understanding of those concepts.

**Table 3: Perception of Respondents Toward Entrepreneurship**

| Measure   | N   | Mean | Std. Deviation |
|---|-----|------|----------------|
| Academic institutions should encourage students to consider entrepreneurship.         | 110 | 3.47 | 1.419          |
| Entrepreneurship can be considered a career option in today's globalized world.       | 110 | 3.63 | 1.262          |
| Entrepreneurship is a too-risky career.   | 110 | 3.11 | 1.144          |
| Difficult to get finance/loans for starting a new business venture.                   | 110 | 2.97 | 1.267          |
| Lack of finance is one of the main reasons why many students don't start a business.  | 110 | 3.39 | 1.279          |
| Lack of technical knowledge prevents students from starting a business.               | 110 | 3.10 | 1.263          |
| Entrepreneurship is a good way to make lots of money.                                 | 110 | 3.21 | 1.205          |
| Entrepreneurship is for people who have courage and ideas.                            | 110 | 3.34 | 1.229          |
| Entrepreneurs are largely responsible for new innovations, technologies and products. | 110 | 3.37 | 1.426          |
| Entrepreneurs do not care about environmental issues to a sufficient extent.          | 110 | 2.61 | 1.242          |

(Source: Primary Data)

Based on a sample of 110 respondents, the survey results generally hold a positive idea about entrepreneurship. Strongly agreeing with the statement, "Entrepreneurship is a viable career option in a globalized world today," the response was high, with  $M = 3.63$ , which strongly endorsed "Academic institutions encourage students toward entrepreneurship" at  $M = 3.47$  and  $SD = 1.419$ . Respondents acknowledged financial problems and a lack of technical knowledge

as startup barriers but considered entrepreneurship an opportunity for more personal income, with a mean of 3.21 and an SD of 1.205. The risk perception in entrepreneurship was fairly neutral; it rated 3.11 with an SD of 1.144. While 2.61, with an SD of 1.242, set up a disagreeing opinion about entrepreneurs ignoring environmental concerns, a very high opinion of entrepreneurs being contributors to innovation was found.

Notably, some variables have fairly high standard deviations, hence the widespread opinions from the respondents, meaning that the majority does not hold similar views.

**Table 4: Motivational Factors Toward Entrepreneurship**

| Measure   | N   | Mean | Std. Deviation |
|---|-----|------|----------------|
| Our own ideas turn into reality.  | 110 | 3.57 | 1.344          |
| It is beneficial to society to have a large enterprise.                       | 110 | 3.63 | 1.132          |
| Entrepreneurship helps with independent living.                               | 110 | 3.62 | 1.173          |
| Entrepreneurship supports having the liberty of being one's own boss.         | 110 | 3.51 | 1.163          |
| I prefer entrepreneurship to continue the family tradition of business.       | 110 | 2.95 | 1.136          |
| It is an opportunity to get rich.   | 110 | 3.13 | 1.033          |
| I can gain public recognition through entrepreneurship.                       | 110 | 3.19 | 1.137          |
| I get motivated by the success stories of successful entrepreneurs.           | 110 | 3.44 | 1.071          |
| I want to become an entrepreneur due to the lack of employment opportunities. | 110 | 3.02 | 1.196          |
| Entrepreneurship allows taking up challenging work.                           | 110 | 3.54 | 1.139          |

(Source: Primary Data)

Responses from the survey showed various motivational attitudes toward engaging in entrepreneurial activities. Respondents showed a strong affirmation of items reflecting the notions of bringing one's ideas to reality, with an M of 3.57 and SD of 1.344, and contributing to society through large enterprises, with an M of 3.63 and SD of 1.132. They also perceived entrepreneurship as an avenue to being independent (M = 3.62, SD = 1.173), having freedom, and being their own boss (M = 3.51, SD = 1.163). Financial gain (M=3.13, SD=1.033) and public recognition (M=3.19, SD=1.137) were identified to be motivators but to a lesser degree; continuing a family business tradition stood less motivating (M=2.95, SD=1.136) whereas lack of employment opportunities had a moderate influence on the same (M=3.02, SD=1.196). Interestingly, I also embrace challenging work (M=3.54, SD=1.139) and learn from the stories of successful entrepreneurs (M=3.44, SD=1.071) were also identified as prominent driving forces behind entrepreneurial aspiration.

The standard deviations ranged from 1.033 to 1.344 across the motivational factors. This relatively small range suggests a fair degree of concurrence among these respondents about their motivations to become entrepreneurs. In other words, although there was some dispersion of individual opinion, the general conclusion that can be reached is that there is some consensus about what matters in leading individuals toward entrepreneurial pursuits.

## Testing of Hypothesis

### Independent Sample T-Test

#### Hypothesis 1

Ho: There is no significant mean difference between males and females regarding entrepreneurship awareness.

H1: There is a significant mean difference between males and females regarding entrepreneurship awareness.

| Variable | Size | Mean   | SD    | T- Value | P- value |
|----------|------|--------|-------|----------|----------|
| Male     | 29   | 3.3498 | 0.861 | .261     | .795*    |
| Female   | 81   | 3.3016 | 0.827 |          |          |

*Note: \* denotes significant at 5 percent*

We accept the null hypothesis since the P-value is more than 0.05. The null hypothesis is accepted at a 5% significance level, concluding that there is no significant mean difference exists between males and females regarding entrepreneurship awareness.

#### Hypothesis 2

Ho: There is no significant mean difference between males and females regarding the perception of entrepreneurship.

H1: There is a significant mean difference between males and females regarding the perception of entrepreneurship.

| Variable | Size | Mean   | SD    | T- Value | P- value |
|----------|------|--------|-------|----------|----------|
| Male     | 29   | 3.0207 | 1.059 | -1.185   | .242*    |
| Female   | 81   | 3.2914 | 1.043 |          |          |

*Note: \* denotes significant at 5 percent*

We accept the null hypothesis since the P-value is more than 0.05. The null hypothesis is accepted at a 5% significance level, concluding that there is no significant mean difference exists between males and females regarding the perception of entrepreneurship.

### Hypothesis 3

Ho: There is no significant mean difference between males and females regarding the motivational factors influencing entrepreneurship.

H1: There is a significant mean difference between males and females regarding the motivational factors influencing entrepreneurship.

| Variable | Size | Mean   | SD    | T- Value | P- value |
|----------|------|--------|-------|----------|----------|
| Male     | 29   | 3.3103 | 0.940 | .744     | .242*    |
| Female   | 81   | 3.3765 | 0.910 |          |          |

*Note: \* denotes significant at 5 percent*

We accept the null hypothesis since the P-value is more than 0.05. The null hypothesis is accepted at a 5% significance level, concluding that no significant mean difference exists between males and females regarding the motivational factors influencing entrepreneurship.

## **Findings and Discussions**

The study's findings reveal that the students generally perceive entrepreneurship positively. They recognize it as a viable career option in today's globalized world and believe that academic institutions should encourage students to consider it. However, they also acknowledge the challenges associated with entrepreneurship, such as the difficulty in obtaining finance and the perceived risk involved.

The research also highlights the motivational factors influencing students' entrepreneurial aspirations. The desire to turn their own ideas into reality, contribute to society, and achieve financial independence are among the key motivators. The success stories of established entrepreneurs also play a significant role in inspiring students to pursue entrepreneurial ventures.

Interestingly, the study found no significant difference between male and female students regarding their awareness, perception, and motivation towards entrepreneurship. This suggests that gender does not play a major role in shaping entrepreneurial intentions among college students.

## **Conclusion**

In conclusion, this study provides valuable insights into the level of awareness, perception, and motivational factors influencing entrepreneurship among college students in Ernakulam district. The findings suggest that while students generally have a positive outlook on entrepreneurship, they also recognize the challenges involved. The study also highlights the importance of various motivational factors in shaping entrepreneurial aspirations, such as the desire for independence, financial gain, and social contribution.

The absence of significant gender differences in entrepreneurial intentions suggests that male and female students are equally likely to consider entrepreneurship as a career option. This finding has important implications for policymakers and educational institutions, suggesting that efforts to promote entrepreneurship should be targeted at both genders.

Overall, this study contributes to the existing body of knowledge on entrepreneurship education and provides valuable insights for policymakers, educational institutions, and support organizations seeking to foster an entrepreneurial spirit among young people. The findings can be used to develop effective programs and interventions that address the challenges and leverage the motivational factors identified in this study.

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2012)

## A Study on Financial Literacy among Working Women in Ernakulam District

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### ABSTRACT

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Financial literacy is knowledge related to financial instruments. In India, women are equally earnable like men, and they are financially independent. Financial literacy is the ability to manage and invest money in financial sources. Low financial literacy may cause financial loss in an individual's life, which affects the family as well. In this study, financial literacy among working women has been analysed with the objective to find the financial literacy level among working women and to analyse the most preferred investment instrument. By using the convenient sampling method, 80 samples were selected from working women in various fields like the textile industry, information technology, fashion, teachers, professors, and health sector. A well-structured questionnaire is used to collect primary data, and SPSS software is used to analyse the data.

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## **Introduction**

Women play a major role in a country's economy. In a country like India, women are equally earning compared to men. Financial literacy is knowledge related to investment, whether it can be a long-term investment or short-term in nature, but still, women are financially independent as they earn, but it depends on family decisions as investment is considered; they have to get permission from their family members. On the other side, women are very curious about future plans; they save money and invest knowing or knowingly. In this study, an attempt has been made to analyze the level of financial literacy and the most preferred investment instrument or source. There are most popular investment avenues available in India, like provident funds, life insurance, real estate, national saving certificates, gold and precious stones, equity, fixed deposits, mutual funds, and savings schemes in post offices, etc.

## **Review of Literature**

**Ganapathi (2010)** studied that various small savings schemes were mainly meant to help the small investors, and investing their amount in post office deposits provides safety and security for the amount invested. Proper advertisements must be made for Post Office Savings Schemes so that even a layman could know about these schemes and deposits can be increased.

**Mathivannan and etc. (2011)** concluded that school teachers are actively using post office small savings as one of the best alternatives to diversify their portfolios.

**Jain (2012)** also found that most of the school teachers are saving their money as deposits in small saving schemes for their children's education, marriage, and as security after retirement.

Similarly, **Ganesan (2012)** is of the view that the majority of the working women are being conservative by nature and are saving and investing to have a safe future.

### **Objective of the Study**

Following are the major objectives of the study:

- To analyze the level of financial literacy among working women in Kochi City.
- To know the sources of information about the various investment avenues among working women.
- To find the most preferred Investment Avenue among the working women.

### **Statement of Problem**

Financial literacy is a keyword that is used to denote the understanding of financial matters. In order to manage financial resources effectively and efficiently, appropriate knowledge and skills are required. This includes making personal financial decisions in the areas of investing, insurance, retirement, tax planning, etc. Having a lower level of financial literacy can lead to taking financial decisions that can have a negative impact on the financial health of an individual. In this study, financial literacy among working women has been analyzed with the objective to find the financial literacy level among working women and to analyze the most preferred investment instrument.

### **Scope of the Study**

The current study is limited to Kochi city. The financial literacy of working women investors is investigated in order to determine how effectively they manage their hard-earned money. And to discover how far they are aware of different

investment avenues available in the financial market. The study includes salaried women from the various sectors in different zones of Kochi city.

### Research Methodology

1. **Study Area:** The study covers Kochi city in the Ernakulam district of Kerala.
2. **Sample Size:** 80 samples were selected from working women in various fields like the textile industry, information technology, fashion, teachers, professors, and health sector.
3. **Sampling Method Used:** Convenient sampling method
4. **Data Sources:** The study is based on primary data that has been collected using a structured questionnaire.
5. **Period of study:** September 2023 to November 2023
6. **Statistical Tool Used:** Simple percentage, Garrett's Ranking Method, and Weighted Average Ranking Method.

### Analysis and Interpretation

#### 1. Demographic profile of the respondents

The following table shows the demographic profile of the respondents.

**Table 1**

**Demographic Profile of The Respondents (Sample size 80)**

| Sl.No | Demographics   | No. of Respondents | percentage |       |
|-------|----------------|--------------------|------------|-------|
| 1     | Age (in years) | Below 20           | 10         | 12.50 |
|       |                | 21-40              | 45         | 56.25 |
|       |                | 41-60              | 18         | 22.50 |

|   |                                     |                   |    |       |
|---|-------------------------------------|-------------------|----|-------|
|   |                                     | 61 and above      | 07 | 8.75  |
| 3 | Educational qualification           | Illiterate        | 01 | 1.25  |
|   |                                     | School level      | 05 | 6.25  |
|   |                                     | Graduation        | 64 | 80.00 |
|   |                                     | PG & Professional | 08 | 10.00 |
|   |                                     | Others            | 02 | 2.50  |
| 4 | Occupational status                 | Agriculture       | 08 | 10.00 |
|   |                                     | Teaching          | 10 | 12.5  |
|   |                                     | Textile Sector    | 25 | 31.25 |
|   |                                     | Office Workers    | 37 | 46.25 |
| 5 | Monthly income (in ₹)               | Below 10000       | 13 | 16.25 |
|   |                                     | 10001-20000       | 38 | 47.50 |
|   |                                     | 20001-30000       | 22 | 27.50 |
|   |                                     | Above 30000       | 07 | 8.75  |
| 6 | Number of earning members in family | 1                 | 3  | 3.75  |
|   |                                     | 2                 | 36 | 45.00 |
|   |                                     | 3                 | 25 | 31.25 |
|   |                                     | Above 3           | 16 | 20.00 |
| 7 | Amount of savings per month (in ₹)  | Below 1500        | 22 | 27.50 |
|   |                                     | 1501-3000         | 30 | 37.50 |
|   |                                     | 3001-6000         | 12 | 15.00 |
|   |                                     | Above 6000        | 16 | 20.00 |

Regarding the age level, 10 (12.50%) respondents age is less than 20, 45 (56.25%) respondents age ranges between 21-40, 18 (22.5%) respondents age ranges between 41-60, and the remaining 7 (8.75%) respondents age is more than 61 and above. Thus, most of the respondent's age ranges between 21 and 40 years.

About the educational qualification 1(1.25%) respondents are illiterate, 5(6.25%) are educated up to school level, 64(80.00%) are graduates, 8(10.00%) are professionals, and the rest 2 (2.50%) respondents are others. Thus, the majority of the respondents are graduates.

Regarding the occupational status, 8 (10.00%) respondents are doing agriculture, 10 (12.50%) are teaching, 25 (31.25%) are working in the textile sector, and the remaining 37 (46.25%) are working in office jobs. Thus, the majority of the respondents are working in office jobs.

It is clear from the above table that, among the respondents, 13 (16.25%) have monthly income less than Rs. 10000, 38 (47.50%) respondents have income ranges between Rs. 10001-20000, 22 (27.50%) respondents have income ranges between 20001-30000, and the remaining 7 (8.75%) respondents have income more than Rs. 30000 per month. Thus, most of the respondent's income ranges between Rs. 1000 and Rs. 1,000,000 per month.

Regarding the number of earning members, 3 (3.75%) respondents have only a single member earning, 36 (45.00%) respondents have two earning members, 25 (31.25%) respondents have three earning members, and the remaining 16 (20.00%) respondents have more than three earning members. Thus, most of the respondents have two earning members in their family.

About the amount of monthly savings, 22 (27.50%) respondents are saving up to 1500 per month, 30 (37.50%) save between 1501-3000 per month, 12 (15.00%) save between 3001-6000 per month, and the remaining 16 (20.00%) respondents save above 6000 per month.

## **1. Sources of Information about Investment Avenues**

The following table shows the different sources of information about post office schemes.

**Table 2**  
**Source of information**

| Sl. No | Source of information          | No. of respondents | Percentages |
|--------|--------------------------------|--------------------|-------------|
| 1      | Friends                        | 24                 | 30.00       |
| 2      | Agents                         | 10                 | 12.50       |
| 3      | Magazines ,News Papers & Media | 36                 | 45.00       |
| 4      | Family members                 | 10                 | 12.50       |
|        | Total                          | 80                 | 100.00      |

*Source: Primary Data*

The table shows that 24 (30.00%) of the respondents are getting various information regarding investment avenues through their friends, 10 (12.50%) of them are known through agents, 36 (45.00%) of them are known through magazines, newspapers, and other media, and 10 (12.50%) of them are getting information through family members.

### 1. Level of Awareness Toward Various Investment Avenues

The following table shows the preferred investment avenues among women in Kochi City.

**Table 3**  
**Various Investment Avenues**

| Sl. No. | Services                   | H (3) | M (2) | L (1) | Total | Score | Mean Score | Rank |
|---------|----------------------------|-------|-------|-------|-------|-------|------------|------|
| 1       | Bank Deposits              | 64    | 15    | 1     | 80    | 238   | 2.975      | 1    |
|         |                            | 192   | 45    | 1     |       |       |            |      |
| 2       | Post Office Saving Schemes | 60    | 14    | 6     | 80    | 214   | 2.675      | 2    |
|         |                            | 180   | 28    | 6     |       |       |            |      |
| 3       | Mutual Fund                | 12    | 24    | 36    | 80    | 120   | 1.5        | 7    |
|         |                            | 36    | 48    | 36    |       |       |            |      |
| 4       | Gold                       | 21    | 32    | 27    | 80    | 154   | 1.925      | 3    |
|         |                            | 63    | 64    | 27    |       |       |            |      |
| 5       | PPF                        | 25    | 20    | 35    | 80    | 150   | 1.875      | 5    |

| Sl. No. | Services         | H (3) | M (2) | L (1) | Total | Score | Mean Score | Rank |
|---------|------------------|-------|-------|-------|-------|-------|------------|------|
|         |                  | 75    | 40    | 35    |       |       |            |      |
| 6       | Real Estate      | 19    | 33    | 28    | 80    | 151   | 1.88       | 4    |
|         |                  | 57    | 66    | 28    |       |       |            |      |
| 7       | Government Bonds | 8     | 21    | 51    | 80    | 127   | 1.58       | 6    |
|         |                  | 24    | 42    | 51    |       |       |            |      |
| 8       | Shares           | 6     | 15    | 59    | 80    | 107   | 1.33       | 8    |
|         |                  | 18    | 30    | 59    |       |       |            |      |

*Source: Primary Data*

The above table clearly shows that the majority of the respondents have a high level of awareness about bank deposits and post office schemes. The table also shows that respondents have a low level of awareness about shares, government bonds, and mutual funds.

### 1. Motivational Factors for Making Investments

Following are the motivating factors for making an investment.

**Table 4**  
**Motivating Factor**

| Sl. No | Particulars   | Mean | Rank |
|--------|---|------|------|
| 1      | Get tax benefits                                      | 6.10 | 4    |
| 2      | Meet emergency needs                                  | 3.21 | 9    |
| 3      | Earn regular income                                   | 3.27 | 8    |
| 4      | Easy formalities                                      | 4.12 | 7    |
| 5      | Risk free investment                                  | 7.13 | 2    |
| 6      | Well-being of my children                             | 5.01 | 5    |
| 7      | Family protection                                     | 6.14 | 3    |
| 8      | Getting security during old age and retirement safety | 4.92 | 6    |
| 9      | Promote savings                                       | 7.83 | 1    |

*Source: Primary Data*

From the following table, it is clear that the majority of the respondents motivational factor for making investment is savings with a mean score of 7.83 (rank 1<sup>st</sup>), followed by risk-free investment 7.13 (rank 2<sup>nd</sup>), family protection with a mean score of 6.14 (rank 3<sup>rd</sup>), and getting tax benefits with a mean score of 6.10 (ranked 4<sup>th</sup>), well-being of my children with a mean score of 5.01 (ranked 5<sup>th</sup>), retirement safety with a mean score of 4.92 (ranked 6<sup>th</sup>), easy formalities with a mean score of 4.12 (ranked 7<sup>th</sup>), earning regular income with a mean score of 3.27 (ranked 8<sup>th</sup>), and meeting emergency needs with a mean score of 3.21 (ranked 9<sup>th</sup>).

### **Findings**

The following are the various findings of the study.

1. Most of the respondents' ages range between 21 and 40 years.
2. The majority of the respondents are graduates.
3. The majority of the respondents are employees.
4. Most of the respondent's income ranges between Rs. 1000 and Rs. 1,000,000 per month.
5. Most of the respondents have two earning members in their family.
6. The majority of the respondents have a high level of awareness about bank deposits and post office schemes.
7. The table also shows that respondents have a low level of awareness about shares, government bonds, and mutual funds.
8. The majority of the respondents' motivational factors for making investments are savings, followed by risk-free investment, family protection, and getting tax benefits.

### **Suggestions**

In order to increase the financial literacy among the working women, financial institutions should conduct financial literacy programs frequently.

## **Conclusion**

Financial literacy refers to the knowledge required for managing personal finance. Financial literacy is the study that is useful to understand finance. More specifically, it refers to an individual's ability to make informed judgments and effective decisions about the use and management of their money. The increasing range and complexity of products has made it very difficult for an ordinary person to take an informed decision. Financial literacy develops confidence, knowledge, and skills to manage financial products and services, enabling them to have more control of their present and future circumstances. In this study, an attempt has been made to analyze the level of financial literacy and the most preferred investment instrument or source. The study revealed that respondents have a high level of awareness about bank deposits and post office schemes and a post office schemes and a low level of awareness towards shares, government bonds, and mutual funds. The major motivational factor for making investments is savings, followed by risk-free investment, family protection, and getting tax benefits. They believe that other sources of investment are not as safe as gold and have risk as well.

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## **A Study on Customer Perception of Paytm App - Comparative Study on Rural and Urban Users in Thiruvananthapuram District of Kerala**

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### **ABSTRACT**

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The emergence of E-commerce has created new financial needs that, in many cases, cannot be effectively fulfilled by the traditional payment systems like cash and cheque. As payment is an integral part of the mercantile process, electronic payment is an integral part of E-commerce. So the study focused on the customer perception of Paytm App among rural and urban users in Thiruvananthapuram district. Three hundred samples were taken from six taluks in Thiruvananthapuram district of Kerala. The Simple Percentage and Garretts ranking method was applied for data analysis.

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Electronic payment is a financial exchange that takes place online between buyers and sellers. The content of this exchange is usually some form of digital financial instrument, such as encrypted credit card numbers, digital cash, or an electronic check that is backed by a bank or intermediary like payment gateways.

A digital or electronic wallet is the digital form of a conventional wallet. It has a software component that allows a user to make payment with a financial instrument and an encrypted storage medium that can store the user's payment information, a digital certificate to identify the user, and shipping information to speed transactions. Users prefer a particular app depending upon its quality, multiple purposes and functions, security, speed, accuracy, convenience, etc. So the study focused on a comparative study of rural and urban consumers regarding the perception of Paytm App in Thiruvananthapuram district of Kerala.

### **Statement of the Problem**

Paytm app is one of the most important digital payment apps used by the common people. People use the Paytm app for various purposes like mobile recharge, bill payment, shopping, etc. The 24\*7 availability of the app helps people save time and ensures safety and security. There is no need to wait for the opening bank or recharge counter whenever required for them.

Customer perception of Paytm app among urban and rural peoples may differ. Some users are fully aware of the uses, but some people are not aware. These reasons made the researcher take up the research study entitled “A Study on Customer Perception of Paytm App—Comparative Study of Rural and Urban Users in Thiruvananthapuram District.”.

### **Objectives of the Study**

The main objectives of the present study are as follows:

- To analyze the socio-economic status of rural and urban respondents in Thiruvananthapuram District.
- To study the users perceptions towards the Paytm app among rural and urban respondents.

### **Methodology**

The study is based on both primary and secondary data. For the collection of primary data, a questionnaire and interview schedule method were used. Secondary data were collected from books, journals, articles, newspapers, and websites.

### **Sample Design**

The Thiruvananthapuram district consisted of 6 taluks. Namely Thiruvananthapuram, Medumangadu, Chirayinkeezhu, Kattakada, Neyyattinkara, and Varkala. From these 6 taluks, a total of 300 samples were taken. 150 respondents from rural areas and 150 respondents from urban areas. Convenient methods of sampling were used to choose samples.

### **Framework of Analysis**

The collected data were processed with the help of appropriate statistical tools in order to fulfill the objectives of the study. For the present study, simple percentage analysis and Garrett's ranking technique were adopted.

## Analysis and Interpretation

This part analyzes the socio-economic profile, level of satisfaction, and reasons for the selection of Paytm digital payment among rural and urban users in Thiruvananthapuram District of Kerala in various aspects.

### 1. Gender of the respondents

The following table shows the gender-wise distribution of respondents.

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

| Gender | Rural              |         | Urban              |         | Total              |         |
|--------|--------------------|---------|--------------------|---------|--------------------|---------|
|        | No. of Respondents | Percent | No. of Respondents | Percent | No. of Respondents | Percent |
| Male   | 80                 | 53.33   | 85                 | 56.67   | 165                | 55.00   |
| Female | 70                 | 46.67   | 65                 | 43.33   | 135                | 45.00   |
| Total  | 150                | 100     | 150                | 100     | 300                | 100     |

*Source: Primary data.*

It is clear from the table that out of 150 rural users, 80 (53.33%) are male and 70 (46.67%) are female. Thus, the majority of the Paytm users are male in rural areas.

Among the 150 urban users, 85 (56.67%) are male and 65 (43.33%) users are female. Thus, the majority of the Paytm users are male in urban areas.

Among the total 300 users, 165 (55.00%) are male and 135 (45.00%) users are female. Thus, the majority of the Paytm users are male.

### 1. Age of the Respondents

The following table shows the age-wise distribution of respondents.

**Table 2**  
**Age of the respondents**

| Particulars  | Rural              |         | Urban              |         | Total              |         |
|--------------|--------------------|---------|--------------------|---------|--------------------|---------|
|              | No. of Respondents | Percent | No. of Respondents | Percent | No. of Respondents | Percent |
| Less than 20 | 20                 | 13.33   | 30                 | 20      | 50                 | 16.67   |
| 21 – 40      | 78                 | 52.00   | 89                 | 59.33   | 167                | 55.67   |
| 41 – 60      | 35                 | 23.33   | 19                 | 12.67   | 54                 | 18.00   |
| 61 and above | 17                 | 11.33   | 12                 | 8.00    | 29                 | 9.67    |
| Total        | 150                | 100     | 150                | 100     | 300                | 100     |

*Source: Primary data*

It is evident from the table among the rural users, 20 (13.33%) users age is less than 20, 78 (52.00%) users age ranges between 21-40, 35 (23.33%) users age ranges between 41-60, and the remaining 17 (11.33%) users age is more than 61 and above. Thus, most of the rural Paytm users' age ranges between 21 and 40 years.

The table also shows that among the urban users, 30 (20.00%) users age is less than 20, 89 (59.33%) users age ranges between 21-40, 19 (12.67%) users age ranges between 41-60, and the remaining 12 (8.00%) users age is more than 61 and above. Thus, most of the urban Paytm users' age ranges between 21 and 40 years.

Among the total 300 users, 50 (16.67%) users age ranges less than 20, 167 (55.67%) users age ranges between 21-40, 54 (18.00%) users age ranges between 41-60, and the remaining 29 (9.67%) users age ranges more than 61 and above. Thus, most of the Paytm users' age ranges between 21 and 40 years.

### 1. Occupation of the respondents

The following table shows the occupation of respondents.

**Table 3**  
**Occupation of the respondents**

| Occupation          | Rural              |         | Urban              |         | Total              |          |
|---------------------|--------------------|---------|--------------------|---------|--------------------|----------|
|                     | No. of Respondents | Percent | No. of Respondents | Percent | No. of Respondents | Per cent |
| Government Employee | 14                 | 9.33    | 36                 | 24.00   | 50                 | 16.67    |
| Private Employee    | 44                 | 29.33   | 77                 | 51.33   | 121                | 40.33    |
| Businessmen         | 6                  | 4.00    | 14                 | 9.33    | 73                 | 24.33    |
| Farmer              | 59                 | 39.33   | 7                  | 4.67    | 13                 | 4.33     |
| Others              | 27                 | 18.00   | 16                 | 10.67   | 43                 | 14.33    |
| Total               | 150                | 100     | 150                | 100     | 300                | 100      |

*Source: Primary data*

It is clear from Table 3 that among the rural users, 14 (9.33%) users have government jobs, 44 (29.33%) users have private jobs, 6 (4.00%) users are businessmen, 59 (39.33%) are farmers, and the remaining 27 (18.00%) users have other jobs. Thus, the majority of the rural users are farmers.

Regarding urban users, 36 (24.0%) respondents have a government job, 77 (51.33%) respondents have a private job, and 14 (9.33%) respondents have their own business. 7 (4.67%) respondents are farmers, and the remaining 16 (10.67%) respondents have other jobs. Thus, the majority of the urban users are private employees.

Among the total 300 users, 50 (16.67) users have government jobs, 121 (40.33) users have private jobs, 73 (24.33) users have own businesses, 13 (4.33%) users are farmers, and the remaining 43 (14.33%) users have other jobs. Thus, most of the users are private employees.

### 1. Monthly Income of the Respondents

The following table depicts the monthly income of respondents.

**Table 4**  
**Monthly Income of the Respondents**

| Monthly Income  | Rural              |         | Urban              |         | Total              |         |
|-----------------|--------------------|---------|--------------------|---------|--------------------|---------|
|                 | No. of Respondents | Percent | No. of Respondents | Percent | No. of Respondents | Percent |
| Below 5000      | 13                 | 8.67    | 6                  | 4.00    | 19                 | 6.33    |
| 5001 – 10000    | 60                 | 40.00   | 48                 | 32.00   | 118                | 39.33   |
| 10001 – 15000   | 38                 | 25.33   | 40                 | 26.67   | 78                 | 26.00   |
| 15001 – 20000   | 25                 | 16.67   | 38                 | 25.33   | 63                 | 21.00   |
| Above Rs. 20000 | 14                 | 9.33    | 18                 | 12.00   | 32                 | 10.67   |
| Total           | 150                | 100     | 150                | 100     | 300                | 100     |

*Source: Primary data*

It is clear from table 4 that, among the rural Paytm users, 13 (8.67%) have monthly income less than Rs. 5000, 60 (40.00%) users' income ranges between Rs. 5001-10000, 38 (25.33%) users have income ranges between 10001-15000, 25 (16.67%) users have income between Rs. 15001-20000, and the remaining 14 (9.33%) users have income more than Rs. 20000 per month.

Among the urban Paytm users, 6(4.00%) users have monthly income less than Rs. 5000, 48 (32.00%) users' income ranges between Rs. 5001-10000, 40(26.67%) users have income ranges between Rs. 10001-15000, 38(25.33%) users have income between Rs. 15001-20000, and the remaining 18(12.00%) respondents have income more than Rs. 20000 per month.

Among the total Paytm users, 19(6.33%) users have monthly income less than Rs. 5000, 118(39.33%) users' income ranges between Rs. 5001-10000, 78(26.00%) users have income ranges between Rs. 10001-15000, 63(21.00%) users have

income between Rs. 15001-20000, and the remaining (10.67%) respondents have income more than Rs. 20000 per month. Thus, most of the users earn between Rs. 5001 and Rs. 10000.

### 1. Purpose of Using Paytm

**Table 5**  
**Purpose of using Paytm**

| Purpose        | Rural              |         | Urban              |         | Total              |         |
|----------------|--------------------|---------|--------------------|---------|--------------------|---------|
|                | No. of Respondents | Percent | No. of Respondents | Percent | No. of Respondents | Percent |
| Recharge       | 61                 | 40.67   | 50                 | 33.33   | 111                | 37.00   |
| Bill Payment   | 40                 | 26.67   | 35                 | 23.33   | 75                 | 25.00   |
| Ticket Booking | 30                 | 20.00   | 25                 | 16.67   | 55                 | 18.33   |
| Shopping       | 15                 | 10.00   | 27                 | 18.00   | 42                 | 14.00   |
| Others         | 4                  | 2.67    | 13                 | 8.67    | 17                 | 5.67    |
| Total          | 150                | 100     | 150                | 100     | 300                | 100     |

*Source: Primary data*

It is clear from Table No. 5 that among the rural users, 61 (40.67%) users choose Paytm for recharge, 40 (26.67%) users use it for making bill payments, 30 (20.00%) users use it for ticket booking, 15 (10.00) users use it for shopping, and the remaining 4 (2.67%) users use it for other purposes. Thus, most of the rural respondents use Paytm for recharge purposes.

Among the urban users, 50 (33.00%) users choose Paytm for recharge, 35 (23.33%) users use it to make bill payments, 25 (16.67%) users use it for ticket booking, 27 (18.00%) users use it for shopping, and the remaining 13 (8.67%) users

use it for other purposes. Thus, the majority of the urban respondents use Paytm for recharge purposes.

Among the total 300 users, 111 (37.00%) users choose Paytm for recharge, 75 (25.00%) users use it to make bill payments, 55 (18.33%) users use it for ticket booking, 42 (14.00%) users use it for shopping, and the remaining 17 (5.67%) users use it for other purposes. Thus, the majority of the users use Paytm for recharge, bill payment, and shopping purposes.

### 1. Reasons for Choosing Paytm among Rural Users.

**Table 6**

**Reasons for choosing Paytm among Rural Users.**

| Sl. No. | Reasons            | Garrett's Mean score | Rank |
|---------|--------------------|----------------------|------|
| 1       | Fast service       | 51.00                | III  |
| 2       | Convenience        | 59.84                | II   |
| 3       | Simple to use      | 65.00                | I    |
| 4       | Secured            | 42.21                | V    |
| 5       | Multiple purpose   | 47.00                | IV   |
| 6       | Promotional offers | 35.25                | VI   |
| 7       | Any time available | 31.28                | VII  |

*Source: Primary data*

It is clear from table number 6 that the majority of the rural respondents prefer Paytm because of its simplicity with a mean score of 65.00 (ranked first), followed by convenience with a mean score of 59.84 (ranked 2nd), fast service with a mean score of 51.00 (ranked 3<sup>rd</sup>), multiple purpose with a mean score of 47.00 (ranked 4<sup>th</sup>), secured transactions with a mean score of 42.21 (ranked 5th),

promotional offers with a mean score of 35.258 (ranked 6<sup>th</sup>), and any time availability with a mean score of 31.28 (ranked 7<sup>th</sup>).

Thus, the majority of the rural users prefer Paytm APP because of its simple-to-use feature.

### 1. Reasons for Choosing Paytm among Urban Users.

**Table 7**  
**Reasons for choosing Paytm among Urban users**

| Sl. No. | Reasons            | Garrett's Mean score | Rank |
|---------|--------------------|----------------------|------|
| 1       | Fast service       | 65.67                | I    |
| 2       | convenience        | 53.25                | III  |
| 3       | Simple to use      | 48.35                | V    |
| 4       | secured            | 52.18                | IV   |
| 5       | Multiple purpose   | 58.45                | II   |
| 6       | Promotional offers | 34.80                | VII  |
| 7       | Any time available | 38.84                | VI   |

*Source: Primary data*

It is clear from Table No. 7 most of the urban respondents prefer Paytm because of fast service with a mean score of 65.67 (rank 1<sup>st</sup>), followed by multiple purpose 58.45 (ranked 2<sup>nd</sup>), convenience with a mean score of 53.25 (ranked 3<sup>rd</sup>), secured with a mean score of 52.18 (ranked 4<sup>th</sup>), simple to use with a mean score of 48.35 (ranked 5<sup>th</sup>), any time available with a mean score of 38.84 (ranked 6<sup>th</sup>), and promotional offers with a mean score of 34.80 (ranked 7<sup>th</sup>).

Thus, the majority of urban consumers choose Paytm because of its fast service, multiple purposes, and convenience.

## **Findings**

Following are the results of the study.

1. The majority of the consumers are male.
2. Most of the respondents' age ranges between 21 and 40 years.
3. Most of the respondents are private employees.
4. Most of the respondents earn between \$5001 and \$10,000.
5. The majority of the rural respondents use Paytm for recharge and bill payment purposes.
6. The majority of the urban respondents use Paytm for recharge purposes.
7. The majority of the rural respondents prefer Paytm because of its simplicity, convenience, and fast service.
8. The majority of urban consumers choose Paytm because of its fast service, multiple purposes, and convenience.

## **Suggestions**

Following are the suggestions:

1. The digital payment companies should create awareness among their users regarding the multiple uses of apps through various sales promotion techniques and advertisements.
2. Provide more facilities and add more features will enhance the utilization of the Paytm app among more people.

## **Conclusion**

Paytm App makes their users transfer their payments with the help of a mobile phone. The study reveals that the majority of the people use the Paytm app for mobile phone recharge, DTH recharge, making payments to electricity bills,

hotel bills, water bills, and shopping. The majority of the respondents prefer Paytm because it is simple to use, secure, convenient, and has fast service.

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