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Further results on Triameter of the Annihilator graph of a commutative ring with identity

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ABSTRACT

The Annihilator graph of the commutative ring R , denoted by $AG(R)$, is the graph whose vertices are the nonzero zero divisors of the commutative ring. If $a \in Z(R)^*$ then let $ann_R(a) = \{d \in R \mid da = 0\}$, two distinct vertices x and y are adjacent if and only if $ann_R(xy) \neq ann_R(x) \cup ann_R(y)$. Also, a distance parameter triameter of a connected graph G , which is defined as for $|V(G)| \geq 3$, $tr(G) = \max \{d(u, v) + d(v, w) + d(u, w); u, v, w \in V(G)\}$. In this article we determine the behaviour of the triametrals vertices of $AG(R)$.

Keywords: Distance in graph, Triameter, Annihilator graph, Ring of integer mod n

AMS Subject Classification (2020): 05C12, 13A70

1 Introduction

One of the most rapidly growing areas of mathematics is graph theory. Understanding how to quantify the nodal connections in a network to build communities, is one of the challenges with the clustering process. Investigating the distance between the vertices will help us to find the solution. The diameter and radius of the graph are two of the most frequently seen properties. Angsuman Das [4] first proposed the idea of a distance parameter triameter of a connected graph in 2018, Which is stated as follows: For a connected graph $G = (V, E)$ on $|V(G)| \geq 3$, the distance parameter triameter of G , $tr(G)$ is equal to the maximum of $\{d_G(u, v) + d_G(v, w) + d_G(u, w); u, v, w \in V(G)\}$. The triameter was used as a parameter in [11]. But explicitly named only in [10].

The study of algebraic structures using the properties of graph theory has been an exciting research topic in recent days. The Annihilator graph of the commutative ring R , denoted by $AG(R)$ is the graph whose vertices are the nonzero zero divisors of the commutative ring. If $a \in Z(R)^*$ then let $ann_R(a) = \{d \in R \mid da = 0\}$, two distinct vertices x and y are adjacent if and only if $ann_R(xy) \neq ann_R(x) \cup ann_R(y)$. This concept was introduced by Ayman Badawi [3] in 2014, For further information see [1, 5]. In this article we determine the behaviour of the triametrals vertices of the annihilator graph $AG(R)$.

We use the following definitions and notations in graph theory [7] in the subsequent sequel. By a graph $G=(V,E)$, we mean an undirected simple graph with vertex set V and edge set E . A graph G is called connected if there is a path between any two distinct vertices in G . for vertices u and v in a graph G , $d(u, v)$ denotes the length of the shortest path from u to v . If there is no such path, then $d(u, v)$ is defined to be infinity; and $d(u, u)$ is defined to be zero. The diameter of a graph G is the supremum of $\{d(u, v) \mid u \text{ and } v \text{ are vertices of } G\}$ denoted by $diam(G)$. A set $D \subseteq V(G)$ is a dominating set if every vertex $v \in V(G)$ is either in D or adjacent to at least one vertex in D . A dominating set with the smallest possible cardinality is minimum dominating set.

Also, we recall some definitions and notations in algebra [9]. We consider R as a commutative ring with identity that is not an integral domain. A ring R in which $ab = ba$ for all $a, b \in R$, is called a commutative ring. A nonempty subset I of a semi ring R is called an ideal if $a, b \in I$ and $r \in R$ implies $a + b \in I$ and $ra \in I$. Let R be a commutative ring. let $I \subseteq R$. The annihilator of I is the ideal consisting of the elements $a \in R$ such that $\forall x \in I: ax = 0$. Moreover, a commutative ring R is referred to as reduced if its nilradical, denoted by $Nil(R)$, is zero. Nilradical of R is the set of nilpotent elements. If $Nil(R) \neq 0$ then R is nonreduced. A proper ideal I of R is termed a maximal ideal if whenever J is an ideal of R and $I \subsetneq J \subseteq R$. Further, we use the following theorems

Theorem 1.1: [3] Let R be a commutative ring with $|Z(R)^*| \geq 2$. Then $AG(R)$ is connected and $diam(AG(R)) \leq 2$.

Theorem 1.2: [8] Let R is not a local ring with $|Z(R)^*| > 3$ if and only if $tr(AG(R)) = 6$.

Theorem 1.3: [3] Let R be a commutative ring and x, y be distinct elements of $Z(R)^*$. Then $x - y$ is not an edge of $AG(R)$ if and only if $ann(xy) = ann(x)$ or $ann(xy) = ann(y)$.

Theorem 1.4: [3] If $ann(x) \subseteq ann(y)$ and $ann(y) \subseteq ann(x)$ for some distinct $x, y \in Z(R)^*$, then $x - y$ is an edge in $AG(R)$.

Theorem 1.5: [8] Let R is not a local ring with $|Z(R)^*| > 3$. Let $a, b, c \in Z(R)^*$ be a triametal triple of vertices in the annihilator graph $AG(R)$ then $abc \neq 0$ and $a, b, c \in M_i$ where M_i 's are maximal ideals of R and $i = 1, 2, \dots, n$

2 Main Results

This section we determine the behaviour of the triametal vertices of the annihilator graph $AG(R)$.

Theorem 2.1. Let R be a nonreduced ring and R is not a local ring with $|Z(R)^*| > 3$ then the triametal vertices of $AG(R)$ have at most one nonzero nilpotent element.

Proof. Let R be a nonreduced ring and R is not a local ring. Let a, b and c are the triametal vertices of $AG(R)$. In order to prove that the triametal vertices of $AG(R)$ have atmost one nonzero nilpotent element we assume that the elements a and b are nilpotent. This implies that $a^n = 0$ and $b^m = 0$ where n, m are the positive integers. Then, $(ab)^k = a^k b^k = 0$, where $k = \max(n, m)$. Thus, $\text{ann}(ab) = R$. Moreover, $\text{ann}(a) \subseteq Z(R)$ and $\text{ann}(b) \subseteq Z(R)$. Hence, $\text{ann}(ab) \neq \text{ann}(a) \cup \text{ann}(b)$. By the definition, $d(a, b) = 1$. By Theorem 1.1, $\text{tr}(AG(R)) < 6$. By Theorem 1.2, there is a contradiction that $\text{tr}(AG(R)) = 6$. Therefore, the triametal vertices of $AG(R)$ have atmost one nonzero nilpotent element.

Theorem 2.2. Let R be a nonreduced ring and R is not a local ring with $|Z(R)^*| > 3$ then the triametal vertices of $AG(R)$ have atmost one element which belongs to the intersection of maximal ideals.

Proof. Let R be a nonreduced ring and R is not a local ring. Let a, b and c are the triametal vertices of $AG(R)$. Let $M_1, M_2, \dots, M_n$ be the maximal ideal of R . Assume to the contrary that, $a, b \in M_1 \cap M_2 \cap \dots \cap M_n$. This implies that, $ab = 0$. Thus, $\text{ann}(ab) = R$. Moreover, $\text{ann}(a) \subseteq Z(R)$ and $\text{ann}(b) \subseteq Z(R)$. Hence, $\text{ann}(ab) \neq \text{ann}(a) \cup \text{ann}(b)$. By the definition, $d(a, b) = 1$. By Theorem 1.1, $\text{tr}(AG(R)) < 6$. By Theorem 1.2, there is a contradiction that $\text{tr}(AG(R)) = 6$. Therefore, the triametal vertices of $AG(R)$ have atmost one element which belongs to the intersection of maximal ideals.

Theorem 2.3. Let R is not a local ring with $|Z(R)^*| > 3$. If a_1, a_2 and a_3 are the triametal vertices of $AG(R)$ then $\text{ann}(a_i) \subseteq \text{ann}(a_j)$ where $i \neq j$ and $i, j = 1, 2, 3$.

Proof. Let R is not a local ring with $|Z(R)^*| > 3$. If a_1, a_2 and a_3 are the triametal vertices of $AG(R)$. In order to prove $\text{ann}(a_i) \subseteq \text{ann}(a_j)$ where $i \neq j$ and $i, j = 1, 2, 3$, we assume $\text{ann}(a_1) \not\subseteq \text{ann}(a_2)$. Then by Theorem 1.4, the vertices a_1 and a_2 are adjacent in $AG(R)$. That is, $d(a_1, a_2) = 1$. By Theorem 1.1, $\text{tr}(AG(R)) < 6$. By Theorem 1.2, there is a contradiction that $\text{tr}(AG(R)) = 6$. Therefore, $\text{ann}(a_i) \subseteq \text{ann}(a_j)$ where $i \neq j$ and $i, j = 1, 2, 3$.

Theorem 2.4. Let R is not a local ring with $|Z(R)^*| > 3$ and a_1, a_2 and a_3 are the triametal vertices of $AG(R)$ if and only if $\text{ann}(a_i a_j) = \text{ann}(a_i)$ or $\text{ann}(a_i a_j) = \text{ann}(a_j)$ where $i \neq j$ and $i, j = 1, 2, 3$.

Proof. Let R is not a local ring with $|Z(R)^*| > 3$. If a_1, a_2 and a_3 are the triametal vertices of $AG(R)$. In order to prove $\text{ann}(a_i a_j) = \text{ann}(a_i)$ or $\text{ann}(a_i a_j) = \text{ann}(a_j)$ where $i \neq j$ and $i, j = 1, 2, 3$, we assume that $\text{ann}(a_1 a_2) \neq \text{ann}(a_1)$ and $\text{ann}(a_1 a_2) \neq \text{ann}(a_2)$. This implies that, $\text{ann}(a_1 a_2) \neq \text{ann}(a_1) \cup \text{ann}(a_2)$. By the definition, the vertices a_1 and a_2 are adjacent in

$AG(R)$. That is, $d(a_1, a_2) = 1$. By Theorem 1.1, $tr(AG(R)) < 6$. By Theorem 1.2, there is a contradiction that $tr(AG(R)) = 6$. Therefore, $ann(a_i a_j) = ann(a_i)$ or $ann(a_i a_j) = ann(a_j)$ where $i \neq j$ and $i, j = 1, 2, 3$.

Conversely, assume that $a_1, a_2, a_3 \in Z(R)^*$ such that $ann(a_i a_j) = ann(a_i)$ or $ann(a_i a_j) = ann(a_j)$ where $i \neq j$ and $i, j = 1, 2, 3$. Thus, $ann(a_1 a_2) = ann(a_1)$ or $ann(a_1 a_2) = ann(a_2)$, $ann(a_1 a_3) = ann(a_1)$ or $ann(a_1 a_3) = ann(a_3)$ and $ann(a_2 a_3) = ann(a_2)$ or $ann(a_2 a_3) = ann(a_3)$. By Theorem 1.4, the vertices a_1 and a_2 , the vertices a_1 and a_3 and the vertices a_2 and a_3 are not adjacent in $AG(R)$. This implies that, $d(a_1, a_2, a_3) = 6$. By Theorem 1.2, the vertices a_1, a_2 and a_3 are the triametal vertices of $AG(R)$.

Theorem 2.5. Let R be a commutative ring with identity then the triametal vertices of $AG(R)$ have at least one end vertex if and only if there exists a non zero element $r \in Z(R)^*$ with $|ann(r)^*| = 1$.

Proof. Let $a, b, c \in Z(R)^*$ be the triametal vertices of $AG(R)$. Without loss of generality, let the vertex a be an end vertex in $AG(R)$. Assume to the contrary that for every $r \in Z(R)^*$ with $|ann(r)^*| = 1$. Then every vertex in $AG(R)$ has at least two neighbours, which is a contradiction to the vertex a be an end vertex in $AG(R)$.

Conversely, let there exists a nonzero element $r \in Z(R)^*$ such that $|ann(r)^*| = 1$. On the contrary assume that the triametal vertices of $AG(R)$ do not contain any end vertices. For that let $a, b, c \in Z(R)^*$ be the triametal vertices of $AG(R)$ which were not end vertices. Since $|ann(r)^*| = 1$, there is a unique vertex in $AG(R)$ which annihilates the vertex r . Let it be ' c '. Since the vertex c is not an end vertex and the vertex r does not lie on a path from the vertex a to the vertex c and the vertex b to the vertex c , $d(a, r) = d(a, c) + 1$ and $d(b, r) = d(b, c) + 1$. This implies $d(a, b, r) = d(a, b, c) + 2$. Thus, $d(a, b, r) > d(a, b, c)$, there is a contradiction. Hence, either a, b or c is an end vertex.

Theorem 2.6. Let R be a commutative ring with identity then at most one vertex in the triametal vertices of $AG(R)$ belongs to the minimum dominating set of $AG(R)$.

Proof. Let R be a commutative ring with identity. Let $a, b, c \in Z(R)^*$ be the triametal vertices of $AG(R)$ and D be the minimum dominating set of $AG(R)$. We prove that either a, b or c belongs to D or neither a, b or c belong to D . If R has only one maximal ideal then $AG(R)$ is a complete graph. This implies that at most one vertex in the triametal vertices of $AG(R)$ belongs to D .

Let R has two maximal ideals, namely M_1 and M_2 . If $AG(R)$ is isomorphic to star graph then M_1 has only one vertex and which is the minimum dominating set of $AG(R)$. Thus,

$a, b, c \in M_2$. Hence, neither a, b or c belong to D . Let $AG(R)$ is not isomorphic to star graph. Then D has one vertex of M_1 and one vertex of M_2 . Thus, at most one vertex of a, b, c belongs to D .

Let R has more than three maximal ideals. Without loss of generality let R has three maximal ideals, namely M_1, M_2 and M_3 . Here, R is not a local ring. Then by Theorem 1.5, $a, b, c \in M_i$ where M_i 's are maximal ideals of R . Suppose the vertices a and b belong to the minimum dominating set D . Then $D = \{a, b\}$. We prove this theorem by following two cases. Case (i): Let R is a reduced ring. By Theorem 1.5, let $a, b, c \in M_1$. Then the vertices in $M_1 \cap M_2$ and $M_1 \cap M_3$ are not dominated by D , which is a contradiction to $|D|=2$. Thus, at most one vertex of a, b, c belongs to D .

Case (ii): Let R is not a reduced ring. Let $M_2^n = 0$ for sufficiently large n . By Theorem 1.5, without loss of generality, let $a, b, c \in M_1$. Then the vertices in M_2^{n-1} are not dominated by D , which is a contradiction to $|D|=2$. Thus, at most one vertex of a, b, c belongs to D .

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Formulation and Characterization of an Organic Herbal Bathing Powder for Skin Care Applications

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ABSTRACT

The present investigation focuses on the formulation and characterization of an organic herbal bathing powder prepared from natural ingredients such as rice, green gram, urad dal, neem leaves, hibiscus leaves, rose petals, white turmeric, vetiver and Tanner cassia. The developed formulation was evaluated using UV-Visible and FT-IR spectroscopic techniques to identify the presence of bioactive functional groups. The UV-Visible spectral analysis exhibited absorption peaks at 284, 425, 553 and 685 nm, indicating the presence of plant-derived chromophoric compounds. FT-IR spectral studies confirmed the presence of hydroxyl, aliphatic and unsaturated functional groups. Quality and safety assessments were carried out through microbial limit tests, total ash analysis and moisture content determination. Microbiological studies confirmed the absence of Salmonella species, indicating the microbial safety of the product. The low ash and moisture contents further suggested good purity, stability and reduced risk of microbial contamination. Overall, the findings indicated that the formulated herbal bathing powder is safe, biodegradable, skin-compatible and suitable alternatives to synthetic cosmetics.

Keywords: Herbal bathing powder; Formulation; Characterization; Microbiological evaluation; Safety assessment

1. Introduction

Cosmetics play a significant role in human civilization for centuries and are commonly used for cleansing, beautifying and enhancing physical appearance. Modern cosmetic industries largely depend on synthetic chemicals such as parabens, sulphates, artificial fragrances and preservatives to improve shelf life and product stability. However, prolonged use of synthetic cosmetic products may cause skin irritation, allergies, hormonal imbalance and environmental pollution. These adverse effects have encouraged researchers and consumers to explore herbal and organic alternatives for safer skin care applications [1-3].

Herbal cosmetics are formulations prepared using naturally derived ingredients obtained from medicinal plants, flowers, cereals and herbal extracts. Such products are considered safer due to their biodegradability, reduced toxicity and skin compatibility. Traditional Indian systems such as Ayurveda and Siddha have long recommended herbal

bathing powders as natural cleansers and skin protectants. These formulations provide antimicrobial, antioxidant, anti-inflammatory, and moisturizing benefits without causing harmful side effects [4].

Nallangumaavu, a traditional South Indian herbal bathing powder, is widely used for maintaining healthy skin. It consists of herbal ingredients such as neem leaves, green gram, rose petals, hibiscus leaves, turmeric, vetiver and rice flour, which collectively help in cleansing, exfoliation, skin brightening and soothing irritated skin [5].

In the present investigation, an organic herbal bathing powder is prepared from rice, green gram, urad dal, neem leaves, hibiscus leaves, rose petals, white turmeric, vetiver and *Tanner cassia* to develop a natural and eco-friendly skin care formulation. The study also aims to characterize the prepared formulations using spectroscopic techniques and evaluate their physicochemical and microbiological properties to ensure quality, safety and effectiveness.

2. Experimental Section

2.1 Materials

Rice, green gram, urad dal, neem leaves, rose petals, hibiscus leaves, *Tanner cassia* flowers, white turmeric and vetiver roots were used for the preparation of herbal bathing powder. Hibiscus leaves, neem leaves and *Tanner cassia* flowers were directly collected from the plant source. Rose petals, urad dhal, green gram and rice were purchased from the market and herbs like vetiver, white turmeric are purchased from ayurvedic shop.

2.2 Preparation of Organic Bathing Powder

Neem leaves, hibiscus leaves, rose petals and *Tanner cassia* flowers were washed thoroughly and dried under shade at room temperature to preserve their medicinal properties. The dried ingredients were powdered separately. Rice, green gram, and urad dal were cleaned and ground into fine powder. Vetiver and white turmeric were crushed and blended with the powdered herbal ingredients. All powdered materials were mixed uniformly and sieved to obtain a smooth herbal bathing powder. The prepared powder was stored in airtight containers.

2.3 Characterization Techniques

The UV-Visible absorption spectrum of the herbal bathing powder was recorded using a Shimadzu UV-1800 spectrophotometer. FT-IR spectral analysis was carried out using the KBr pellet method in the range of 400-4000 cm^{-1} with a Shimadzu IR Affinity-1 spectrophotometer.

2.4 Microbial Limit Test

2.4.1 Total Viable and Aerobic Bacteria Count

The total viable and aerobic bacterial count of the herbal bathing powder were determined by mixing 1 g of the bathing powder with 10 mL of Tryptic Soy Broth (TSB). Serial tenfold dilutions (10^{-1} to 10^{-10}) were prepared, and 0.1 mL aliquots from the 10^{-4} , 10^{-5} and 10^{-6} dilutions were spread onto Nutrient Agar plates. The plates were incubated at 37°C for 24 h and colonies containing fewer than 300 colony-forming units (CFU) were counted. The bacterial count was expressed as CFU per gram of the sample.

2.4.2 Total Yeast and Mould Count

About 1 g of the bathing powder was aseptically mixed with 10 mL of TSB. Serial tenfold dilutions (10^{-1} to 10^{-10}) were prepared, and 0.1 mL aliquots from the 10^{-5} , 10^{-6} and 10^{-7} dilutions were spread onto Potato Dextrose Agar plates. The plates were incubated at 25°C for 72 h and colonies containing fewer than 50 CFU were counted. The results were expressed as CFU/g of the sample.

2.4.3 Identification of *Salmonella* sp

About 1 g of the sample was inoculated into 10 mL of TSB medium and incubated at 37°C for 18 - 24 h. The enriched culture was streaked onto *Salmonella-Shigella* agar and incubated at 37 °C for 18 - 48 h. The presence of black-centered colonies indicated presumptive positive results for *Salmonella* sp.

2.5 Total Ash Content

About 2 g of herbal powder was taken in a clean dry crucible. Heated slowly, then incinerated in a muffle furnace at 500 - 550 °C until a white/grey ash was formed. Cooled in a desiccator and weighed.

$$\text{Total ash} = \frac{\text{Weight of ash}}{\text{Weight of sample}} \times 100$$

2.5.1 Acid-Insoluble Ash

The collected ash was treated with 25 mL of 2N HCl, boiled and filtered. The residue was washed, ignited along with the filter paper, cooled and weighed to determine the acid-insoluble ash content.

$$\text{Acid insoluble ash} = \frac{\text{Residue weight}}{\text{Original sample weight}} \times 100$$

2.5.2 Water-Soluble Ash

The total ash is taken and mixed with boiled water and filtered. The insoluble residue was collected, ignited and weighed. The weight of the residue was subtracted from the total ash to determine the water-soluble ash content.

Water insoluble ash = total ash – insoluble part in water

2.6 Moisture Analysis

The empty dish was dried in an oven, cooled in a desiccator and weighed to obtain the dish weight (W_1). About 2 g of herbal powder was added and weighed again to obtain the initial weight (W_2). The sample was then dried at 105°C for 3 h, cooled in a desiccator, and reweighed to obtain the final weight (W_3). Drying was continued until a constant weight was achieved to ensure complete moisture removal.

$$\% \text{ Moisture} = \frac{W_2 - W_3}{W_2 - W_1} \times 100$$

3. Results and Discussion

3.1 Characterization of Herbal Bathing Powder

The organic herbal bathing powder is characterized by UV-Visible and FT-IR spectral techniques. The absorption spectrum of the herbal bathing powder in ethanol shows absorption peaks at 284, 425, 553 and 685 nm indicating $\pi \rightarrow \pi^*$ and $n \rightarrow \pi^*$ electronic transitions (Fig. 1).

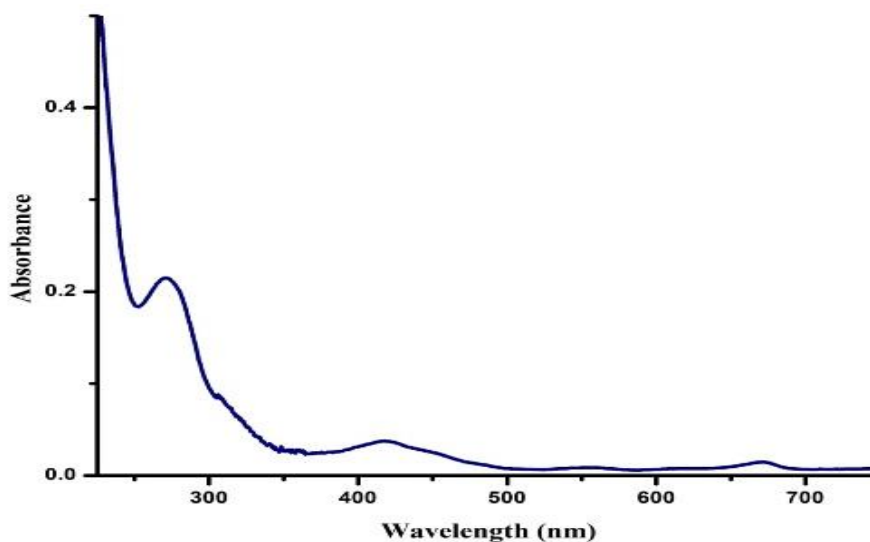


Fig. 1 UV-Visible spectrum of herbal bathing powder

The FT-IR spectrum of the herbal bathing powder shows a broad and intense peak at 3454 cm^{-1} corresponds to O–H stretching vibrations of hydroxyl groups such as alcohols or phenols, and indicates H-bonding. The bands observed at 2937 cm^{-1} and 2636 cm^{-1} indicate the C–H stretching vibrations of aliphatic $-\text{CH}_2$ and $-\text{CH}_3$ groups, confirming the presence of hydrocarbon chains. A distinct peak at 2264 cm^{-1} suggests the presence of either a nitrile ($\text{C}\equiv\text{N}$) or alkyne ($\text{C}\equiv\text{C}$) functional group. The absorption at 1637 cm^{-1} may be attributed to C=C stretching vibrations of alkenes or possibly C=O stretching in conjugated systems or amide linkages. The band around 1402 cm^{-1} indicates CH_2 bending or O–H deformation,

while the absorption at 569 cm^{-1} lies in the fingerprint region, often associated with skeletal vibrations. Overall, the FT-IR analysis indicates that the sample contains hydroxyl groups, aliphatic hydrocarbons, unsaturation ($\text{C}=\text{C}$), and possibly nitrile or alkyne functionalities, suggesting that the material is organic mixture and plant-derived extract with multiple functional groups (**Fig. 2**).

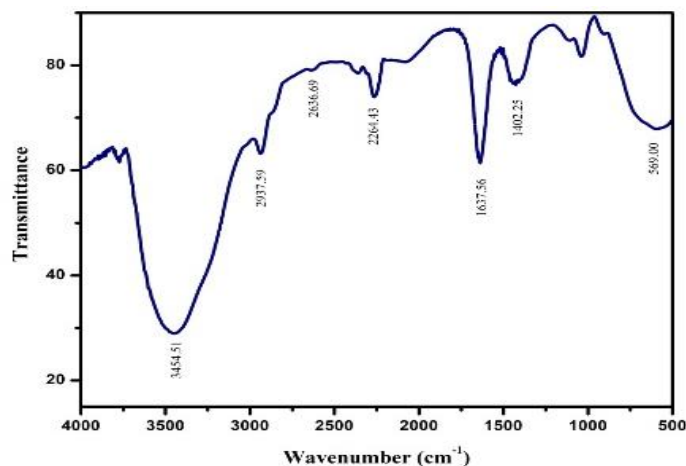


Fig. 2 FT-IR spectrum of herbal bathing powder

3.2 Microbial Limit Test

The total viable and aerobic bacteria count is performed to determine the microbial load present in the herbal bathing powder. At dilution levels of 10^{-5} and 10^{-6} , the colonies are found to be too numerous to count. At 10^{-7} dilution, the bacterial count is recorded as 32×10^8 CFU/g, indicating the presence of viable aerobic bacteria in the sample (**Fig. 3**).

The total yeast and mould count is carried out to evaluate fungal contamination in the herbal bathing powder. At dilution levels of 10^{-4} , 10^{-5} , and 10^{-6} , the colonies are observed to be too numerous to count, indicating a high yeast and mould population in the sample (**Fig. 4**). The presence of *Salmonella* sp. is examined using Salmonella–Shigella agar. No black-centered colonies are observed on the agar plates, confirming the absence of *Salmonella* sp. in the prepared herbal bathing powder (**Fig. 5**).



Fig. 3 Total viable and aerobic bacteria count



Fig. 4 Total yeast and mould count



Fig. 5 Identification of *Salmonella* on SS agar

3.3 Determination of Total Ash Content

The total ash content of the organic bathing powder is determined to evaluate the amount of inorganic residue remaining after complete combustion. The total ash value is found to be 1.27%, indicating a low level of inorganic matter and good purity of the formulation. This value falls well within the acceptable international limit for herbal powders, where total ash is generally recommended to be below 10%. The acid-insoluble ash value, which represents siliceous impurities such as sand and dirt, is found to be 9.3%. The water-insoluble ash content is determined as 5.8%, indicating the presence of a small amount of inorganic material insoluble in water. These ash values provide important information regarding the purity, quality, and safety of the herbal bathing powder.

3.4 Determination of Moisture Content

The moisture content of the organic bathing powder is evaluated to determine the amount of water present in the formulation, as moisture plays an important role in the stability, quality, and shelf life of herbal products. Excess moisture can promote microbial growth and degradation of phytoconstituents, whereas low moisture content enhances product stability and storage life.

The moisture content of the herbal bathing powder is found to be 0.2185%, indicating very low water content in the formulation. This low moisture level confirms adequate drying.

of the powder and reduces the possibility of microbial contamination during storage. The obtained value falls well below the standard acceptable moisture limit for herbal powders, which is generally below 10%. Therefore, the prepared herbal bathing powder shows good stability, purity, and suitability for long-term storage and safe consumer use.

Conclusion

The present investigation successfully demonstrated the formulation and characterization of an organic herbal bathing powder from natural ingredients. UV-Visible and FT-IR spectral analyses confirm the presence of bioactive phytoconstituents and important functional groups responsible for the therapeutic and skin-protective properties of the formulation. The microbial analysis confirms the absence of *Salmonella* sp., indicating the microbiological safety of the prepared product. The herbal bathing powder also exhibits low ash and moisture contents, reflecting good purity, stability and minimal inorganic contamination. The low moisture level further enhances shelf life by reducing the risk of microbial growth and degradation of active constituents during storage. Overall, the formulated herbal bathing products are safe, biodegradable, skin-compatible, and eco-friendly alternatives to synthetic cosmetic products. The study highlights the potential of traditional herbal ingredients in developing effective and sustainable personal care formulations.

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Weed Species Diversity and Their Medicinal Uses in the Holy Cross College Campus, Nagercoil, Kanyakumari District, Tamilnadu

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ABSTRACT

The 2025 survey of Holy Cross College campus in Nagercoil documented 134 weed species across 38 families, identifying Poaceae (23 species), Acanthaceae, Asteraceae, and Malvaceae as the most dominant groups. The findings highlight that 90% of these species, holds significant medicinal value for treating various ailments, while simultaneously supporting ecological health through soil stabilization and nutrient cycling. By establishing a link between environmental adaptability and bioactive potential, the study redefines weeds as vital biodiversity assets rather than unwanted plants. Ultimately, this research provides a baseline for future phytochemical and pharmacological studies, advocating for the sustainable conservation and utilization of weed flora within educational and semi-urban ecosystems.

Keywords: Weed diversity, Medicinal plants, Holy Cross College, Nagercoil, Poaceae, Asteraceae, Ethnobotany, Plant families, Biodiversity conservation, Traditional medicine, Phytochemical potency.

1 Introduction

A weed is scientifically defined as any plant that grows aggressively in a location where it is not intentionally cultivated, often competing with desirable crops for essential resources (Zimdahl, 2018). These species are characterized by their high reproductive capacity, rapid seed germination, and the ability to thrive in disturbed or harsh environmental conditions (Bhowmik, 2014). While traditionally viewed as agricultural pests, weeds are increasingly recognized as "pioneer species" that play a vital role in soil stabilization and nutrient cycling within ecosystems (Altieri, 1999). Furthermore, many common weeds serve as a primary source of phytochemicals and secondary metabolites, making them indispensable in traditional and folk medicinal practices across the globe (Santhosh et al., 2021). According to historical documentation, more than 8,000 plant species are utilized within traditional and folk medicinal frameworks (Ambasta et al., 1986). This vast botanical variety is a direct result of India's diverse climatic and soil conditions, which support a wide array of life forms ranging from Himalayan alpine zones to the southern coasts of

Kanyakumari. Every district contributes unique floristic wealth that is essential for the health and economic stability of local communities (Srinivasan et al., 2022).

Kanyakumari District, positioned at the southernmost edge of the Indian peninsula, serves as a unique ecological junction where the Western Ghats meet the sea. The region's tropical climate, marked by high humidity and significant precipitation, fosters the growth of highly varied vegetation. Within this environment, the Holy Cross College campus in Nagercoil acts as a micro-ecosystem, featuring diverse habitats such as fallow lands, gardens, shaded groves, and lawns. These areas host a dense population of herbaceous plants, particularly weeds, which have been noted for their high resilience and value in rural and semi-urban life within the district (ResearchGate,2015). Research indicates that many of these species are rich in bioactive compounds used for centuries in traditional healing practices, as highlighted by Parrotta (2001) and Siddalinga Murthy and Vidyasagar (2013). Such species are increasingly recognized as primary sources of basic medical care in various Indian states, including coastal regions (Samal et al., 2024).

Investigating weed populations within institutional grounds like college campuses offers a localized perspective on biodiversity and sustainable resource management. These campuses effectively function as miniature versions of the surrounding regional ecosystem. Documenting the flora in these settings is multi-functional: it cultivates botanical literacy among students, supports conservation efforts, and assists in the identification of phytochemical resources. Studies in other major Indian university campuses have demonstrated that urban institutional environments can maintain a significant diversity of important common medicinal plants (Verma et al., 2008).

The current research, titled “Weed Species Diversity and Its Medicinal Uses in Holy Cross College Campus, Nagercoil, Kanyakumari District, Tamil Nadu,” focuses on three core objectives: documenting the various weed species across campus habitats, cataloging their medicinal applications based on established literature, fostering a greater appreciation for these overlooked plants. Ultimately, this study supports the broader national and global mission of documenting biodiversity and promoting the sustainable use of natural plant resources.

2 Materials and Methods

2.1 Study Area

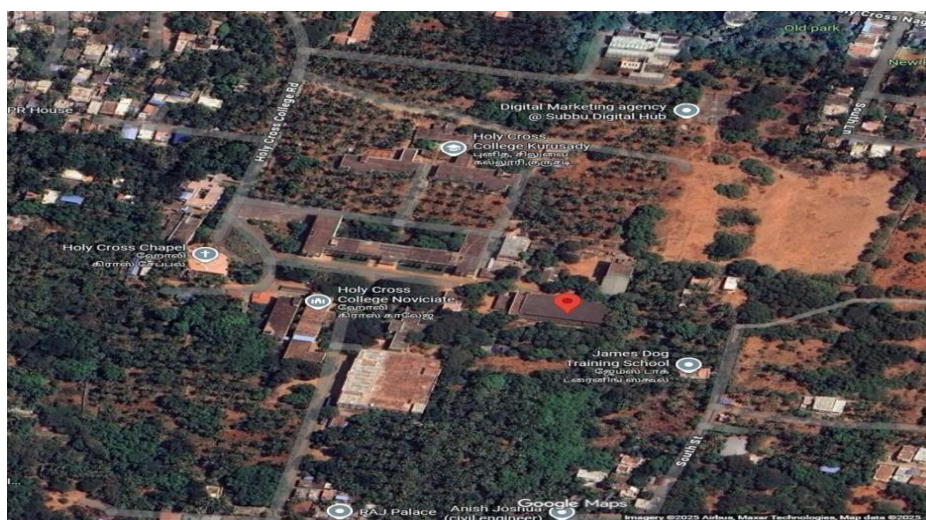
The present study on Weed Species Diversity and Its Medicinal Uses was carried out in the Holy Cross College Campus, Nagercoil, located in Kanyakumari District, Tamil Nadu (Latitude: 8°10' N; Longitude:77°26'E). The campus extends over an area of approximately

22 acres and comprises botanical gardens, cultivated plots, lawns, waste lands, roadsides, and shaded areas that support a rich diversity of herbaceous flora (Plate 1 and 2). The region experiences a tropical humid climate with an average temperature ranging between 24°C and 33°C and an average annual rainfall of about 1400 mm. The study was conducted from June to September 2025, which corresponds to the southwest monsoon period favouring luxuriant weed growth.

Plate1: Aerial View of Holy Cross College Campus



Plate2: Google Map Image of Holy Cross College Campus



2.3 Survey and Collection of Plant Specimens

A systematic field survey was undertaken to record the weed flora from various habitats within the college campus from June 2025 to September 2025. Surveys were conducted once every week during the study period to observe seasonal variations and ensure proper identification of species. Representative specimens of all weed species were collected

using standard herbarium techniques (Jain and Rao, 1977). Each specimen was pressed, dried, mounted, and labelled with relevant field data such as date, habitat, locality, and collector's name.

2.4 Identification and Classification

Collected specimens were identified with the help of regional floras, including The Flora of the Presidency of Madras (Gamble, 1935) and The Flora of Tamil Nadu (Nair and Henry, 1983–1989). The scientific names were verified and updated using Plants of the World Online (POWO) and The Plant List to ensure nomenclatural accuracy.

2.5 Documentation of Medicinal Uses

Information on the ethnomedicinal uses of the recorded weed species was collected through a literature survey. Standard references such as Wealth of India (CSIR, 1948 - 1976), Indian Medicinal Plants (Kirtikar and Basu, 1935), and Medicinal Plants of India (Pullaiah, 2006) were used. The medicinal uses were categorized based on their therapeutic applications, such as treatment for skin diseases, wounds, fevers, digestive disorders, and respiratory ailments.

2.6 Data Analysis

All data were tabulated and analyzed and graphical representations were prepared to depict the dominant families, and major medicinal categories.

3 Results and Discussion

3.1 Weed Diversity in the Study Area

The investigation conducted on the weed flora at the Holy Cross College Campus in Nagercoil identified a significant diversity of herbaceous plants thriving across various microhabitats. Throughout the study period, which spanned from June to September 2025, a total of 134 weed species representing 38 families were documented (Table: 1). This high level of diversity is a testament to the region's rich floristic composition, supported by its tropical climate, fertile soil, and high humidity.

Among the recorded groups, the family Poaceae (grasses) was the most dominant with 23 species, followed by Acanthaceae, Asteraceae, and Malvaceae (10 species each), Fabaceae (8 species), and Amaranthaceae (6 species). Other families that made significant contributions to the campus flora included Euphorbiaceae, Lamiaceae, Rubiaceae, and Convolvulaceae (Graph:1). This pattern of family-wise dominance indicates that the majority of these species are exceptionally well-adapted to open, disturbed, and moisture-retaining environments, including lawns, gardens, wastelands, and shaded corners.

Table: 1 List of Plants with Botanical Name, Family and Uses

S. No	Botanical Name	Family	Uses
1	<i>Andrographis paniculata</i> (Burm.f.) Wall. ex Nees	Acanthaceae	Anti-inflammatory, Anti-microbial, Antiviral, Anti-cancer potential and Blood sugar regulation. Fever and Malaria management
2	<i>Asystasia gangetica</i> (L.) T. Anderson	Acanthaceae	Asthma, Rheumatism, Stomachache and Diabetes, Anthelmintic
3	<i>Barleria buxifolia</i> L.	Acanthaceae	Antidiabetic effects, Gastroprotective properties, Analgesic effects, Antibacterial properties
4	<i>Barleria cristata</i> L.	Acanthaceae	Boils, Bee and Snake bites, Asthma, Leprosy, Cough, Jaundice, and Toothaches.
5	<i>Barleria strigosa</i> Willd.	Acanthaceae	Antidiabetic Anti ulcer, Antiseptic and Wound healing properties
6	<i>Barleria prionitis</i> L.	Acanthaceae	Dental problems, Fights oral Infections and Strengths gums, Wound healing, Treat skin disease and Reduce swelling
7	<i>Justicia glauca</i> Rottl.	Acanthaceae	Anti-Inflammatory, Respiratory relief, Digestive acid, Anticancer problems and Antioxidant
8	<i>Justicia simplex</i> D.Don	Acanthaceae	Anti-bacterial and Anti-fungal properties, Wound healing and Potential anti-cancer activity
9	<i>Ruellia prostrata</i> Poir.	Acanthaceae	Anti-inflammatory and Pain relief, Joint pain, Localized pain antimicrobial, Antifungal, Treat skin infections ringworm, Cough, Cold and Astma, Urinary and Reproductive uses.
10	<i>Ruellia tuberosa</i> L.	Acanthaceae	Kidney and Bladder issues, Diuretic, Anti-inflammatory, Gonorrhea, Syphilis, Diabetes, Antioxidant and Antimicrobial.
11	<i>Gisekia pharnaceoides</i> L.	Aizoaceae	Diarrhoea, acting as purgative and taenicide

12	<i>Mollugo pentaphylla</i> L.	Aizoaceae	Skin conditions, Stomach issues and Earaches
13	<i>Trianthema</i> <i>portulacastrum</i> L.	Aizoaceae	Edema, dropsy, Jaundice, Rheumatism, Wound healing, Liver protection, digestive issues and Urinary problems
14	<i>Aerva lanata</i> (L.) Juss. ex Schult.	Amaranthaceae	Kidney and Bladder stones, Diabetes, Coughs and Diarrhea
15	<i>Alternanthera</i> <i>caracasana</i> Kunth	Amaranthaceae	Dysentery, Diarrhea and Fever
16	<i>Alternanthera</i> <i>sessilis</i> (L.)DC.	Amaranthaceae	Anti-inflammatory, Diuretic, Eye diseases, Wound healing, Diarrhea, Dysentery, Asthma, Fever, Hepatitis, and Some viral diseases
17	<i>Amaranthus spinosus</i> L.	Amaranthaceae	Laxative, Diuretic and Antipyretic
18	<i>Amaranthus viridis</i> L.	Amaranthaceae	Analgesic, Antipyretic, Fever, Diuretic, Laxative, Anti inflammatory, Antidiabetic, Anti oxidants, Anti cancer and Anti microbial
19	<i>Digera muricata</i> (L.) Mart.	Amaranthaceae	Prophylactic, Anti-microbial, Anti-oxidant, Anti-diabetic, Anti-testicular, Anthelmintic, Allelopathic and Defensive effects.
20	<i>Gomphrena serrata</i> L.	Amaranthaceae	Respiratory relief and Anti-Inflammatory
21	<i>Centella asiatica</i> (L.) Urban.	Apiaceae	Anti-oxidant, Anti-inflammatory and Wound healing.
22	<i>Hydrocotyle vulgaris</i> L.	Apiaceae	Fevers, Wounds, Skin diseases, Digestive issues, and Respiratory ailments like colds and coughs.
23	<i>Catharanthus roseus</i> (L.) G.Don	Apocynaceae	Leukemia, Hodgkin' and Breast cancer
24	<i>Acanthospermum</i> <i>hispidum</i> DC.	Asteraceae	Fever, Skin ailments, Infectious disease and Pain
25	<i>Ageratum conyzoides</i> L.	Asteraceae	Wounds, Skin infections and Fever, Antibacterial, Anti-inflammatory and Pain-

			relieving properties
26	<i>Chromolaena odorata</i> (L.) R.M. King & H. Rob.	Asteraceae	Heal wounds and Stop bleeding
27	<i>Cyathillium cinereum</i> (L.) H. Rob.	Asteraceae	Antibacterial, Anti-inflammatory and Antioxidant properties
28	<i>Ecliptaalba</i> (L.) Hassk.	Asteraceae	Enhances hair growth and Liver protection, Anti-inflammatory, Antibacterial and Antioxidant properties
29	<i>Parthenium Hysterophorus</i> L.	Asteraceae	Skin disorders, Fever and Wounds
30	<i>Sphagneticola trilobata</i> (L.) Pruski	Asteraceae	Anti-inflammatory, Analgesic, Antidiabetic, Antioxidant, Wound healing, and Antimicrobial.
31	<i>Synedrella nodiflora</i> (L.) Gaertn.	Asteraceae	Antimicrobial, Anti-inflammatory and Antioxidant properties
32	<i>Tridax procumbens</i> L.	Asteraceae	Woundhealing, Diarrhea, Dysentery, Bronchial catarrh, head ache, Liver disease, Anti diabetic, Anti bacterial and Anti inflammatory
33	<i>Vernonia albicans</i> DC.	Asteraceae	Treating filariasis, Eye infections, Wounds healing, Viral fevers, Tonsillitis, Dysentery, Urinary problems, Antimicrobial, Antioxidant and Anti-inflammatory
34	<i>Buglossoides arvensis</i> (L.) I.M. Johnst.	Boraginaceae	Diuretic, Anti-inflammatory and Anti-neuroinflammation.
35	<i>Heliotropium indicum</i> L.	Boraginaceae	Anti-inflammatory, Wound-healing, Antibacterial properties, Skin disorders, Fevers, Poisonous bites, Stomachaches, Diarrhea, Anti-tumor and Anti-inflammatory.
36	<i>Cleome rutidosperma</i> DC.	Cleomaceae	Analgesic, Antiinflammatory, Anti microbial, Anti oxidant, Wounds and Skin condition, Ear aches Deafness, Respiratory issues and Parasitic infection.

37	<i>Cleome viscosa</i> L.	Cleomaceae	Anthelmintic, Antiseptic, Carminative, and Febrifuge, Malarial fevers, Blood disorders and Skin diseases.
38	<i>Gynandropsis pentaphylla</i> (L.) DC.	Cleomaceae	Pain, Inflammation, Parasitic infections and Skin conditions.
39	<i>Commelina benghalensis</i> L.	Commelinaceae	Burns, Leprosy, Fever, Eye ailments, Laxative, Emollient and Demulcent.
40	<i>Commelina clavata</i> C.B.Clarke	Commelinaceae	Hypertension, Infertility, Sore throats and Burns.
41	<i>Cyanotis axillaris</i> (L.) D.Donex Sweet	Commelinaceae	Ascites, Abscesses, Fever, Ear infections, Tympanitis, Worms, Inflammation, Antifungal and Antimalarial.
42	<i>Evolvulus alsinoides</i> (L.) L.	Convolvulaceae	Memory-enhancing, Neuroprotective, Cough, Cold, fever, Dementia, anxiety, anti-inflammatory, antioxidant and cardiovascular.
43	<i>Evolvulus nummularius</i> (L.)L.	Convolvulaceae	Wound healing, anti-inflammatory, antibacterial, anthelmintic and sedative.
44	<i>Ipomoea cairica</i> (L.) Sweet.	Convolvulaceae	Inflammation, rheumatism, liver complaints, antimicrobial, antioxidant, neuroprotective, body rashes and purgative.
45	<i>Ipomoea triloba</i> L.	Convolvulaceae	Antibacterial, anti-diarrheal, and wound-healing.
46	<i>Merremia tridentata</i> (L.) Hallier f.	Convolvulaceae	Rheumatism, joint stiffness, inflammation, piles, swelling, urinary affections, laxative, anti-inflammatory, anti-arthritis, and anti-diabetic.
47	<i>Bryophyllum pinnatum</i> (Lam.) Oken	Crassulaceae	Renal failure and type II diabetes.
48	<i>Coccinia grandis</i> (L.) Voigt.	Cucurbitaceae	Anti-diabetic, antioxidant, skin diseases, jaundice, asthma and bronchitis.
49	<i>Cyperus rotundus</i> L.	Cyperaceae	Indigestion, diarrhea, bloating. painful periods, menstrual irregularities, fevers, wounds, weight management and diabetes.
50	<i>Fimbristylis</i> sp	Cyperaceae	Rheumatism, cough and bronchitis
51	<i>Kyllinga nemoralis</i>	Cyperaceae	Antivenom for snakebites, diabetes and skin

	(J.R.Forst. &G.Forst.) Dandyex Hutch. & Dalziel		issues like pruitus.
52	<i>Eriocaulon cinereum</i> R.Br.	Eriocaulaceae	Febrifuge, fevers and immune support.
53	<i>Acalypha indica</i> L.	Euphorbiaceae	Skin ailments, coughs, wounds healing, and alleviating gastrointestinal problems
54	<i>Acalypha ciliata</i> Forssk.	Euphorbiaceae	Diuretic, anti-diarrheal and anthelmintic agent.
55	<i>Croton bonplandianus</i> Baill.	Euphorbiaceae	Liver disorders, constipation, skin diseases, and hypertension
56	<i>Euphorbia heterophylla</i> L.	Euphorbiaceae	Bronchitis, asthma, skin diseases, gonorrhea, and gynecological disorders.
57	<i>Euphorbia hirta</i> L.	Euphorbiaceae	Diarrhea, dysentery, asthma, bronchitis skin conditions like wounds and boils.
58	<i>Euphorbia notoptera</i> Boiss.	Euphorbiaceae	Wound healing, antimicrobial activity, anti- inflammatory, skin diseases, purgative, antivenom.
59	<i>Euphorbia thymifolia</i> L.	Euphorbiaceae	Worm infections, diarrhea, dysentery, asthma, bronchitis, skin diseases, wounds, laxative, antiviral, antioxidant, and anti-inflammatory.
60	<i>Alysicarpus monilifer</i> (L.)DC.	Fabaceae	Anti-inflammatory, skin diseases, fever, jaundice, kidney stones, antidote for snake bites, diuretic, eye and ear ailments and wound healing.
61	<i>Crotalaria pallida</i> Aiton.	Fabaceae	Urinary problems, fever, swelling of joints, anti-parasitic for intestinal worms, antioxidant, antibacterial, and anti-inflammatory.
62	<i>Crotalaria verrucosa</i> L.	Fabaceae	Fevers, indigestion, skin diseases, stomach pain, wounds, snakebites, and oral/throat disorders.
63	<i>Desmodium triflorum</i> (L.)DC.	Fabaceae	Dysentery, diarrhea, coughs, wounds, skin sores, fever, anti-inflammatory, stomach ache

			and indigestion.
64	<i>Indigofera linnaei</i> Ali.	Fabaceae	Digestive disorders, pain and inflammation, skin disorders, neurological disorders
65	<i>Indigofera prostrata</i> Willd.	Fabaceae	Digestive disorders, pain and inflammation, skin disorders, respiratory issues, infectious diseases and nervous disorder
66	<i>Rhynchosia minima</i> (L.)DC.	Fabaceae	Respiratory problems, chest pain, diarrhea, dysentery, anti-inflammatory, antioxidant properties, skin infections, hemorrhoids, and joint pain.
67	<i>Tephrosia purpurea</i> (L.) Pers.	Fabaceae	Liver disorders, skin conditions, asthma, bronchitis, anti-inflammatory, antioxidant and anti-diabetic.
68	<i>Enicostemma littorale</i> Blume	Gentianaceae	Anti-diabetic, fever, rheumatism, skin disorders, antimicrobial, antioxidant and anti-inflammatory
69	<i>Leucas aspera</i> (Willd.) Link	Lamiaceae	Antipyretic, anti-inflammatory, insecticide and psoriasis.
70	<i>Ocimum americanum</i> L.	Lamiaceae	Colds, fevers, stomach problems, diabetes, tuberculosis, antimicrobial, anti-inflammatory and antioxidant
71	<i>Ocimum basilicum</i> L.	Lamiaceae	Coughs, bronchitis, gastrointestinal problems, antioxidant, anti-inflammatory, antimicrobial, digestion, stress, and wound healing.
72	<i>Abutilon indicum</i> (L.) SW.	Malvaceae	Diarrhea, diabetes, inflammation, wound healing, laxative, diuretic, and analgesic properties.
73	<i>Corchorus aestuans</i> L.	Malvaceae	Headaches, pneumonia, stomach issues and various skin infections
74	<i>Pavonia zeylanica</i> (L.) Cav.	Malvaceae	Indigestion, diarrhea, scabies arthritis, joint pain and muscular sprains.
75	<i>Sida acuta</i> Burm.f.	Malvaceae	Fever, malaria, headaches, liver disorders and rheumatic conditions

76	<i>Sida cordata</i> (Burm. f.) Borss. Waalk.	Malvaceae	Wounds, piles, anti-diabetic, anthelmintic, hepatoprotective, and antioxidant.
77	<i>Sida cordifolia</i> L.	Malvaceae	Arthritis, rheumatism, joint pain, Parkinson's disease, ashtma, bronchitis, cough and nasal congestion
78	<i>Sida rhombifolia</i> L.	Malvaceae	Stomach and liver disorders, kidney stones, skin issues, wounds, fever, cough, cold, inflammation, anti-inflammatory, antioxidant, antimicrobial, and analgesic.
79	<i>Triumfetta rhomboidei</i> Jacq.	Malvaceae	Anti-inflammatory, anti-diabetic, antioxidant, anti-ulcer properties, skin disorders, wounds, dysentery, diarrhea, stomach ulcers, arthritis, cancer and diuretic.
80	<i>Urena lobata</i> L.	Malvaceae	Anti-inflammatory, antioxidant, antidiabetic, antimicrobial, gonorrhea, diarrhea, fevers, wounds and rheumatism.
81	<i>Waltheria indica</i> L.	Malvaceae	Coughs, dysentery, diarrhea, inflammation, wounds, and ulcers.
82	<i>Mimosa pudica</i> L.	Mimosaceae	Wound healing and skin disease
83	<i>Boerhavia diffusa</i> L.	Nyctaginaceae	Diuretic, renoprotective, laxative properties, asthma, constipation, cough and detoxifying body
84	<i>Boerhavia erecta</i> L.	Nyctaginaceae	Diuretic, stomachic, expectorant, asthma, coughs, febrifuge, laxative, jaundice, skin disorders and gonorrhea.
85	<i>Biophytum sensitivim</i> (L.) DC	Oxalidaceae	Asthma, diabetes, skin problems, anti-inflammatory, anti-diabetic, antioxidant, insomnia, convulsions, tumors and wound healing.
86	<i>Oxalis corniculata</i> L.	Oxalidaceae	Fever, diarrhea, parasitic worms, warts, boils, anti-inflammatory, astringent, diuretic, wound healing, poultices for snake bites, and

			headaches.
87	<i>Oxalis triangularis</i> A.St.Hil.	Oxalidaceae	Cuts, rashes, fevers, mouth sores and urinary tract infections
88	<i>Passiflora foetida</i> L.	Passifloraceae	Fever, skin issues, anxiety, insomnia coughs and digestive problems
89	<i>Pedaliium murex</i> L	Pedaliaceae	Impotence, nocturnal emissions, gonorrhea and leucorrhoea in women.
90	<i>Phyllanthus maderaspatensis</i> L.	Phyllanthaceae	Liver health, kidney health, anti-inflammatory, analgesic, fever and infections, anti-microbial, skin health, detoxification, nervous system and general health
91	<i>Phyllanthus niruri</i> L.	Phyllanthaceae	Gallstones, diuretic, inflammatory, anti microbial, and digestive disorders.
92	<i>Phyllanthus virgatus</i> G. Frost.	Phyllanthaceae	Skin problems, infections, liver and urinary tract disorders, antioxidant and antimicrobial properties.
93	<i>Rivina humilis</i> L.	Phytolacaceae	Wounds, skin diseases, respiratory and reproductive issues, antimicrobial, antioxidant and anti-inflammatory.
94	<i>Peperomia pellucida</i> (L.) Kunth	Piperaceae	Anti-inflammatory, analgesic, swelling, pain, headaches, mental fatigue, anti-microbial and antioxidant, urinary and reproductive health
95	<i>Bacopa monnieri</i> (L.) Wettst.	Plantaginaceae	Memory enhancement, neuroprotective: anti-anxiety and ADHD Support
96	<i>Plumbago zeylanica</i> L.	Plumbaginaceae	Digestive problem, inflammation and skin issues.
97	<i>Agrostis gigantea</i> Roth.	Poaceae	Allergy tester and anti- cancer
98	<i>Apluda mutica</i> L.	Poaceae	Diarrhea and mouth sores in cattle. Diuretic, fevers, anti-inflammatory, anti-diabetic and antibacterial.
99	<i>Aristida hystrix</i> L.f	Poaceae	Cough, colds, skin ailments, stomach pain and digestive problem.

100	<i>Aristida adscensionis</i> L.	Poaceae	Skin disease, dysentery, gastrointestinal issues, menopausal symptoms.
101	<i>Arthraxon castratus</i> (Griff.) V.Naray.ex. Bor.	Poaceae	Anti-inflammatory and anti- cancer
102	<i>Axonopus compressus</i> (Sw.) P. Beauv.	Poaceae	Fever, colds, stomach problems, diabetes, antioxidant, hemorrhoids and antimalarial.
103	<i>Brachiaria distachya</i> (L.) Stapf.	Poaceae	Jaundice and kidney disorder.
104	<i>Brachiaria ramosa</i> (L.) Stapf.	Poaceae	Laxative, anti-allergic, indigestion and anti-inflammatory.
105	<i>Brachiaria setigera</i> (Retz.) C.E. Hubb.	Poaceae	Infectious diseases in livestock
106	<i>Chloris barbata</i> Sw.	Poaceae	Anti-inflammatory, wound healing, diuretic, fever, skin ailment and antioxidant.
107	<i>Cynodon dactylon</i> (L.) Pers	Poaceae	Diarrhea, dysentery, skin problems, cough, bronchitis, diabetes, pain, fever, inflammatory disorders, wound healing, antimicrobial and anti-inflammatory.
108	<i>Dactyloctenium aegyptium</i> (L.) P.Beauv.	Poaceae	Wounds and skin infections, diarrhea, ulcers, anti puritic, urinary ailments, skin condition and small pox treatment.
109	<i>Echinochloa colona</i> (L.) Link	Poaceae	Antidiabetic, antiulcer, antiseptic and wound healing.
110	<i>Ehrharta erecta</i> Lam.	Poaceae	Fodder grass for livestock
111	<i>Eleusine indica</i> (L.) Gaertn.	Poaceae	Anti-inflammatory, diuretic, antioxidant agent, rheumatism, inflammation, fever, jaundice, digestive issues, antimicrobial activity and wound healing.
112	<i>Eleusine indica</i> (L.) Gaertn.	Poaceae	Diuretic, anti-inflammatory, wound healing, pain relief and skin conditions
113	<i>Heteropogon contortus</i> (L.) P.Beauv.exRoem	Poaceae	Toothache, snakebites, measles, burns, wounds, rheumatism and diuretic.

	&Schult		
114	<i>Melinis repens</i> (Willd.) Zizka	Poaceae	Diabetes, enrich blood, reduce swelling and gonorrhea
115	<i>Paspalidium flavidum</i> (Retz) A.Camus	Poaceae	Hepatoprotective, gastroprotective, antioxidant and diuretic
116	<i>Pennisetum polystachion</i> (L.) Schult	Poaceae	Auria, blennorrhoea, painkiller, antioxidant and anti-inflammatory.
117	<i>Perotis indica</i> (L.) Kuntze.	Poaceae	Skin diseases, wounds and ulcers.
118	<i>Setaria palmifolia</i> (J.Konig) Stapf	Poaceae	Diarrhea, fever, toothache, irregular menstruation and postpartum.
119	<i>Themeda cymbaria</i> (Roxb.) Hack.	Poaceae	Mouth ulcers, indigestion, eczema, urinary disorders, cuts and wounds
120	<i>Polygala arvensis</i> Willd.	Polygonaceae	Fever, dizziness, asthma and diabetes
121	<i>Polygala erioptera</i> DC.	Polygonaceae	Gastrointestinal disorders and obesity- relates issues.
122	<i>Portulaca oleracea</i> L.	Portulacaceae	Dysentery, gastritis, burns, fungal infection, dysuria and kidney issues.
123	<i>Oldenlandia corymbosa</i> L.	Rubiaceae	Liver and skin disease infections and anti-inflammation
124	<i>Oldenlandia umbellata</i> L.	Rubiaceae	Asthma, bronchitis, poisonous bites, ulcers, antibacterial, anti-inflammatory, and antioxidant.
125	<i>Richardia scabra</i> L.	Rubiaceae	Skin diseases, wound healing and urinary tract Infections.
126	<i>Spermacoce hispida</i> Linn.	Rubiaceae	Wound healing, diabetes, inflammation, stomach problems, urinary issues, liver diseases, antioxidant, antibacterial, and anti-cancer.
127	<i>Physalis minima</i> L.	Solanaceae	Anti-inflammatory, analgesic, diuretic, inflammation, fever, digestive issues, anti-ulcer, anti-fertility, and anti-microbial.
128	<i>Solanum nigrum</i>	Solanaceae	Liver disorders, dermatitis, eczema, fevers,

	Linn.		stomach ulcers, asthma, inflammation and digestive issues.
129	<i>Cardiospermum halicacabum</i> L.	Sapindaceae	Anti-inflammatory, Analgesic, Antioxidant, Antimicrobial, Arthritis, Rheumatism, Eczema, Ringworm and Muscle aches.
130	<i>Bacopa monnieri</i> (Linn.) Pennell	Scrophulariaceae	Improve memory and Focus, reduce Anxiety, Antioxidant, Epilepsy, Alzheimer's disease, Anti-inflammatory and Antidepressant.
131	<i>Scoparia dulcis</i> L.	Scrophulariaceae	Diabetes, Skin issues, Gastrointestinal problems, Antioxidant, Anti-inflammatory, Fevers, Kidney stones and Snakebites
132	<i>Pilea microphylla</i> L.	Urticaceae	Antioxidant, Antimicrobial, Menstrual pain relief, Dysmenorrhea and Skin conditions
133	<i>Pouzolzia auriculata</i> Wight	Urticaceae	Cold, cough, Pain relief and Skin inflammation
134	<i>Tribulus terrestris</i> L.	Zygophyllaceae	Anti-diabetic, Antimicrobial, Antiviral, and Anti-inflammatory, Antioxidant and Kidney stones.

Grasses, specifically, were observed occupying nearly every open space across the campus. The ecological dominance of the Poaceae family is significant, as these species act as pioneer colonizers with extensive root systems that aid in soil binding and moisture retention. Their ability to produce high seed volumes and achieve rapid vegetative growth ensures their success in frequently disturbed environments. Additionally, families like **Asteraceae** and **Fabaceae**, which are rich in herbaceous weeds, are recognized for both their ecological resilience and their medicinal importance.

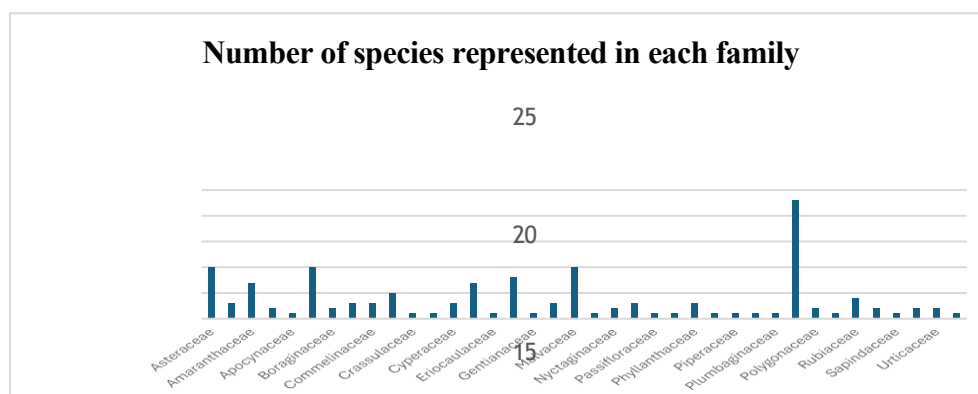
The diverse array of habitats within the college-including shaded groves, open grounds, flower beds, roadside patches, and neglected corners-creates specific micro-niches that support various weed communities. Certain species, such as *Tridax procumbens*, *Ageratum conyzoides*, and *Euphorbia hirta*, were found to be cosmopolitan, appearing throughout the entire campus. In contrast, species like *Centella asiatica* and *Peperomia pellucida* showed a clear preference for shaded, moist environments. This broad ecological adaptability highlights the highly dynamic and resilient nature of the campus weed vegetation.

3.2 Family-wise Distribution and Ecological Significance

The dominance of the Poaceae family at the Holy Cross College campus signifies the unique ability of grasses to flourish in nutrient-poor and disturbed soils, where they form dense mats that act as early colonizers and prevent soil erosion. Beyond their ecological role, grass species such as *Cynodon dactylon*, *Eleusine indica*, and *Pennisetum polystachion* are documented for their anti-inflammatory, antidiabetic, and wound-healing medicinal properties. This family-wise dominance varies by geography; for instance, a study by Dangwal et al. (2011) at the S.R.T. Campus in Uttarakhand, India, found Asteraceae to be the leading family, followed by Fabaceae and Amaranthaceae. Similarly, research at the Narasinha Dutt College campus in Howrah reported Asteraceae as the dominant group, followed by Amaranthaceae, Euphorbiaceae, Poaceae, and Scrophulariaceae (Pampa Chakraborty et al., 2020).

The Acanthaceae family, represented on campus by species like *Andrographis paniculata*, *Asystasiagangetica*, and *Barleria prionitis*, serves a dual role as shade-loving herbs that thrive under tree canopies and along moist drainage lines, while being traditionally used to treat fever and respiratory infections. Meanwhile, the Asteraceae family—including *Eclipta alba*, *Tridax procumbens*, and *Ageratum conyzoides*—flourishes in sunlit areas and drought conditions, acting as soil stabilizers and sources of antibacterial and antioxidant compounds. The Fabaceae family provides vital ecological services through nitrogen-fixing, which enriches the soil, while species such as *Tephrosia purpurea* and *Desmodium triflorum* offer therapeutic benefits for liver disorders and skin infections.

Furthermore, the Malvaceae family, featuring hardy perennials like *Sida acuta* and *Abutilon indicum*, contributes significantly to the flora across both moist and dry soils, with traditional applications for arthritis and diabetes. Ultimately, the distribution pattern of these families reflects a sophisticated interaction between ecological adaptation and ethnomedicinal value, representing a balanced mix of hydrophytic weeds in moist, shaded zones and xerophytic species in open, dry patches.

Graph:1 Species Richness in each Family

Diversity Pattern and Habitat Association

The weed flora in the study area exhibited distinct habitat preferences, reflecting a high degree of adaptability to various anthropogenic environments. Open lawns were primarily dominated by hardy species like *Tridax procumbens* and *Cynodon dactylon*, while moist, shaded zones—particularly those near drainage lines—provided the necessary conditions for *Centella asiatica*, *Peperomia pellucida*, and *Commelina benghalensis*. In contrast, cultivated and semi-managed garden patches were home to *Amaranthus viridis*, *Alternanthera sessilis*, and *Boerhavia diffusa*. The dry, fallow lands supported resilient species such as *Cleome viscosa* and *Sida acuta*, which are capable of withstanding intense sunlight and severe water scarcity. This variation across specific microhabitats demonstrates a balanced coexistence of both annual and perennial weeds, highlighting their ability to thrive within diverse ecological niches.

3.3 Medicinally Important Weeds

Of the 134 recorded species identified in the study area, nearly 90% possess documented medicinal properties (Table1), serving as a vital foundation for Ayurveda, Siddha, Unani, and various folk medicine systems. These plants are frequently utilized to treat a wide range of ailments, including respiratory disorders, gastrointestinal problems, skin diseases, and persistent fevers. Within the family Acanthaceae, species such as *Andrographis paniculata* are essential for managing liver disorders and diabetes, while *Barleria prionitis* is valued for its anti-inflammatory and wound-healing properties. Similarly, Asteraceae members like *Tridax procumbens* and *Eclipta alba* offer significant hepatoprotective effects, and *Chromolaena odorata* is relied upon for its ability to rapidly stop bleeding. Amaranthaceae species, including *Amaranthus spinosus* and *Aerva lanata*, provide diuretic benefits for kidney and urinary disorders, while Poaceae weeds like *Cynodon dactylon* are highly regarded for their antidiabetic and anti-inflammatory uses.

According to research reported by Rajeev Kumar Yadav and Nisha Verma (2020) at Bareilly College, Uttar Pradesh, India, Fabaceae species such as *Tephrosia purpurea* and *Crotalaria verrucosa* are effective in treating liver disorders, fevers, and various skin conditions. This therapeutic diversity extends to the Euphorbiaceae family, where *Euphorbia hirta* and *Acalypha indica* are used against asthma and bronchitis, and the Malvaceae family, where *Sida cordifolia* and *Urena lobata* are applied to treat arthritis and inflammation. Furthermore, aromatic Lamiaceae species like *Ocimum basilicum* and *Leucas aspera* provide antimicrobial and antioxidant activities for respiratory health. Because many of these medicinal weeds are abundant and grow year-round, they represent a highly accessible source for community-based traditional medicine, highlighting the immense, often overlooked therapeutic wealth contained within neglected regional flora.

Agricultural weeds are increasingly recognized as a significant resource in ethnopharmacology, with a notable correlation existing between weed families and those used for medicinal purposes (Stepp & Moerman, 2001). Beyond their role as pests, many weeds possess biomedical importance, serving as a primary source for the development of modern pharmaceuticals (Ali et al., 2021; Stepp, 2004). Specifically, species within the Asteraceae family found in agricultural settings have been identified for their high medicinal value (Jayasundera et al., 2021). These plants are often viewed as culturally and cognitively important resources by local farmers, rather than mere competition for crops (Cruz-Garcia & Price, 2012). Furthermore, certain weeds contribute to the economic and ecological health of farmland by repelling insect pests through their natural scents (Ekwealor et al., 2019). The presence of weeds may even act as a beneficial stressor for cultivated medicinal herbs, potentially increasing the production of secondary medicinal metabolites (Carrubba, 2017). Despite being overlooked in traditional pharmacopeias, weeds represent a critical, readily available resource for medicinal and nutritional needs (Sahrawat et al., 2020; Stepp, 2004).

3.4 Implications for Conservation and Education

Weeds are recognized as an essential source of medicine for indigenous people, playing a vital role in local healthcare and traditional knowledge systems (Ekwealor et al., 2019). Beyond medicinal value, weeds are significant for maintaining biological diversity within crop fields, providing necessary resources for various insect and bird populations (Marshall et al., 2003). In the context of sustainable farming, conservation agriculture (CA) aims to enhance sustainability without compromising land productivity, though it significantly influences how weed populations behave (Chauhan et al., 2012). Research suggests that conservation tillage technologies can actually increase the biodiversity of field

weeds, which contributes to a more resilient ecosystem (Winkler et al., 2022). Furthermore, the use of allelopathic traits from specific crops can be integrated with common control strategies to manage weed inhibition effectively within these conservation systems (Singh et al., 2014). However, weed management remains a complex challenge in conservation agriculture because high amounts of crop residue can make traditional mechanical weed control much harder to achieve (Basch et al., 2020). Ultimately, finding a balance through sustainable management is an important task, as changing weed dynamics require the fabrication of new and adaptive management options (Bajwa, 2014).

4 Summary and Conclusion

The research titled “Weed Species Diversity and Its Medicinal Uses in Holy Cross College Campus, Nagercoil, Kanyakumari District, TamilNadu” offers a detailed documentation of weed flora and their ethnomedicinal importance within the campus ecosystem. Identifying a total of 134 weed species across 38 families, the study reflects the region's rich floristic diversity, with Poaceae (23 species), Acanthaceae (10), Asteraceae (10), Malvaceae (10), and Fabaceae (8) emerging as the dominant families. This distribution suggests these families are exceptionally well-adapted to the campus's tropical, humid climate and varied microhabitats, ranging from lawns and drainage lines to shaded groves and wastelands.

Crucially, the study found that approximately 90% of these recorded weeds possess recognized medicinal properties, serving as traditional remedies for ailments such as respiratory disorders, digestive issues, skin diseases, and chronic inflammation. Families like Asteraceae, Acanthaceae, and Euphorbiaceae are notably rich in pharmacologically active species, with plants such as *Andrographis paniculata*, *Tridax procumbens*, and *Cynodon dactylon* being staples of folk and Ayurvedic medicine. Beyond their therapeutic value, these weeds are ecologically significant, helping to stabilize soil, conserve moisture, and support local pollinators. The link between their ecological dominance and medicinal value further suggests that the stress-tolerance mechanisms of these plants contribute to the production of potent bioactive compounds.

Ultimately, this study achieves its goal of reframing "weeds" as valuable reservoirs of phytochemicals rather than mere agricultural nuisances. By providing essential baseline data for future research in phytochemistry and pharmacognosy, the findings highlight the importance of educating students and the community on the ecological roles of these plants. Promoting such awareness is vital for the sustainable utilization and conservation of these overlooked resources, aligning with the broader objectives of environmental education and

biodiversity preservation.

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Evaluation of Antibacterial Properties of *Averrhoa bilimbi* and *Averrhoa carambola* Using Different Solvent Extracts

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ABSTRACT

The ongoing research was conducted to compare the antibacterial properties of various solvent extracts of Averrhoa bilimbi and Averrhoa carambola against selected pathogenic bacteria. Freshly gathered plant materials were obtained, and extracted using ethanol, methanol, butanol, acetone and ethyl acetate solvents. The antibacterial activity of the extracts was evaluated by using the agar well diffusion approach to combat E. coli, K. pneumoniae, P. mirabilis, P. aeruginosa, B. subtilis, B. cereus and S. aureus. Streptomycin was utilized as the typical antibiotic control. The findings demonstrated that the antibacterial activity of each extract varied depending on the solvent and tested bacterial strain. Among the diverse solvent extracts, the butanol extract revealed the maximum antibacterial efficacy in both plants. In A. carambola, the butanol extract shown top inhibition against E. coli (35 mm), followed by K. pneumoniae (33 mm) and S. aureus (30 mm). In Averrhoa bilimbi, the chief growth restriction was detected against P. aeruginosa (30 mm) and E. coli (26 mm). Ethanol extracts likewise established substantial antibacterial activity, while methanol extracts exhibited sensible activity. Acetone also ethyl acetate extracted samples exhibited comparatively lower antibacterial effects. Comparative analysis revealed that Averrhoa carambola possessed stronger potential than Averrhoa bilimbi. The antibacterial activity may be credited to the occurrence of phytochemicals such as flavonoids, tannins, alkaloids, phenolics, and terpenoids. The study suggests that both plants can serve as promising natural sources of antibacterial agents for future pharmaceutical applications.

Keywords: Bioactive Compounds, Extraction, Pathogens, Phytochemicals, Solvents.

Introduction

Antibiotic-resistant microbes are becoming more and more common, which is a thoughtful risk to world health. There is a persistent essential for substitute healing mediator's derivative from natural sources because the overuse and abuse of synthetic antibiotics in human health, veterinary medicine, and agriculture have decreased the efficacy of many antimicrobial medications (Alvarez-Martínez et al., 2021). Researchers are looking into remedial plants as possible sources of new antimicrobial chemicals owing to the advent of germs that are resistant to drugs. Compared to manufactured medications, plant-derived bioactive compounds are thought to be safer, biodegradable, and less likely to cause negative

side effects. Phytochemicals are abundant in therapeutic shrubberies and have important antibacterial, antioxidant, anti-inflammatory, and therapeutic qualities (Luan et al. 2021). Through a variety of processes, including as rupture of the microbial cell wall, suppression of protein synthesis and interference with nucleic acid processing, these substances can prevent bacterial development.

Two significant therapeutic floras under the Oxalidaceae family are *Averrhoa carambola* and *Averrhoa bilimbi*. These sultry plants are usually grown in Asian nations and are valued for their dietary worth along with for therapeutic uses in conventional medical systems. Fruits, leaves, bark, and roots are among the several elements of these plants with documented historical use to treat fever, cough, inflammation, diabetes, skin conditions, digestive issues, and microbiological infections. Owing to the occurrence of phytochemicals and other secondary metabolites, both plants were reported in earlier research to have antimicrobial, antioxidant, anti-inflammatory, antidiabetic and hypoglycemic properties (Silva et al. 2021; Leliqia and Safitri 2021). Furthermore, these plants' antioxidant capacity may improve their therapeutic effectiveness in the ailment of illness and shield cells from oxidative stress.

Bioactive compounds extracted by a range of solvents, including ethyl alcohol, methyl alcohol, butanol, acetone, aqueous and ethyl acetate. The amount and quality of plant chemicals take out from plant parts are involved by the polarization of the solvent, extraction temperature and time, all of which have a substantial impact on extraction efficiency. While non-polar solvents are appropriate for extracting lipophilic molecules, polar solvents are typically more effective at extracting phenolic and flavonoid chemicals. Consequently, the antibacterial activity and general efficacy of plant extracts are greatly influenced by the solvent selection (Alvarez-Martínez et al. 2021). Comparative analysis of various solvent extracts can produce vital perceptions into the best extraction technique and the healing potential of therapeutic plants against pathogenic microbes.

Materials and Methodology

Collection and Preparation of fruit Extracts

Fresh and healthy fruits, *A. carambola* and *A. bilimbi* were obtained from Elavuvilai, Kanniyakumari District, and identified using standard botanical keys. Approximately 25g of fresh, healthy fruit was collected, thoroughly washed with distilled water, cut into small pieces, and homogenized using a sterile blender. The homogenized fruit material was separately mixed with 100 mL of ethanol, methanol, butanol, acetone and ethyl acetate. Each mixture was macerated for 48 hours under cool conditions with intermittent shaking to

facilitate the extraction of bioactive compounds. After maceration, the mixtures were filtered through Whatman No. 1 filter paper and the filtrates were concentrated by evaporating the respective solvents. The concentrated fruit extracts were collected in sterile, labelled containers and stored at 4° C until further analysis.

Test Microorganisms

E. coli, *K. pneumoniae*, *P. mirabilis*, *P. aeruginosa*, *B. subtilis*, *B. cereus* and *Staphylococcus aureus* were among the harmful bacterial strains that were used to test the extracts' antibacterial efficacy. At 4°C, pure cultures of the bacteria were kept on nutrient agar slants.

Antibacterial Assay

The disc diffusion technique was handled to assess the solvent extracts antibacterial activity. Using sterile cotton swabs, bacterial cultures were evenly injected onto sterile Mueller-Hinton agar plates. Using sterile forceps, sterile filter paper discs (6 mm in diameter) were gently placed on the upper layer of the inoculated agar plates then being permeated with equivalent amounts (25µl) of various solvent extracts. The typical antibiotic control was a disc that contained streptomycin. After the plates were incubated at 37°C for a full day, the antibacterial activity was evaluated by measuring the diameter of the zone of inhibition surrounding each disc in millimeters (mm). The average values were recorded after the trials were conducted in triplicate. The average zone inhibition values of the triple experiments were employed to convey the findings. The antibacterial effects of different solvent extracts were analyzed by evaluating the diameters of the inhibition zones produced against the tested bacterial strains.

Results

Antibacterial potency of the *Averrhoa bilimbi* extracts

In comparison to the common antibiotic streptomycin, the antibacterial activity of several solvent fruit extracts of *Averrhoa bilimbi* was assessed against seven harmful bacterial strains. The findings demonstrated that, depending on the solvent utilized and the bacterial species examined, all extracts had differing levels of antibiotic activity (Table 1). The butanol extract had the strongest antibacterial activity against the majority of the microorganisms among the studied extracts. *P.s aeruginosa* had the major zone of growth resistance (30 mm), whereas *E. coli* had a zone of 26 mm. Additionally, strong antibacterial potential against *B. cereus* (18 mm) and *S. aureus* (19 mm) was noted. *Proteus mirabilis* (10 mm), *Bacillus subtilis* (9 mm), and *Klebsiella pneumoniae* (11 mm) all showed moderate inhibition. The ethanol extract also demonstrated considerable antimicrobial activity.

However, the peak growth resistance was distinguished against *E. coli* (18 mm) and *S. aureus* (15 mm). Moderate to low antibacterial efficiency was identified against *P. aeruginosa* (10 mm), *B. subtilis* (10 mm), *B. cereus* (9 mm), and *K. pneumoniae* (8 mm). The present findings demonstrate that the antibacterial efficacy varied contingent on the solvent used for extraction and the vulnerability of the bacterial species tested. No bacterial inhibitory activity was detected against *P. mirabilis*. The acetone and ethyl acetate isolates showed comparatively lower antibacterial activity.

Table 1: Antibacterial potency of the *Averrhoa bilimbi* extracts

Microbes	Ethanol	Methanol	Butanol	Acetone	Ethyl acetate	Streptomycin
<i>K. pneumoneae</i>	15	8	11	10	14	15
<i>P. mirabilis</i>	15	-	10	-	8	15
<i>E. coli</i>	24	18	26	13	12	18
<i>B. subtilis</i>	12	10	9	-	8	20
<i>P. aureginosa</i>	20	10	30	8	10	20
<i>B. cereus</i>	24	9	18	10	12	15
<i>S. aureus</i>	14	15	19	13	15	20

Antibacterial potency of the *Averrhoa carambola* extracts

Of all the solvent extracts, the butanol extract displayed the strongest antibacterial potency with majority of the tested bacteria. *E. coli* presented the major zone of hang-up (35 mm), indicating high susceptibility of the bacterium to the extract (Table 2). Considerable antibacterial potency was detected with *P. aeruginosa* and *B. cereus* (29 mm each), *S. aureus* (30 mm), and *K. pneumoniae* (33 mm). Additionally, the butanol extract displayed reasonable antibacterial potency against *B. subtilis* (20 mm) and strong activity against *P. mirabilis* (28 mm). These results imply that the butanol extract contains potent bioactive mixtures with broad-spectrum antibacterial properties. The ethanol extract demonstrated moderate to strong antibacterial efficacy against every species of bacteria tested. *E. coli* displayed the largest inhibition zone (25 mm), followed by *P. mirabilis* (24 mm). *B. subtilis* and *B. cereus* unveiled growth inhibition zones of 18 mm each, while *S. aureus* displayed a zone of moderate potency (20 mm). Comparatively, there was evidence of antibacterial potency lower against *P. aeruginosa* (15 mm) and *K. pneumoniae* (16 mm). The methanol extract exhibited moderate antibacterial activity. The greatest level of inhibition was distinguished against *B. subtilis* (22 mm) and *E. coli* (20 mm). Reasonable potency was detected against *B. cereus* (16 mm) and *S.*

aureus (15 mm), whereas lower inhibition was noted against *K. pneumoniae* and *P. mirabilis* (9 mm each). No bacterial growth resistance was detected against *P. aeruginosa*. The antibacterial capacity of the acetone and ethyl acetate isolates was comparatively low against the bacteria tested. The acetone extract showed no inhibitory activity against *P. mirabilis*, *P. aeruginosa* and *B. cereus*. These results denoted that the butanol extract of *A. carambola* possesses significant antibacterial efficiency and may aid as a promising natural gift of antimicrobial complexes.

Table 2: Antibacterial potency of the *Averrhoa carambola* extracts

Microbes	Ethanol	Methanol	Butanol	Acetone	Ethyl acetate	Streptomycin
<i>K. pneumoneae</i>	16	9	33	16	21	25
<i>P. mirabilis</i>	24	9	28	-	18	16
<i>E. coli</i>	25	20	35	20	16	23
<i>B. subtilis</i>	18	22	20	17	15	28
<i>P. aureginosa</i>	15	-	29	-	20	25
<i>B. cereus</i>	18	16	29	-	9	18
<i>S. aureus</i>	20	15	30	12	18	19

Discussion

The current investigation showed that several extracts of *A. bilimbi* and *A. carambola* have robust antibacterial efficacy against a number of harmful bacterial strains. The bacterial species examined and the extraction solvent utilized affected the antibacterial effectiveness. The butanol extract showed the most antibacterial activity against the majority of the tested microorganisms among the other solvent extracts. This could be because bioactive phytochemicals with potent antibacterial qualities, such as flavonoids (Panche et al. 2016), tannins (Cowan 1999), phenolic compounds (Daglia 2012), alkaloids (Wink 2012), and terpenoids (Bakkali et al., 2008) are effectively extracted (Luan et al. 2021).

In *A. carambola*, the butanol extract with the strongest antibacterial efficiency against *E. coli*, *K. pneumoniae*, and *S. aureus*. Similarly, in *A. bilimbi*, the butanol extract demonstrated better antibacterial efficiency against *P. aeruginosa* and *E. coli*. These findings are in agreement with earlier studies reporting that the presence of phenolic (Daglia 2012) and flavonoid (Panche et al. 2016) compounds in solvent extracts of *Averrhoa* species contributes to their broad-spectrum antibacterial efficacy against bacteria that are both Gram-positive and Gram-negative (Silva et al., 2021). Both plants' ethanol isolates displayed potent antibacterial

efficiency against a diverse of bacterial species. When extracting polar and moderately polar bioactive elements from medicinal plants, ethanol is thought to be an efficient solvent. Therefore, the inclusion of tannins, saponins, flavonoids and glycosides may be linked to the notable antibacterial efficiency of ethanol compounds found in the present investigation (Atiyah et al., 2022). Leliqia and Safitri (2021) reported similar findings, discovering that *A. bilimbi* ethanol extracts shown significant inhibitory potential against harmful microbes.

The antibacterial potency of the methanol extracts was moderate, whereas that of the extracts of acetone, ethyl acetate was relatively low. Variations in polarity of solvent and their ability to dissolve certain phytochemical elements may be accountable for the discrepancies in antibacterial activity between solvents. The efficiency of extracting antimicrobial chemicals from plant materials is significantly influenced by the solvent polarity (Alvarez-Martinez et al. 2021). In this current investigation, butanol and ethanol seemed to be better solvents than ethyl acetate and acetone for the extraction of antibacterial chemicals.

The antibacterial efficiency exhibited against Gram-positive bacteria *B. subtilis*, *B. cereus* and *S. aureus*, also Gram-negative bacteria including *E. coli*, *K.pneumoniae* and *P. aeruginosa*, demonstrates the broad-spectrum potency of the plant extracts. According to Cushnie and Lamb (2011), the antibacterial mechanism of phytochemicals may involve disruption of bacterial cell walls and cell membranes, inhibition of nucleic acid synthesis, interference with protein synthesis, and alteration of microbial metabolic pathways. Interestingly, in certain cases, the butanol extracts exhibited greater antibacterial activity than the standard antibiotic streptomycin. This finding suggests that these medicinal plants possess significant therapeutic potential as alternative natural antibacterial agents. The findings of the present investigation support earlier reports highlighting the medicinal and therapeutic importance of *A. bilimbi* and *A. carambola* in traditional healthcare systems (Luan et al., 2021; Leliqia and Safitri, 2021). The current investigation demonstrates that *A. bilimbi* and *A. carambola* possess significant antibacterial potential, particularly in their butanol and ethanol extracts. These findings suggest that both plants could serve as promising natural products for the growth of plant-based antibacterial agents. However, further studies are need to isolate, purify and elucidate the active bioactive complexes accountable for the antibacterial potency. In addition, detailed toxicity evaluation and pharmacological surveys are required to explore their safety, effectiveness and potential pharmaceutical applications.

Conclusion

The current investigation showed that *A. carambola* and *A. bilimbi* possess good antibacterial potency against different pathogenic bacteria. The antibacterial capacity varied reliant on the solvent used for extraction. Among all the extracts, the butanol extract showed the remarkable antibacterial capacity, followed by the ethanol extract. Methanol extracts showed moderate activity, while acetone and ethyl acetate extracts showed lower antibacterial activity. Compared to *A. bilimbi*, *A. carambola* exhibited stronger antibacterial activity. The antibacterial properties may be owing to the occurrence of phytochemicals and secondary metabolites. The study suggests that both plants can be used as natural sources of antibacterial compounds. Further investigation are essential to identify the functional groups and assess their therapeutic applications.

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Artificial Intelligence in Life Sciences: Transformative Applications, Challenges, and Future Horizons

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ABSTRACT

Artificial intelligence (AI) has fundamentally altered biological inquiry, shifting the domain from purely observational studies to predictive, computational engineering. This paper provides a rigorous evaluation of AI deployments across core biological spheres, including genomic analysis, molecular therapeutics, biotechnology, neurobiology, and environmental monitoring. Highlighting breakthroughs such as AlphaFold 3, the analysis shows how generative models, deep neural architectures, and multi-omics aggregation are resolving long-standing biological puzzles. Furthermore, the paper examines the operational improvements of computational pipelines over classic empirical techniques, contrasting their speed and analytical depth while addressing ongoing vulnerabilities in algorithmic interpretability and dataset bias. To navigate ongoing bottlenecks such as structural data fragmentation, opacity, and regulatory ambiguity an integrative 'Technology–Ethics–Talent' framework is designed to foster equitable and transparent innovation. Ultimately, this work articulates how computational models are orchestrating an autonomous and data-centric future for life sciences.

Keywords: Artificial Intelligence, Machine Learning, Precision Medicine, Computational Genomics, Structural Proteomics, Multi-Omics, Biomanufacturing, Ethics in AI

1. Introduction

For generations, progress in biological research followed a traditional, hypothesis-first framework. Scientific breakthroughs relied heavily on laboratory intuition: investigators framed tentative mechanisms, isolated single variable conditions, and evaluated outcomes using manual physical testing. While this rigorous blueprint unlocked fundamental breakthroughs, its incremental pace is intrinsically bounded by human cognitive constraints and the immense, interconnected complexity of biological networks. Modern biomedical inquiry generates staggering arrays of high-throughput data across DNA sequencing, tissue imaging, proteomic profiles, and cellular metabolomics. This massive data volume creates a dual imperative: while deep datasets contain the signatures of complex diseases, extracting actionable insights requires computational architectures far exceeding legacy manual analysis (Luo et al., 2024).

Computational intelligence answers this bottleneck by deploying automated pattern recognition, high-dimensional predictive modeling, and scalable hypothesis formation. Where conventional statistical tools rely on rigid, linear assumptions, modern algorithms excel at identifying subtle, non-linear dependencies embedded within vast data reservoirs. Consequently, researchers can decipher subtle genetic variants that dictate cellular malfunction—a task previously obscured by noise. This technical shift alters the fundamental nature of biology, moving the discipline from retrospective descriptions of cellular behavior toward proactive, predictive modeling of living systems.

However, embedding algorithm-driven insights into real-world medicine brings complex challenges. Persistent issues around training data fidelity, model opacity (the 'black-box' dilemma), and regulatory governance must be tackled systematically. Furthermore, reliance on massive human demographic databases introduces complex questions around data ownership, privacy, and systemic bias. True progress requires pairing technical computational milestones with robust ethical frameworks and adaptive governance mechanisms. This review presents a comprehensive assessment of advanced computational frameworks in biological sciences, assessing both operational capabilities and systemic constraints across the discovery pipeline.

2. Computational Frameworks and Core Technologies

The rapid evolution of artificial intelligence in life sciences stems from specialized computational paradigms tailored for distinct dataset formats. At the foundational layer, classical machine learning (ML) algorithms including random forests, decision trees, and support vector machines have long supported bioinformatics tasks like gene expression classification and disease risk scoring. Although these classic approaches offer structural transparency and mathematical simplicity, they struggle when evaluating unstructured, multi-dimensional biological datasets.

To overcome these performance bottlenecks, deep learning (DL) utilizes layered neural network architectures to automatically learn hierarchical feature representations directly from raw input files. Convolutional Neural Networks (CNNs) have established benchmark performance in visual diagnostics, accurately interpreting complex radiological scans and histopathological tissue slides. Concurrently, Recurrent Neural Networks (RNNs) and modern Transformer networks have transformed sequence analysis across genomics and proteomics. Transformer architectures, equipped with self-attention mechanisms, excel at capturing long-range contextual relationships across extensive nucleic acid sequences, dramatically elevating structural variant predictions (Benegas *et al.*, 2024).

A prominent milestone in structural biology is AlphaFold 3, an advanced deep learning framework that predicts three-dimensional macromolecular interactions with atomic precision (Abramson *et al.*, 2024). Historically, resolving protein architectures required months of labor-intensive wet-lab techniques, such as X-ray crystallography and cryo-electron microscopy. AlphaFold 3 bypasses these physical bottlenecks by delivering high-confidence structural predictions in minutes, fundamentally accelerating target validation and rational drug design.

Simultaneously, generative modeling has expanded computational workflows from data analysis to *de novo* biomolecular design. Utilizing Generative Adversarial Networks (GANs) and modern diffusion architectures, researchers can construct novel functional proteins and screen synthetic chemical libraries *in silico*. Rather than relying on slow, iterative physical testing, generative pipelines navigate immense chemical spaces to pinpoint optimal therapeutic leads efficiently (Springer Nature, 2025). Complementing these tools, Natural Language Processing (NLP) parses millions of unstructured scientific publications, patient health records, and clinical trial repos to automate literature synthesis and surface hidden therapeutic links.

3. Applications in Basic Biological Discovery

By processing heterogeneous datasets simultaneously, intelligent computational models offer a unified, systems-level vantage point on living organisms. In genomic research, computational models process nucleotide sequences to evaluate non-coding regions, identify rare variants, and predict functional consequences on cellular expression. Unlike static statistical associations, deep learning networks incorporate cross-layer cellular parameters to reveal intricate genetic interactions driving complex phenotypic traits (Benegas *et al.*, 2024). In structural proteomics, advanced prediction tools have resolved structural configurations for hundreds of millions of biomolecules. Tools like AlphaFold 3 allow structural biologists to model complex protein-ligand, protein-RNA, and multi-protein assemblies accurately (Abramson *et al.*, 2024). Although wet-lab assays remain necessary for downstream experimental verification, algorithmic pre-screening reduces experimental failure rates and accelerates the mapping of fundamental cellular machinery.

Biotechnology and synthetic engineering have similarly embraced algorithmic optimization, particularly within CRISPR-Cas gene-editing workflows. Machine learning platforms analyze genomic context to forecast off-target cleavage events and optimize guide RNA sequences, maximizing target specificity and safety. Additionally, synthetic biology leverages algorithms to construct metabolic pathways in engineered microbial hosts,

streamlining the bio-production of specialized enzymes, biofuels, and therapeutic compounds (Springer Nature, 2025).

On an ecological scale, computational models analyze multi-spectral satellite footage, distributed environmental sensor networks, and field observations to track biodiversity trends in real time. Algorithmic modeling enables environmental scientists to forecast ecosystem shifts, track habitat loss, and deploy proactive conservation measures efficiently (Luo et al., 2024).

4. Modernizing Healthcare: Diagnostics, Precision Medicine, and Drug Discovery

The integration of predictive algorithms into clinical workflows is accelerating diagnostic precision and individualizing therapy. Deep learning models applied to digital pathology, oncology imaging, and cardiology enable automated recognition of subtle cellular aberrations prior to clinical presentation. These intelligent tools provide reproducible, rapid assessments, reducing visual fatigue for pathologists while elevating diagnostic consistency across varied clinical settings (Zhao *et al.*, 2025).

In precision medicine, predictive frameworks combine individual patient profiles—including whole-genome sequencing, metabolic panels, lifestyle habits, and real-time biometric tracking—to tailor specific therapeutic protocols. Moving beyond traditional 'one-size-fits-all' medicine, algorithmic pharmacogenomics predicts how individual genetic variations alter drug metabolism, optimizing dosage and minimizing toxic side effects (Frontiers, 2025).

The pharmaceutical discovery funnel has seen profound transformation. Developing a new drug candidate through traditional laboratory pipelines routinely requires over a decade and billions of dollars in investment. Predictive algorithms collapse these timelines by performing virtual high-throughput screening, predicting molecular binding affinities, and filtering candidate molecules for optimal pharmacokinetic profiles early in development. Furthermore, computational drug repurposing identifies novel therapeutic targets for existing, FDA-approved compounds, dramatically cutting clinical translation timelines (Springer Nature, 2025).

5. Computational Advances in Neuroscience

Deciphering the human brain comprising over 86 billion interconnected neurons—presents one of the most formidable challenges in biological science. Neural networks generate highly dynamic electrophysiological and biochemical signals that overwhelm classic analytical tools. Modern computational approaches, particularly deep learning networks and

graph-based models, decode these complex signaling networks with remarkable precision (Frontiers, 2025).

A transformative outcome of this intersection is the Brain-Computer Interface (BCI). BCIs translate neural signals recorded via electroencephalography (EEG), electrocorticography, or functional MRI into digital control signals for external machinery. Machine learning algorithms filter background signal noise, enabling motor-impaired patients to maneuver prosthetic limbs, control digital interfaces, or communicate using thought patterns directly. High-capacity neural networks process continuous streams of neural data in real time, delivering finer control and clinical utility. Nevertheless, long-term implant biocompatibility, signal degradation, and neuro-ethical concerns surrounding mental privacy remain active research priorities (Frontiers, 2025).

Computational models also drive progress in neuroinformatics. By organizing multi-modal imaging datasets into structural networks, Graph Neural Networks (GNNs) map macro-scale functional connectivity across distinct brain regions. These graphical models clarify how neural sub-networks coordinate complex cognitive processes like memory retention, focus, and executive decision-making.

Clinically, predictive algorithms aid in the early identification of neurodegenerative disorders before overt anatomical atrophy occurs. Models trained on functional neuroimaging and fluid biomarkers detect subtle pathological patterns indicative of early Alzheimer's, Parkinson's, or ALS (Zhao *et al.*, 2025). Identifying early neurodegenerative markers enables earlier therapeutic interventions, improving patient management strategies.

6. Automation in Biomanufacturing and Pharmaceutical Systems

Beyond early-stage research, biological algorithms are modernizing industrial bioprocessing and pharmaceutical production. Legacy biomanufacturing methods often suffer from batch-to-batch inconsistency, high operational overhead, and rigid process controls. Deploying predictive models allows biomanufacturers to establish dynamic, automated control over sensitive biological production runs (Springer Nature, 2025).

Machine learning models leverage real-time sensor streams to track critical bioprocess parameters, such as pH levels, dissolved oxygen, ambient temperature, and nutrient consumption rates inside industrial bioreactors. Predictive algorithms continuously adjust control variables to maintain optimal biological growth conditions, maximizing therapeutic protein yields while limiting product degradation. Compared to static, pre-programmed control loops, dynamic algorithmic systems adapt seamlessly to fluctuations within biological systems.

A key innovation in industrial biomanufacturing is the deployment of 'Digital Twins' virtual computer models that mirror physical bioreactors in real time. Digital twins allow process engineers to simulate parameter changes, run stress tests, and optimize yield outcomes virtually before making physical adjustments on the factory floor. This capability reduces physical resource consumption, lowers operational risks, and facilitates smooth scale-up from lab testing to commercial production. Furthermore, predictive maintenance models evaluate equipment operational stress, forecasting machinery failure before expensive production losses occur (Springer Nature, 2025).

Additionally, Reinforcement Learning (RL) agents are increasingly applied to continuous bioprocess management. RL systems autonomously fine-tune nutrient feeds to maintain cell culture viability in complex environment settings. Coupled with automated quality control algorithms, these platforms verify biologic product purity and consistency, helping biomanufacturers comply with strict regulatory mandates.

7. Multi-Omics Integration and Systems Biology

Understanding complex human diseases requires evaluating biological systems across multiple operational levels rather than inspecting single layers in isolation. Legacy research typically isolated genomic, transcriptomic, proteomic, or metabolomic data individually, offering an incomplete window into biological function. Multi-omics integration unites these distinct biological layers to yield a dynamic, holistic model of cellular behavior (Zang & Wang, 2025).

Artificial intelligence provides the necessary mathematical machinery to fuse, normalize, and analyze these high-dimensional biological layers. Advanced algorithms cross-evaluate genomic mutations with corresponding transcript variations, protein abundance levels, and downstream metabolic outputs. Mapping these complex cross-layer pathways uncovers novel driver mechanisms underlying complex pathologies such as oncogenesis and autoimmune dysfunction.

Graph Neural Networks (GNNs) excel in multi-omics applications by representing cellular components genes, proteins, and metabolites as interconnected nodes within biological graphs. This topological framework models complex feedback loops, cascade signaling, and multi-gene regulatory networks accurately. For multi-omics precision medicine, integrative models stratify patient cohorts based on multi-layered biological signatures, ensuring targeted therapies match an individual's unique biological profile (Zang & Wang, 2025).

8. Operational Bottlenecks, Biases, and Ethical Imperatives

Despite rapid technical progress, deploying artificial intelligence in sensitive biological and clinical domains presents operational and ethical challenges that require careful governance. A major issue centers on data security and individual privacy. Aggregating comprehensive genomic files alongside detailed clinical histories creates risk regarding non-consensual re-identification, demanding robust data encryption, decentralized federated learning frameworks, and transparent data access governance.

Another major operational barrier is the model interpretability problem the 'black-box' nature of deep neural networks. While complex deep models yield high predictive accuracy, they rarely explain the underlying biological rationale behind their outputs. In clinical diagnostic scenarios, physicians are hesitant to base life-altering treatment decisions on unexplained machine predictions (Adadi& Berrada, 2018). Building interpretable, explainable architecture remains essential for clinical adoption.

Algorithmic bias represents another critical concern. Computational models trained predominantly on homogeneous demographic data such as genomic repositories over-representing populations of European ancestry struggle to generalize to underrepresented global populations. Deploying uncalibrated models risks amplifying existing healthcare disparities. Remedying this requires enforcing rigorous demographic diversity in training datasets, mandatory bias audits, and ongoing post-deployment validation.

Finally, current regulatory frameworks struggle to keep pace with rapidly evolving computational architectures. Regulatory agencies require novel evaluation metrics to validate adaptive algorithms that update continuously post-deployment. Establishing dynamic, standardized regulatory oversight is vital to guarantee patient safety without smothering beneficial innovation.

9. Future Horizons and Strategic Roadmap

The trajectory of biological AI points toward safer, highly transparent, and interdisciplinary analytical frameworks. A key priority is the refinement of Explainable AI (XAI) models tailored specifically for biological networks. By surfacing the key biological features driving model outputs, XAI bridges the gap between raw statistical throughput and human biological reasoning, building trust among clinical practitioners (Adadi& Berrada, 2018).

Furthermore, convergence with adjacent emerging technologies will expand computational biology capabilities. Blending quantum computing architectures with deep learning models promises to accelerate complex molecular dynamics simulations and

quantum chemistry calculations beyond modern supercomputer limits. Concurrently, pairing intelligent design models with automated robotic lab platforms will enable closed-loop 'autonomous laboratories' capable of formulating biological hypotheses, conducting physical experiments, and interpreting results with minimal human intervention.

Importantly, computational platforms offer a powerful tool for global health equity. Deploying lightweight, algorithm-driven diagnostic tools on low-cost mobile hardware can extend expert-level clinical screening to under-resourced, rural populations globally. Achieving this requires intentional investment in digital infrastructure, localized training data collection, and equitable technology transfer (Luo et al., 2024).

10. Conclusion and Strategic Framework

Artificial intelligence has shifted biological science from an empirical, discovery-based model into a predictive, data-driven engineering discipline. Across structural biology, genomic variant mapping, precision diagnostics, biomanufacturing, and ecosystem tracking, computational models demonstrate unmatched speed, scale, and analytical depth. However, realizing the full potential of these tools requires addressing systemic issues surrounding dataset bias, model transparency, data privacy, and regulatory oversight.

To guide this transition, we propose a balanced 'Technology–Ethics–Talent' framework:

- **Technology:** Focus on developing explainable, robust, and mathematically grounded algorithms alongside scalable infrastructure for multi-omics data integration.
- **Ethics:** Establish proactive governance models, privacy-preserving computational protocols, and global data standards to ensure technological benefits are shared equitably.
- **Talent:** Cultivate cross-disciplinary scientists proficient in biological mechanisms, advanced computer science, and ethical design principles.

By advancing along these three pillars simultaneously, the life sciences community can deploy artificial intelligence responsibly building an efficient, highly predictive, and equitable scientific landscape.

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Multimodal Deep Learning and Transcriptomic Synthesis for Precision Diagnostics in Acute Ischemic Stroke

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ABSTRACT

Acute ischemic stroke (AIS) is a major cause of mortality and long-term neurological disability, requiring rapid and accurate diagnosis for effective treatment. This study proposes a Hybrid Attention Fusion Multimodal Deep Learning (HAF-MDL) framework that integrates brain magnetic resonance imaging (MRI) with whole-blood transcriptomic biomarkers for precision diagnosis of AIS. DWI, ADC, and FLAIR MRI sequences are analyzed using a ResNet50-UNet with a Convolutional Block Attention Module (CBAM) for automated lesion segmentation. Transcriptomic data are processed through differential gene expression analysis, WGCNA, PPI network analysis, Boruta, LASSO, and SVM-RFE, identifying six key biomarkers: ATG7, KAT2A, RNF20, UBA1, UBE2I, and USP15. An Artificial Neural Network (ANN) classifier is developed using these biomarkers, and intermediate feature fusion combines imaging and molecular representations for unified diagnosis and prognosis prediction. Experimental results demonstrate that the proposed HAF-MDL framework outperforms unimodal approaches, achieving higher diagnostic sensitivity, specificity, and AUC. The proposed multimodal framework provides an interpretable and clinically applicable approach for accurate AIS diagnosis, prognostic assessment, and personalized treatment planning, supporting precision medicine in stroke management.

Keywords: *Acute ischemic stroke; Deep learning; Magnetic resonance imaging (MRI); Transcriptomics; Multimodal learning; Biomarkers.*

1. Introduction

Historically, acute ischemic stroke diagnosis has relied on rapid clinical evaluations and neuroimaging modalities. Non-contrast computed tomography is widely employed due to its accessibility and speed, yet it exhibits limited sensitivity in identifying early hyper-acute infarctions. Contrastingly, magnetic resonance imaging provides unparalleled soft-tissue contrast, high spatial resolution, and exquisite sensitivity to early microstructural changes [1]. However, manual evaluation of multi-slice magnetic resonance imaging volumes is time-consuming, subjective, and highly dependent on operator experience, which can introduce cognitive delays and inter-rater inconsistencies in high-stakes emergency settings.

To overcome these barriers, a paradigm shift is occurring toward automated computer-aided diagnosis systems leveraging deep learning [2]. By training deep convolutional neural networks on multi-parametric magnetic resonance imaging sequences, clinical systems can rapidly segment ischemic lesions and classify stroke territories. Yet, macro-scale imaging alone cannot fully capture the dynamic cellular and molecular microenvironment driving tissue fate. The next frontier in precision stroke medicine relies on the fusion of macro-scale neuroimaging with micro-scale molecular data, specifically whole-blood transcriptomics reflecting systemic post-translational modifications. This multimodal synthesis allows for a holistic assessment of both anatomical injury and physiological viability, providing a robust pathway for early risk stratification, prediction of long-term functional recovery, and individualized therapeutic selection.

1.1 High-Resolution Neuroimaging Modalities and Ischemic Markers

Magnetic resonance imaging acts as the clinical gold standard for characterizing brain ischemia, utilizing several core sequences that capture distinct aspects of tissue pathophysiology. Diffusion-Weighted Imaging (DWI) is uniquely sensitive to the random microscopic motion of water molecules. Within minutes of arterial occlusion, the failure of energy-dependent sodium-potassium pumps leads to an influx of extracellular water into the intracellular compartment, causing cytotoxic edema. This cellular swelling restricts water diffusion, rendering the acute infarct core highly hyperintense on diffusion-weighted images [3,4].

To verify true diffusion restriction and eliminate confounding "T2 shine-through" effects, diffusion-weighted imaging is always paired with Apparent Diffusion Coefficient (ADC) maps. True acute ischemic lesions present as distinct hypointensities on apparent diffusion coefficient maps, reflecting a drop in the quantitative diffusion coefficient. Fluid-Attenuated Inversion Recovery (FLAIR) suppresses free fluid (cerebrospinal fluid) signals, making it ideal for identifying vasogenic edema, subacute tissue damage, and pre-existing cerebral small vessel disease [5].

Integrating these sequences provides critical biological markers that guide therapeutic decisions. The DWI-FLAIR mismatch represents a crucial clinical surrogate for stroke onset timing. Because hyper-acute ischemic lesions (less than 4.5 hours from onset) appear bright on diffusion-weighted imaging but are not yet visible on fluid-attenuated inversion recovery sequences, the presence of a mismatch indicates that the patient is within the safe window for intravenous thrombolysis. Once the lesion becomes hyperintense on fluid-attenuated inversion recovery, it denotes substantial vasogenic edema, indicating a subacute phase and

an elevated risk of reperfusion-induced hemorrhage. Additionally, structural markers such as total lesion volume, spatial location, and overlap with critical eloquent motor pathways—most notably the corticospinal tract—serve as strong, interpretable predictors of long-term motor recovery and functional disability, typically quantified via the modified Rankin Scale [6,7,8].

1.2 Systemic Transcriptomic Biomarker Extraction

Computational analysis of peripheral whole-blood transcriptomic datasets has emerged as a non-invasive, translationally powerful strategy to uncover molecular biomarkers of acute ischemia [9]. Whole-blood transcriptomic datasets, specifically GSE16561 (comprising 39 ischemic stroke patients and 24 healthy controls, total $n=63$) and GSE58294 (comprising 69 cardiogenic embolic stroke patients and 23 controls, total $n=92$), have been analyzed using robust bioinformatics workflows. Low-expression filtering (levels ≤ 1 in $>50\%$ of samples), K-nearest neighbors (KNN) imputation, quantile normalization, and $\log_2(\text{expression} + 1)$ transformation are performed on the microarrays to establish consistent baseline distributions.

Weighted Gene Co-expression Network Analysis (WGCNA) using a soft power threshold of 7 identifies functional gene modules, revealing a significant positive correlation between the brown module and ischemic stroke, and negative correlations for the black, magenta, and tan modules. Differentially expressed genes (DEGs) are identified using empirical Bayes linear modeling with criteria of $|\log_2\text{Fold Change}| \geq 0.2$ and adjusted $P < 0.05$, yielding 1,465 upregulated and 1,782 downregulated genes. The intersection of significant WGCNA module genes, DEGs, and known post-translational modification-related genes (PTMRGs) identifies 75 candidate biomarkers.

A Protein-Protein Interaction (PPI) network topology (using the STRING database with a confidence threshold >0.4 and Cytoscape's cy to Hubba plugin) prioritizes the top 20 connected nodes. Three machine learning feature selection methods are then applied to these nodes: Boruta (confirming 13 features via Bonferroni correction at $P < 0.01$), LASSO regression (yielding 10 core features through L1 regularization), and SVM-RFE (identifying 10 features via 10-fold cross-validation), intersecting to yield 7 robust biomarkers. Removing the gene NEDD8 due to inconsistent external expression trends yields six highly prioritized post-translational modification-related diagnostic biomarkers. Following Table 1 consists of gene expression changes and pathophysiological impact in ischemia.

Table 1 Gene Expression Changes and Pathophysiological Impact in Ischemia

Gene Symbol	Full Biological Name	Direction of Change	Primary Post-Translational Modification Role	Downstream Pathophysiological Contribution in Ischemia
ATG7	Autophagy Related 7	Upregulated	Autophagic conjugation enzyme	Initiates autophagosome membrane formation; over-activation triggers cell death.
KAT2A	Lysine Acetyltransferase 2A	Downregulated	Histone/non-histone acetylation	Controls chromatin remodeling; depletion induces anti-inflammatory microglial shift.
RNF20	Ring Finger Protein 20	Upregulated	E3 ubiquitin-protein ligase	Monoubiquitinates Histone H2B; cooperatively drives STAT3 astrocytic differentiation.
UBA1	Ubiquitin Activating Enzyme 1	Upregulated	Primary ubiquitin activating enzyme	Initiates cellular ubiquitination cascade; crucial for proteotoxic clearance.
UBE2I	Ubiquitin Conjugating Enzyme E2 I	Downregulated	SUMOylation conjugating enzyme	Serves as the sole conjugator for SUMOylation-induced cell survival mechanisms.
USP15	Ubiquitin Specific Peptidase 15	Upregulated	Deubiquitinating cysteine protease	Removes ubiquitin chains; regulates type I interferon pathway and neuroinflammation.

2. Literature Review

Magnetic Resonance Imaging (MRI) remains the preferred imaging modality for evaluating acute ischemic stroke because of its superior soft-tissue contrast and high sensitivity in detecting early ischemic lesions. Diffusion-Weighted Imaging (DWI) identifies cytotoxic edema within minutes after arterial occlusion, whereas Apparent Diffusion Coefficient (ADC) maps differentiate true diffusion restriction from T2 shine-through artifacts. Fluid-Attenuated Inversion Recovery (FLAIR) imaging provides complementary information regarding lesion age and tissue viability through the clinically important DWI–FLAIR mismatch [10,11].

Traditional computer-aided diagnosis systems relied on handcrafted image features combined with classical machine learning classifiers such as Support Vector Machines (SVM), Random Forests, and K-Nearest Neighbors (KNN). Although these methods achieved moderate diagnostic performance, they required manual feature engineering and often failed to capture complex lesion morphology, resulting in poor generalization across different patient populations and imaging protocols [12].

The rapid advancement of deep learning has significantly improved automated stroke diagnosis. Fully Convolutional Networks (FCNs), U-Net, ResNet, DenseNet, EfficientNet, and Vision Transformer (ViT)-based architectures have demonstrated superior performance in brain lesion segmentation by learning hierarchical image representations directly from MRI data [13]. Among these, U-Net has become one of the most widely adopted architectures for biomedical image segmentation due to its encoder–decoder structure and skip connections that preserve spatial information during feature reconstruction [14].

3. Methodology

3.1 Overview of the Proposed Framework

The proposed framework integrates complementary structural information extracted from multi-parametric MRI, with molecular information obtained from whole-blood transcriptomic biomarkers. Unlike conventional unimodal diagnostic systems that rely solely on imaging or genomic information, the proposed multimodal architecture simultaneously captures anatomical abnormalities and systemic molecular responses associated with cerebral ischemia. Brain MRI data are obtained from publicly available ischemic stroke datasets, including the ATLAS and ISLES repositories, which contain expert-annotated ischemic lesion masks for supervised deep learning. The complete workflow of the proposed framework is illustrated in Figure 1.

3.2 Artificial Neural Network Construction for Transcriptomic Classification

An Artificial Neural Network (ANN) is constructed to map the expression values of the six prioritized diagnostic biomarkers into a binary classification indicating ischemic stroke versus healthy control [15].

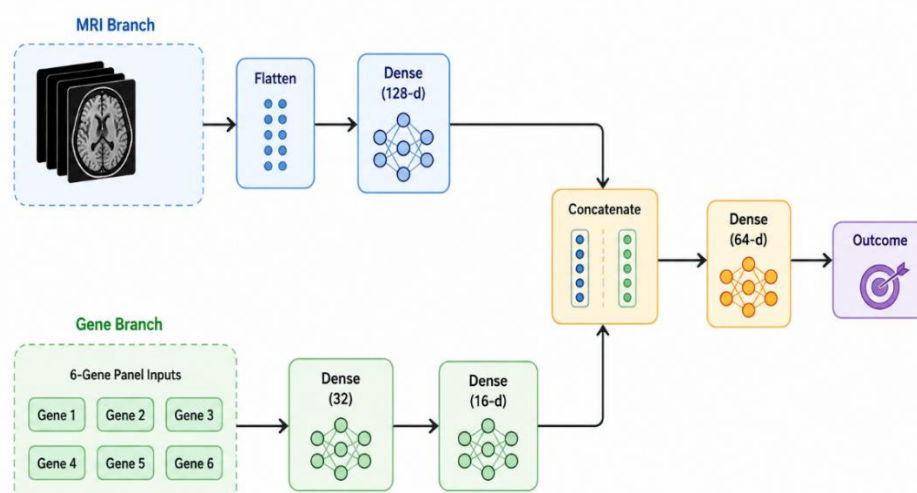


Fig. 1 Multi-model neural network architecture

The network is developed using the R package neuralnet. Prior to training, batch correction and Z-score normalization are applied across the datasets to align their feature distributions.

$$\text{Z-score} = \frac{x - \mu}{\sigma} \quad (1)$$

The network topology consists of an input layer accepting the six diagnostic gene expression features, a single hidden layer composed of 5 hidden neurons, and a single output neuron utilizing a logistic sigmoid activation function. The model is trained with a propagation error threshold set to 0.05 and a maximum constraint of 1×10^6 training steps to prevent infinite loop execution during gradient optimization. Rigorous 10-fold cross-validation is implemented during model development to minimize the risk of overfitting on the primary dataset.

$$\text{Sigmoid}(z) = \frac{1}{1 + e^{-z}} \quad (2)$$

To validate the clinical applicability of these six diagnostic markers, reverse transcription quantitative PCR (RT-qPCR) is performed on whole-blood samples from an independent validation cohort of 10 ischemic stroke patients and 10 healthy controls. Total RNA is isolated using TRIzol reagent, reverse-transcribed into cDNA, and amplified through 40 cycles. The relative expression levels are calculated using the comparative $2^{-\Delta\Delta C_t}$ method, with statistical significance determined via two-tailed student's t-tests ($P < 0.05$). This clinical validation confirms that ATG7, RNF20, UBA1, and USP15 are significantly upregulated in stroke patients, while KAT2A and UBE2I are significantly downregulated, matching the bioinformatics predictions. The comparative evaluation of diagnostic models listed in Table 2.

Table 2 Comparative Evaluation of Diagnostic Models

Diagnostic Model Configuration	Training Dataset AUC (GSE16561)	Testing Dataset AUC (GSE58294)	Clinical Sensitivity / Specificity Implications
ATG7 Standalone	0.750	0.934	Strong performance in subacute settings; reflects active autophagic stress.
KAT2A Standalone	0.853	0.723	Moderately sensitive; reflects early epigenetic transcription alterations.
RNF20 Standalone	0.864	0.845	Consistent diagnostic capacity; tracks chromatin changes and astrocyte activation.
UBA1 Standalone	0.702	0.749	Acceptable performance; reflects general proteasomal stress response.

UBE2I Standalone	0.848	0.736	Strong training AUC; marks the extent of microvascular SUMOylation.
USP15 Standalone	0.871	0.910	High performance; correlates with systemic immune response and neuroinflammation.
Six-Gene Integrated ANN	0.983	0.950	Superior performance; leverages non-linear correlations across pathways.

3.3 Computerized Architectures for Brain MRI Segmentation

Hybrid ResNet50-UNet Model (ResUNet50)

The automated segmentation of ischemic lesions in brain magnetic resonance imaging is formulated as a semantic pixel-wise classification task. While standard U-Net models perform reasonably well, they often struggle with boundary delineation of irregular, scattered, or microvascular infarctions. To address this, a hybrid ResNet50-UNet architecture replaces the standard contracting path with a pre-trained ResNet50 encoder. The ResNet50 backbone (pre-trained on ImageNet, with classification layers excluded using `include_top=False`) extracts high-level semantic features while bypassing vanishing gradient limitations through internal skip connections.

In a Keras and TensorFlow implementation, intermediate activations are captured from the encoder to serve as skip connections to the decoder. The exact Keras layer query names used to extract these skip feature maps are `input_1` (for raw resolution features), `conv1_relu`, `conv2_block3_out`, and `conv3_block4_out`.

The deepest layer of the ResNet50 encoder, `conv4_block6_out`, serves as the semantically rich, low-resolution bottleneck. Each decoder block upsamples the feature maps using transposed 2D convolutions, concatenates them with the corresponding encoder skip activations using Keras Concatenate layers, and refines the concatenated maps through consecutive 3×3 convolutional layers, batch normalization, and rectified linear unit (ReLU) activations.

Spatial and Channel Attention Integration

To enhance spatial awareness and minimize false-positive segmentations, a Convolutional Block Attention Module (CBAM) is integrated into the ResNet50-UNet framework. The CBAM block dynamically refines intermediate features by sequentially computing channel and spatial attention maps [11,12]. The channel attention submodule aggregates spatial details of a feature map using both Global Average Pooling (GAP) and Global Max Pooling (GMP) [13, 14]. These pooled features are processed through a shared

multi-layer perceptron to generate a channel-wise attention vector, highlighting "what" semantic features are most important.

The spatial attention submodule takes the channel-refined feature map, applies average and max-pooling operations along the channel axis, and convolving them with a 7×7 kernel to generate a spatial-wise attention map, highlighting "where" the ischemic regions are located. This joint attention gating mechanism suppresses noise from surrounding healthy tissues and artifacts, improving the model's focus on acute ischemic stroke lesions.

4. Experimental Setup

4.1 Model Compilation, Optimization, and Training Dynamics

To train deep learning models on brain magnetic resonance imaging datasets (e.g., ISLES or ATLAS challenges), specific training pipelines must be configured in Keras and TensorFlow to handle class imbalances, as stroke lesions typically occupy less than 2% of total brain voxels.

$$\text{Class Ratio} = \frac{\text{Lesion Voxels}}{\text{Total Brain Voxels}} \leq 0.02 \quad (3)$$

Advanced Combined Loss Formulations

To mitigate the impact of class imbalance, standard binary cross-entropy is combined with the Dice Similarity Coefficient (DSC) loss to form a hybrid loss function:

$$\mathcal{L}_{\text{Combined}} = \alpha \mathcal{L}_{\text{BCE}} + \beta \mathcal{L}_{\text{Dice}} \quad (4)$$

Binary cross-entropy computes the average voxel-wise classification error:

$$\mathcal{L}_{\text{BCE}} = -\frac{1}{N} \sum_{i=1}^N [y_i \log(\hat{y}_i) + (1 - y_i) \log(1 - \hat{y}_i)] \quad (5)$$

The Dice loss is derived from the overlap between the predicted mask and the ground-truth label:

$$\mathcal{L}_{\text{Dice}} = 1 - \frac{2 \sum_{i=1}^N y_i \hat{y}_i + \epsilon}{\sum_{i=1}^N y_i + \sum_{i=1}^N \hat{y}_i + \epsilon} \quad (6)$$

where $\epsilon = 1 \times 10^{-7}$ is a smoothing factor to prevent division-by-zero errors. To further minimize false-negative predictions (which can lead to untreated penumbral tissue), a Tversky loss is used to adjust the penalties for false positives and false negatives:

$$\mathcal{L}_{\text{Tversky}} = 1 - \frac{\sum y_i \hat{y}_i + \epsilon}{\sum y_i \hat{y}_i + \gamma \sum (1 - y_i) \hat{y}_i + \delta \sum y_i (1 - \hat{y}_i) + \epsilon} \quad (7)$$

Setting $\delta = 0.7$ and $\gamma = 0.3$ penalizes false negatives more heavily, encouraging the model to maintain sensitivity to subtle lesion boundaries.

Optimization Strategy and Learning Rate Schedulers

The model is compiled using the Adam optimizer with an initial learning rate of 1×10^{-4} . A cosine decay learning rate scheduler is implemented to gradually reduce the learning rate to 1×10^{-6} over 150 epochs, facilitating stable convergence as training progresses:

$$\eta_t = \eta_{\min} + \frac{1}{2}(\eta_{\max} - \eta_{\min}) \left(1 + \cos \left(\frac{T_{\text{cur}}}{T_{\text{max}}} \pi \right) \right) \quad (8)$$

Model checkpointing preserves the weights that minimize validation loss, and early stopping with a patience of 15 epochs prevents overfitting on small medical datasets.

Data Augmentation Operations in Keras

To enhance model generalizability and prevent overfitting, data augmentation is performed on-the-fly during training using Keras pre-processing layers or the tf.data pipeline. The spatial transformations applied to both the input images and their corresponding segmentation masks include:

- Random rotation of the image's X-axis up to 15 degrees.
- Horizontal and vertical random translations up to 20% of image dimensions.
- Random image shearing within 10 degrees.
- Zoom factor variations up to 20%.
- Random brightness adjustments between 0.8 and 1.2.

$$\text{Augmentation Pipeline} = \{\text{Rotation}_{15^\circ}, \text{Translation}_{20\%}, \text{Shear}_{10^\circ}, \text{Zoom}_{20\%}\} \quad (9)$$

To maximize hardware utilization, all mathematical operations are wrapped in compiled graph functions using the @tf.function decorator, and the model leverage mixed precision training (float16 weights with a float32 loss accumulator) to accelerate training on compatible GPUs.

5. Results and Discussion

5.1 Multimodal Data Fusion and Systemic Prognostic Modeling

To overcome the diagnostic limitations of single-modality systems, intermediate (joint) feature fusion is used to integrate macroscopic neuroimaging with systemic genomic profiling. The conceptual formulation of intermediate fusion involves extracting latent features from each modality through independent, specialized network branches, and

combining them at a deeper hidden layer. This enables the model to preserve modality-specific details while learning non-linear cross-modal correlations during joint optimization.

$$\text{Intermediate Joint Feature Space: } M_{\text{Fused}} = M_{\text{MRI}} \oplus M_{\text{Genomic}} \quad (10)$$

The clinical outcome model is trained to predict a binary prognosis at discharge (modified Rankin Scale score ≥ 3 , indicating moderate-to-severe disability or death). The imaging branch processes multi-parametric MRI sequences (DWI, ADC, and FLAIR) to extract the total lesion volume, spatial coordinates, and the degree of corticospinal tract (CST) overlap. The genomic branch processes the six-dimensional transcriptomic expression vector (ATG7, KAT2A, RNF20, UBA1, UBE2I, USP15).

The fused representation is mapped through joint dense layers with dropout regularization (0.3) and a final sigmoid output node. This multimodal fusion approach consistently outperforms individual unimodal baselines, showing a substantial increase in diagnostic accuracy, prognostic sensitivity, and calibration stability. The Table 3 shows the diagnostic performance of multimodal deep learning architectures.

Table 3 Diagnostic Performance of Multimodal Deep Learning Architectures

Model Architecture	Input Data Modalities	Target Clinical Endpoint	Diagnostic Sensitivity	Diagnostic Specificity	Area Under the Curve (AUC)
Unimodal Imaging Model	Brain MRI (DWI/ADC)	3-Month m RS Prognosis	0.695	0.720	0.737
Unimodal Clinical Model	Patient Tabular Metadata	3-Month m RS Prognosis	0.708	0.878	0.808
Unimodal Genomic Model	Whole-Blood 6-Gene Panel	Acute Stroke Triage	0.739	0.902	0.950
Early Fusion Model	MRI + Genomic Vectors	3-Month m RS Prognosis	0.723	0.891	0.825
Late Fusion Model	Model Probability Averaging	3-Month m RS Prognosis	0.731	0.915	0.850
Intermediate Fusion Model	Joint Keras Functional API	3-Month m RS Prognosis	0.875	0.939	0.975
HAF-MDL Model	Image + Genomics Cross-Attention	Brain Pathology Triage	0.912	0.960	0.964

5.2 Biological Mechanisms and Computational Docking Validation

To validate the clinical relevance of the six post-translational modification-related diagnostic genes, Gene Set Enrichment Analysis (GSEA) was performed on the GSE16561

dataset. The analysis linked these biomarkers to critical biological pathways activated during cerebral ischemia:

- ATG7 is significantly enriched in 27 signaling pathways, including DNA repair, E2F target genes, and MYC-mediated transcription, which govern downstream autophagy and neuronal survival.
- KAT2A is enriched in 19 pathways, including the coagulation cascade, complement pathways, and heme metabolism, which influence early microvascular thrombosis.
- RNF20 relates to 25 pathways, including DNA damage repair, oxidative phosphorylation, and MYC signaling, promoting astrocyte differentiation via STAT3 epigenetic activation.
- UBA1 is enriched in 20 pathways, including epithelial-mesenchymal transition and E2F target genes, reflecting active proteological stress.

UBE2I and USP15 are enriched in pathways governing glycolysis, DNA repair, and MYC signaling, which modulate the cellular response to hypoxia. The Figure 2 illustrates the biological pathway and docking validation.

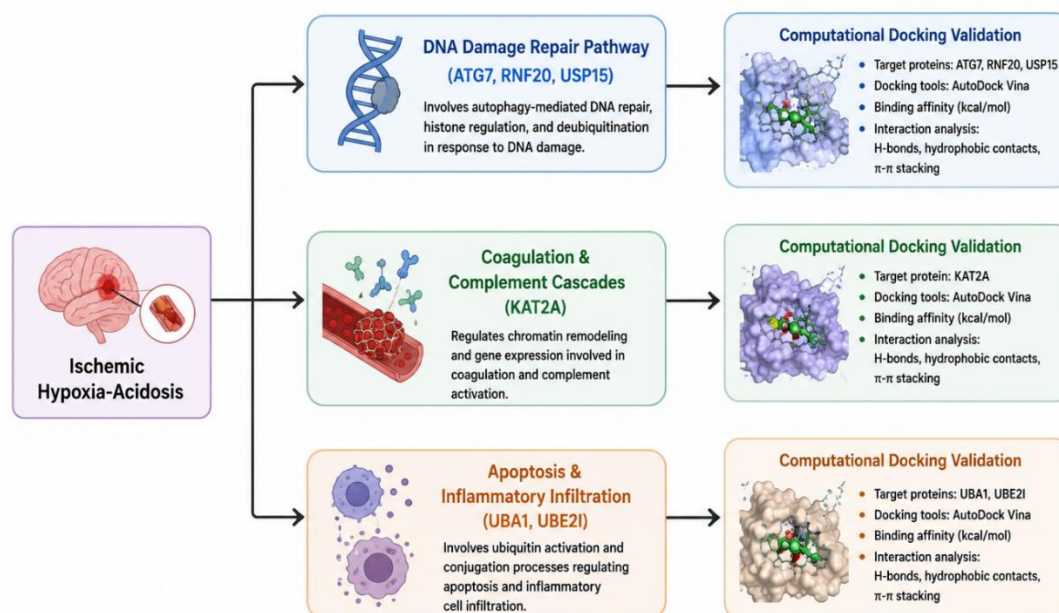


Fig. 2 Biological pathway and docking validation

Evaluating the immune cell microenvironment using the CIBERSORT algorithm reveals distinct immune cell infiltration patterns between ischemic stroke patients and controls. Significant differences are observed in peripheral CD8⁺ cytotoxic T cells ($P < 0.001$), activated CD4⁺ helper T cells ($P < 0.05$), M0 macrophages ($P < 0.01$), and neutrophils ($P < 0.0001$). Spearman correlation analysis indicates that:

- ATG7, RNF20, and UBA1 are significantly associated with M0 macrophage infiltration, reflecting systemic activation of phagocytic cells.
- KAT2A and UBE2I correlate with activated CD4⁺ and CD8⁺T cells, which can cross the blood-brain barrier and exacerbate tissue damage.
- USP15 expression correlates with peripheral neutrophil levels, which can release reactive oxygen species and contribute to blood-brain barrier breakdown.

To identify potential small-molecule therapies, the Enrichr and Drug Gene Interaction Database (DGIdb) were queried using the six diagnostic genes. Eicosatetraynoic acid (ETYA), a synthetic triple-bonded arachidonic acid analogue, was predicted as a promising therapeutic candidate. Molecular docking performed using CB-DOCK2 shows high binding affinity between ETYA and KAT2A (Vina score of -7.0 kcal/mol) and UBE2I (Vina score of -5.6 kcal/mol).

ETYA binds within the active pocket of KAT2A by forming two hydrogen bonds with the arginine residue (ARG) at position 45. It binds to UBE2I by forming a single hydrogen bond with the arginine residue at position 62. These findings suggest that ETYA may limit ischemic injury by modulating SUMOylation and histone acetylation pathways. The following Table 4 computational validation of protein–compound interactions through molecular docking studies.

Table 4 Computational Validation of Protein–Compound Interactions Through Molecular Docking Studies

Target Protein	UniProt ID	Interacting Compound	PubChem CID	Vina Score (kcal/mol)	Active Docking Pocket Binding Site residues
KAT2A	Q92830	Eicosatetraynoic Acid (ETYA)	1780	-7.0	Forms two stable hydrogen bonds with Arginine at position 45 (ARG-45).
UBE2I	P63279	Eicosatetraynoic Acid (ETYA)	1780	-5.6	Forms one stable hydrogen bond with Arginine at position 62 (ARG-62).

6. Conclusion

The synthesis of high-resolution neuroimaging features with whole-blood transcriptomic biomarkers offers an advanced approach to managing acute ischemic stroke. By bridging macroscopic magnetic resonance imaging findings with microscopic metabolic gene signatures, this multi-scale framework can capture both the structural extent of brain

damage and the systemic physiological response, facilitating early diagnosis, precise therapeutic targeting, and robust risk stratification.

Despite this potential, several challenges hinder immediate clinical translation. A major barrier is the temporal and spatial discrepancy across modalities. Whole-blood transcriptomics reflects systemic cellular dynamics, which may not fully capture local molecular changes occurring within the ischemic brain parenchyma. Additionally, deep learning models can act as "black boxes," making it difficult to understand the complex, non-linear representations they learn. To address these limitations, incorporating Explainable AI (XAI) tools, such as Grad-CAM++ to highlight key imaging regions and SHAP value analysis to explain clinical feature contributions, can enhance model transparency. Validating these architectures across larger, multi-center cohorts is also essential to ensure generalizability across diverse scanners and patient demographics. Developing robust computational models that combine the speed of deep learning with the interpretability of classical statistical frameworks will support the creation of safe, reliable, and translationally viable decision-support systems for clinical stroke care.

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Financial Planning for Higher Education in Tamil Nadu: Government Initiatives, Key Factors, and Policy Suggestions

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ABSTRACT

Higher education is essential for personal development, employment generation, and national progress. However, the increasing cost of college education has made financial planning an important concern for students and families. This study examines the significance of financial planning for higher education, with special reference to the role of government support and the factors influencing educational finance. The study follows a descriptive research design and is based on secondary data collected from journals, reports, and official websites. The findings reveal that government assistance through scholarships, grants, subsidized education, tuition fee concessions, educational loans, and welfare schemes such as Pudhumai Penn, Tamil Pudhalvan, First Graduate Concession, Naan Mudhalvan, and laptop support programmes have improved access to higher education, especially for economically weaker and firstgeneration learners. The reviewed literature highlights that household income, rising tuition fees, inflation, employment stability of parents, awareness of savings options and access to loans significantly influence financial planning for higher education. The study concludes that proper financial planning, combined with strong government intervention, can reduce financial barriers and make higher education more affordable and accessible. It also suggests increasing public spending, expanding scholarships, regulating fee hikes, promoting financial literacy, and encouraging long-term savings for education

Keywords: Financial planning Higher education Welfare schemes Savings.

Introduction

Higher education has become increasingly important in the modern knowledge economy. It plays a vital role in national development by creating skilled-manpower, increasing employment opportunities and encouraging innovation. Planning finance for higher education refers to systematic management of resources to meet educational expenses effectively.

The government plays a significant role in providing financial support like scholarships, grants, subsidies, and loan schemes. On the other hand, families also want to prepare savings plans, identify funding schemes, and arrange sources in advance.

Review of Literature

The review of literature examines previous studies related to higher education financing, government support, educational loans, and financial planning. It provides the theoretical background for the study and helps identify the existing research gap.

Tilak (1993) explored the financing framework of higher education in India by examining policy documents and other secondary sources. The analysis indicated that expanding higher education requires substantial public investment to maintain equitable educational opportunities. The study emphasized that scholarships, government funding, and other financial support mechanisms are essential to reduce the financial burden on families. These findings provide a conceptual basis for understanding financial planning for higher education. *Rani (2014)* analyzed the contribution of education loans to higher education financing using secondary information obtained from government publications, banking records, and existing literature. The study concluded that education loans improve access to higher education, although students from economically disadvantaged families continue to face barriers in obtaining financial assistance. The findings highlight the importance of combining education loans with supportive financial policies to promote equitable access. *Frank, Bhandary, and Prabhu (2024)* conducted a systematic review of international studies on higher education loan schemes using the PRISMA framework. Based on published evidence, the review found that education loans play a significant role in expanding higher education opportunities but may also create financial pressure due to repayment obligations. The authors recommended flexible repayment mechanisms to improve the long-term effectiveness of education loan programmes. *Bukhari (2024)* carried out a systematic review of the financial challenges experienced by higher education institutions using published academic studies. The review identified rising educational expenditure, funding constraints, and limited financial resources as major issues affecting higher education financing. The study emphasized the importance of sustainable financing strategies and supportive government policies to strengthen the financial capacity of higher education institutions. *Raghu, Kumari, and Srivani (2024)* investigated the determinants of parental financial decisions regarding higher education through a descriptive survey. The findings revealed that household income, social influences, institutional factors, and financial preparedness significantly shape parents' decisions to finance their children's higher education. The study offers empirical evidence on the factors influencing financial planning for higher education.

The reviewed studies indicate that higher education financing is influenced by government support, educational loans, and various socio-economic factors. However,

limited studies have comprehensively examined these aspects in the context of Tamil Nadu, creating the need for the present study.

Objectives of the Study

- To study the role of the government in financing higher education in Tamil Nadu.
- To analyze the factors influencing financial planning for higher education.
- To propose policy suggestions for strengthening financial planning in higher education.

Statement of the Problem

Eventhough Tamil Nadu has made substantial progress in higher education, many students face financial hurdles while pursuing college education like inflation, unequal household income and lack of awareness about available schemes. Therefore, this study reviews Government Initiatives, identifies key factors affecting financial planning for higher education and provides policy suggestions to improve educational financing in Tamil Nadu.

Research Gap

Although previous studies have examined higher education financing, educational loans, parental decision-making, and financing policies, they have addressed these issues separately. Very few studies have brought together government initiatives, the factors influencing financial planning, and policy recommendations in the specific context of Tamil Nadu. In addition, recent State Government schemes that support higher education have not been reviewed comprehensively. The present study addresses this gap by examining government initiatives, identifying the major factors affecting financial planning, and suggesting measures to improve higher education financing in Tamil Nadu.

Research Methodology

The present study adopts a descriptive research design and is exclusively on secondary data. Information was collected from peer-reviewed journal articles, books, government reports, and other authentic published sources related to financial planning for higher education. The reviewed literature was systematically analyzed to identify the major factors, findings, and policy suggestions related to financial planning for higher education.

Role of Government in Financing Higher Education.

The government plays a significant role in promoting access to higher education by introducing various financial support measures. Through scholarships, grants, subsidies, educational loan schemes, and welfare programmes, both the Central and Tamil Nadu Governments help reduce the financial burden on students and encourage greater participation in higher education.

- **Scholarship and Grants (Ministry of Education, Government of India, 2023):** Government provides merit-based and need-based scholarships to deserving students. These schemes reduce the financial burden on families and improve participation among low-income groups.
- **Subsidized Public Education (Tilak, 2020):** Government colleges and public universities often charge lower tuition fees because a large part of operational expenses is supported through public funds.
- **Educational Loan Assistance (Ministry of Education, Government of India, 2024):** Government frequently collaborates with banks to provide student loans with concessional interest rates and favorable repayment terms.
- **Infrastructure Development (Ministry of Education, Government of India, 2023):** Public expenditure is used to establish and maintain colleges, laboratories, libraries, hostels, and digital learning facilities.
- **First Graduate Tuition Fee Concession (Government of Tamil Nadu, 2024):** The government supports students who are the first graduates in their families, especially in professional courses.
- **Pudhumai Penn Scheme (Government of Tamil Nadu, 2024):** The government offers monthly financial assistance to eligible girl students pursuing higher education.
- **Tamil Pudhalvan Scheme (Government of Tamil Nadu, 2024):** The government offers monthly support to eligible male students for continuation of higher education.
- **The world in your hand scheme (Government of Tamil Nadu, 2026):** The government launched a new scheme 'Ulagam Ungal Kaiyil' with the objective of strengthening digital education across the state and providing free laptops to eligible students studying in government educational institutions.
- **Naan Mudhalvan Scheme (Government of Tamil Nadu, 2022):** The scheme is to enhance students' skills, employability, and career readiness. The programme provides training, counselling, and placement assistance to students in schools and colleges.

Factors influencing Financial Planning

The factors influencing financial planning for higher education have been identified through an extensive review of previous empirical and review studies. These factors explain the major economic, institutional, and social aspects that shape families' decisions in arranging financial resources for higher education.

- **Household Income Level (Rani, 2014; Raghu et al., 2024):** The financial capacity of a household largely determines its ability to prepare for higher education expenses. Families with stable and adequate income can make planned savings, while those with limited income often encounter financial difficulties in meeting educational costs.
- **Cost of Education (Tilak, 1993; Bukhari, 2024):** The growing expense of higher education has become an important factor in financial planning. Increasing tuition fees and other academic costs require families to allocate additional financial resources to support higher education.
- **Inflation in Education Expenses (Tilak, 1993; Bukhari, 2024):** The continuous rise in education-related expenses, including tuition, accommodation, books, and transportation, increases the need for systematic and long-term financial planning.
- **Government Financial Support (Tilak, 1993; Rani, 2014; Bukhari, 2024):** Government initiatives such as scholarships, fee concessions, and financial assistance programmes help reduce educational expenses and improve the affordability of higher education for families.
- **Access to Education Loans (Rani, 2014; Frank et al., 2024):** Education loans serve as an important financial resource for students pursuing higher education. However, loan availability, eligibility conditions, and repayment responsibilities influence families' financing decisions.
- **Institutional Support (Bukhari, 2024; Raghu et al., 2024):** Support offered by educational institutions through financial guidance, assistance schemes, and student support services can help families manage higher education expenses more effectively.
- **Family Financial Planning (Raghu et al., 2024):** The financial planning practices of parents, including saving and budgeting, play an essential role in ensuring that adequate funds are available for future higher education needs.
- **Social and Family Factors (Raghu et al., 2024):** Family commitments and social obligations may affect the amount of financial resources available for higher education, thereby influencing overall financial planning decisions.

Findings

The following findings have been formulated by synthesizing evidence from the selected literature reviewed for the present study. These findings summarize the major aspects influencing financial planning for higher education identified across previous studies.

- Government financial support significantly enhances the affordability and accessibility of higher education.
- Education loans serve as an important financing option; however, repayment obligations may create financial challenges for borrowers.
- The continuous rise in educational expenses increases the need for effective financial planning among families.
- Household income has a substantial influence on a family's capacity to meet higher education costs.
- Institutional support and systematic family financial planning contribute to better management of educational expenses.

Policy Implications

Based on the synthesized findings of the reviewed literature, the following policy suggestions are proposed to strengthen financial planning for higher education and improve access to educational finance.

- Strengthening government investment in higher education to improve affordability and equitable access.
- Expanding scholarship and financial assistance schemes for economically weaker students.
- Simplifying education loan procedures and introducing flexible repayment mechanisms.
- Strengthening financial guidance and counselling services in higher education institutions.
- Promoting awareness of long-term financial planning for higher education through government agencies, educational institutions, and financial institutions.

Conclusion

Financial planning is a key factor that determines whether students can successfully pursue higher education without financial difficulties. Careful planning helps families manage education expenses in a systematic way and reduces the pressure of sudden financial burden. Government support, scholarships, and loan facilities play an important role, but awareness and proper utilization of these benefits are equally essential. Families who plan early and manage their resources wisely are better able to meet educational expenses. Overall, effective financial planning ensures that higher education becomes more accessible, stable, and less stressful for students and parents.

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The Sacred Cage: Devadasi Tradition and Female Suffering in Amita Trasi's *The Color of Our Sky*

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ABSTRACT

*Marginalization is the process by which certain individuals or groups are deliberately excluded from the benefits and opportunities that are available to others in society. This exclusion happens through various forms of inequality, such as class, caste, gender, religion, race, and economic status. In her book *The Second Sex*, Simone de Beauvoir describes women as the "Other" in a society dominated by men, highlighting how they are often placed outside the areas of power and privilege. The term devadasi, which comes from Sanskrit, translates to "female servant of God." It refers to young girls who are dedicated to a deity between the ages of eight and thirteen during a special religious ceremony that is often seen as a symbolic marriage. Amita Trasi's first novel, *The Colour of Our Sky* (2017), portrays this difficult situation through the lives of two girls, Tara, who comes from a wealthy family, and Mukta, the daughter of a devadasi. Mukta tries to escape the fate that tradition has set for her and temporarily stays with Tara's family, but she ends up caught in a cycle of trafficking and abuse. The later discovery that Tara and Mukta are half-sisters reveals the complex ways in which privilege, gender, and social standing intersect, showing how oppression can be shared but experienced differently. Through this story, the novel brings attention to the extreme marginalization faced by devadasi women, exposing the deep and lasting nature of their social exclusion.*

Keywords: *Marginalization, Women, Devdasi, Caste-system*

Amita Trasi, an author from Mumbai, has become a notable figure in literature with her first book, *The Color of Our Sky* (2017). This novel explores the complex issues of privilege, gender, caste, and the exploitation that is embedded in social systems. Trasi's inspiration comes from her early life in India, where she created the character Mukta as a tribute to a close childhood friend she met when she was nine. Despite her initial focus on a professional career, after completing an MBA in Human Resource Management, her move to the United States in 2007 marked a significant change in direction, leading her to pursue writing. Her stories highlight the harsh reality of human trafficking and celebrate the strength and resilience of women who face discrimination due to caste and class. Through her writing, Trasi consistently aims to give a voice to those who have been marginalized by oppressive traditions, and she actively supports efforts to combat human trafficking.

At the center of *The Color of Our Sky* are the intertwined lives of two young women who represent contrasting social experiences. Tara, from a wealthy Brahmin family, returns to Mumbai in search of Mukta, her childhood friend who disappears under mysterious circumstances after being taken from Tara's home. Mukta, on the other hand, has a life shaped by forced dedication to a deity as part of the devadasi tradition. Over time, this religious practice transforms into a form of sexual exploitation, trapping Mukta in a system that disguises abuse as sacred duty. By bringing these two women into contrast, Trasi creates a powerful narrative about social inequality. The novel shows that privilege does not protect women from suffering or ensure freedom rather, it changes the nature of how oppression is experienced. Tara faces constraints from patriarchal norms and the expectations of her caste, while Mukta is confined within a religious structure that turns devotion into servitude. Despite their different social contexts, both women are ultimately denied autonomy, dignity, and full control over their lives due to patriarchal systems.

The term *devadasi* comes from Sanskrit, combining “deva,” means “god,” and “dasi,” means “female servant.” Although the literal meaning suggests a woman who serves a deity, the practice has evolved into a system where young girls are given to temples, eventually becoming vulnerable to sexual exploitation. In various parts of India, this tradition is known by different names, such as *Murali* in Maharashtra, *Basavi and Murali* in Andhra Pradesh, and *Jogati* in Karnataka (Shingal 108). Initially, the system had important roles in religious, artistic, and ritualistic practices, but over time, it became closely tied to caste discrimination, poverty, and social injustice. Scholars observe that the devadasi system developed in specific regional and historical settings, and its decline came with the loss of royal patronage during the colonial era. This change left many *devadasis* without social acceptance or legal protection (Shingal 109 - 110). As a result, what was once seen as sacred service has become increasingly linked with prostitution. This historical shift is one of the key themes in Trasi's novel, which avoids romanticizing the *devadasi* tradition and instead exposes the suffering hidden behind religious justification. Historian William Dalrymple describes the decline of the *devadasi*'s social status as:

The nature of that service and the name given to it have wide regional variations and have changed through time; only recently have most devadasis come to be working in the sex trade. . . . Today, the devadasis are drawn exclusively from the lowest castes usually from the Dalit Madar caste and are almost entirely illiterate. The majority of modern devdasis in Karnataka are straightforward sex workers. . . . They usually work from home rather than in brothels or on the streets, and tend to start younger than

commercial sex workers. Nevertheless, the main outlines of their working lives are in reality little different from those of others in the sex trade.

Mukta's initiation into the *devadasi* tradition is presented with striking emotional and narrative intensity. At the age of ten, she is dedicated to the goddess *Yellamma* through a religious ceremony conducted by her grandmother and the temple priest. Rather than portraying this ritual as an act of sacred devotion, the novel reveals it as the moment when a child's autonomy is permanently surrendered to an oppressive social institution. The ceremony marks not a spiritual commitment but the beginning of a life over which Mukta has no control. The priest asks Sakubai,

"Are you willing to dedicate your granddaughter to the Goddess?" Sakubai nodded. "Yes," she said just as easily as I had expected she would, without a second thought. Then the priest addressed to me, while leaning forward and planting a red tilak on my forehead. "You cannot marry any man. You are married to the deity and only after worshipping her will you be able to have a meal. You have to fast two days a week and oblige any man who comes to you. If he beats you, you must not retaliate." (TCOOS 73).

This episode forms one of the most powerful critiques in the novel because it demonstrates how authority disguises itself as religious discipline and how violence is legitimized through ritual language. Every instruction imposed upon Mukta strips away a fundamental aspect of her humanity. She loses the freedom to experience childhood, the right to make choices about her own life, the possibility of marriage, and even the right to defend herself against abuse. Religious symbolism is used to sanctify a system that normalizes exploitation, allowing the subjugation of women to appear socially and spiritually acceptable.

The novel further suggests that the endurance of the *devadasi* system depends not only on religious customs but also on deeply internalized beliefs sustained across generations. Families living in poverty continue to uphold the practice because they fear divine punishment if traditional obligations are rejected. Sakubai embodies this inherited mindset when she warns Mukta's mother against resisting the dedication. She declares, "You will anger the deity. We will have to live with her curse if you insult our tradition. It was decided for us the day we were born" (TCOOS 21). Her words reveal that oppression is preserved not merely through ritual but through fear passed from one generation to the next. What is inherited is not simply a cultural practice but a belief that questioning tradition invites inevitable misfortune. Within the same conversation, another voice challenges this unquestioned acceptance by asking, "What tradition? What was decided? That we are going

to sleep with men in the name of God, that we are servants of God but the wife of the entire village?" (TCOOS 21). This moment exposes the contradiction that lies at the heart of the institution. The religious identity of the *devadasi* promises sacred honour, yet her lived reality is defined by sexual exploitation. Although she is described as a servant of the deity, she is ultimately treated as a woman whose body is considered accessible to the men of the community, exposing the vast distance between religious rhetoric and social practice.

The novel also traces the gradual transformation of the *devadasi* from a ritual devotee into a commodity within a commercialized system of sexual exploitation. As soon as Mukta reaches puberty, her body acquires monetary value, and arrangements are made for the sale of her virginity. Trasi portrays this transaction without sensationalism, allowing its disturbing normality to reveal the extent of institutionalized violence. Mukta overhears the negotiation between her keepers: "They haggled about money, with her going higher and him preferring to stay closer to what he had initially offered. I hadn't understood most of the conversation I heard that day. '... but I am giving you a virgin,' Madam said. 'I can have others ...' 'But it is a reasonable price.'" (TCOOS 75).

The conversation reduces Mukta's body to an object of financial exchange, where her worth is measured entirely through economic calculation. Her virginity is transformed into a marketable commodity, valued not for its personal significance but for the profit it can generate within a patriarchal system. Through this episode, the novel illustrates how female purity is commercialized and consumed, revealing the intimate connection between gender inequality and economic exploitation. The *devadasi* institution therefore emerges not as an isolated cultural practice but as an entrenched mechanism through which women's bodies are systematically objectified, controlled, and commodified under the combined authority of religion, patriarchy, and commerce.

The persistence of the *devadasi* system cannot be understood without recognizing the combined influence of caste hierarchy and the culture of social silence that protects it. In most cases, women drawn into this institution belong to the lowest sections of the caste order, particularly Dalit communities, who already endure long-standing inequalities in education, employment, housing, and political participation. These structural disadvantages leave little room to challenge inherited practices. The same social order that marginalizes these communities simultaneously profits from the exploitation of their women, creating a cycle in which discrimination and oppression reinforce one another. In this context, Louis Wirth's understanding of minority status offers an important analytical framework. He defines a minority as "a group of people who, because of their physical or cultural characteristics, are

singled out from the others in the society in which they live for differential and unequal treatment, and who therefore regard themselves as objects of collective discrimination” (Wirth 347). Mukta and the women of her community embody this definition in every respect. Their lives are shaped by the intersecting realities of caste, gender, and poverty, each of which deepens their vulnerability. Their exclusion is neither incidental nor temporary, rather, it is sustained through inherited customs, social exclusion, and systems of coercive labour that continually reproduce their marginalized position.

Trasi strengthens this critique by demonstrating that physical exploitation is inseparable from the politics of silence. After enduring repeated violence, Mukta loses her ability to speak, yet her muteness signifies far more than psychological trauma. It reflects the systematic erasure of a voice that society has never been willing to acknowledge. In this regard, Gayatri Chakravorty Spivak’s assertion that “There is no space from which the sexed subaltern subject can speak” (Spivak 307) illuminates Mukta’s condition. At the same time, the novel extends this argument by suggesting that the problem lies not only in the inability of the marginalized to speak but also in society’s refusal to hear them. John McLeod captures this dimension when he observes:

It is not so much that subaltern women did not speak, but rather that others did not know how to listen, how to enter into a transaction between speaker and the listener. The subaltern cannot speak because their words cannot be properly interpreted. Hence, the silence of the female as subaltern is the result of a failure of interpretation and not a failure of articulation. (McLeod 195)

Mukta’s condition after her rescue reflects precisely this failure of interpretation. Although speech abandons her, her suffering continues to manifest itself through involuntary cries, groans, and physical expressions of distress that those around her fail to understand. Instead of recognizing these sounds as signs of profound trauma, the community interprets them as evidence of something unnatural. Her neighbours question how a mute girl can scream at night and attribute her cries to the presence of evil spirits. Through this response, the novel reveals how women’s suffering is frequently displaced into superstition whenever compassion and understanding are absent. Rather than acknowledging trauma, society transforms it into another reason for fear and exclusion.

The novel further intensifies its examination of marginalization by linking silence with the organized violence of human trafficking. After finding temporary refuge in Tara’s household, Mukta is abducted and sold into the brothels of Kamathipura, where she becomes part of a larger system sustained by prostitution, debt, and commercial exploitation. Her

kidnapping is not an isolated act of violence but the outcome of calculated betrayal, misplaced trust, and patriarchal complicity. Even more disturbing is the economic structure that follows her sale. The amount paid to purchase her is converted into a debt that she herself is forced to repay, making the victim financially accountable for the crime committed against her. Another woman trapped within the brothel explains this cruel reality:

For us - the women in our family - the truck drivers who pass on the highway are a regular means of livelihood. We have our houses along the highways so truckers can avail themselves of our services easily. I made one mistake - falling in love, thinking I could have a family. We eloped. He ... he brought me here, sold me. I did not know then that when the brothel owners buy us, the money they give our kidnappers becomes our debt. It has been two years, and I still haven't paid my debt. (TCOOS 224-25)

This testimony exposes the multiple layers through which trafficking is sustained. Emotional trust becomes a tool for deception, intimate relationships are manipulated for profit, and economic indebtedness becomes an instrument of continued captivity. The language of debt functions as a powerful mechanism of control, ensuring that women remain imprisoned within the system under the illusion that freedom can be earned through repayment. By exposing this structure, Trasi demonstrates that trafficking extends far beyond physical confinement; it is reinforced through emotional betrayal, financial coercion, and institutionalized exploitation that deny women any meaningful possibility of escape.

Trasi extends her critique by demonstrating that human trafficking operates through far more than physical abduction. The novel reveals a network of coercive practices that includes deception, drugging, manipulation, and the systematic destruction of family relationships. One of the trafficked girls recalls the circumstances that led to her captivity: "I hadn't eaten in two days. I jumped at it and didn't think. He had drugged it, brought me to Bombay" (TCOOS 225). This brief testimony illustrates how traffickers prey upon hunger, desperation, and economic vulnerability rather than relying solely on force. Poverty itself becomes a weapon that weakens resistance and leaves women and children increasingly susceptible to exploitation. The violence portrayed in the novel is therefore institutional rather than incidental, rooted in social inequalities that make marginalized communities easy targets. Mukta's later separation from her own daughter deepens this critique by revealing how exploitation extends beyond a single generation. Her loss demonstrates that trafficking fractures families and perpetuates cycles of displacement, ensuring that inherited suffering continues across generations. In connecting the *devadasi* institution with child trafficking and

the commercial sex trade in urban spaces, the novel exposes a larger system in which impoverished women and children are reduced to commodities that can be bought, sold, and transferred according to market demands.

Although Mukta's experiences constitute the emotional core of the narrative, Trasi broadens her examination of marginalization by showing that patriarchal control transcends caste boundaries. Tara and her mother, despite belonging to a socially privileged household, also confront restrictions imposed by patriarchal values, though these operate in different forms. Tara's parents choose to marry against the wishes of their families, and the consequences fall disproportionately upon her mother. She is forbidden from returning to her native village, while her father continues to enjoy acceptance within the same community. Tara reflects that her mother risks death if she attempts to return, whereas her father is allowed to visit without consequence. This unequal treatment illustrates how patriarchal societies excuse male transgression while severely punishing women who exercise personal choice. The expectations placed upon women are further expressed through Tara's mother's belief that "A good woman's life is in her husband's happiness, in being a good wife and a good mother, taking care of the family" (TCOOS 58). Her words reflect a deeply rooted cultural ideal in which a woman's worth is measured by her devotion to her husband and family rather than by her own individuality or aspirations. Consequently, even within a privileged domestic environment, womanhood continues to be defined through relationships with others instead of through independent selfhood. Simone de Beauvoir's observation powerfully illuminates this condition:

Thus humanity is male and man defines woman not in herself but as relative to him: she is not regarded as an autonomous being For him she is sex - absolute sex, no less. She is defined and differentiated with reference to man and not he with reference to her; she is the incidental, the inessential as opposed to the essential. He is the Subject, he is the Absolute - she is the Other. (16)

Trasi's narrative affirms this insight by demonstrating that patriarchal authority regulates women's lives across caste divisions, even though the mechanisms through which that authority is exercised differ according to social location.

Questions of identity also occupy a central place in the novel, where belonging is repeatedly shaped by rejection, loss, and the longing for recognition. Mukta's search for her father becomes one of the most emotionally charged moments in the narrative because it exposes the cruelty of abandonment by an upper-caste man who acknowledges her existence

yet refuses to accept responsibility for her. The emotional intensity of this rejection is captured in the following scene:

I saw a man leave the mansion, saunter past the sleeping security guards, and walk up to the car waiting for him outside the gates Then something strange happened. I started running toward the man. I don't know what I was thinking when I called out, "Appa!" The man turned to look, squinted through the sunlight. "Appa!" I yelled again, even louder, as I stopped a few yards away When I ran behind the car, the man had looked behind briefly as if he was sorry he had to leave me behind. And I knew then, I knew as the dust that the car left behind blew on my face, that my father did not want me, that he would never come to get me. Sakubai had been right all along; I did not deserve a father. (50-51)

The significance of this episode lies not only in the father's rejection but also in Mukta's gradual acceptance of that rejection as something she believes she deserves. Abandonment ceases to be an external act and becomes internalized as a judgment on her own worth. Earlier in the novel, Mukta observes that she is "too fair for a lower caste" and possesses the complexion and green eyes inherited from her Brahmin father (TCOOS 14). Yet this biological connection offers neither legitimacy nor social acceptance. Instead, it reinforces her position as an unwanted reminder of caste transgression, forcing her to exist as a hidden and inconvenient secret. Her loss of identity reaches its final stage after she is trafficked into prostitution, where even her name is taken away and replaced according to the preferences of her customers, who call her "sweety, chameli, chanda" (TCOOS 249). The erasure of her name symbolizes the erasure of her individuality. By denying her the most basic marker of personal identity, the novel demonstrates how systems of exploitation reduce women to anonymous bodies, stripping them not only of dignity and autonomy but also of the language through which they are recognized as human beings.

The novel further deepens its exploration of marginalization by drawing attention to the relationship between the sex trade and HIV, revealing how illness compounds the discrimination already experienced by women in prostitution. These women endure exclusion not only from the larger society but also from those within their own social circles, particularly when disease exposes their precarious circumstances. As Shalini Bharat and her colleagues observe, disclosure of HIV status among sex workers is uncommon because of the "fear of isolation, ostracism, loss of income, and destitution," while denial frequently becomes the immediate response following a positive diagnosis (Bharat et al. 55). This perspective helps illuminate the social reality represented in the novel, where exploitation

extends far beyond physical abuse to include abandonment and social erasure. The bodies of devadasis and women in prostitution become burdened with multiple forms of stigma, carrying the weight of disease, shame, and exclusion simultaneously. Instead of generating compassion or support, illness further intensifies their invisibility. A society that has already treated these women as expendable becomes even more indifferent once they are associated with HIV. By foregrounding this dimension, Trasi situates the experiences of devadasis within a broader discourse that examines the intersections of public health, gender-based discrimination, and social stigma affecting marginalized women.

The title, *The Color of Our Sky*, itself carries profound symbolic significance, suggesting that although individuals inhabit the same world, their experiences are shaped by unequal social realities. Tara and Mukta live beneath the same sky, yet the meaning of that shared space is profoundly altered by differences in caste, class, and gender. Trasi's narrative therefore extends beyond the personal tragedy of a single protagonist to expose an entire social structure sustained through deeply rooted inequalities. Throughout the novel, religious ritual becomes a means of legitimizing sexual exploitation, the family transforms into a space where betrayal is enacted, and even rescue fails to ensure genuine liberation. Rather than presenting the *devadasi* tradition as a forgotten religious custom, the novel reveals it as an enduring system of coercion that continues to survive through caste discrimination, economic deprivation, and patriarchal privilege. At the same time, the narrative emphasizes that women from privileged backgrounds are not entirely exempt from patriarchal domination, although the forms and intensity of their oppression differ significantly from those endured by women such as Mukta. This nuanced representation strengthens the novel's social critique by resisting simplistic distinctions between privileged and marginalized women while making clear that caste and poverty expose the most vulnerable women to the harshest forms of violence and exploitation.

In conclusion, *The Color of Our Sky* offers a compelling literary indictment of the *devadasi* institution and the wider social structures that perpetuate gendered oppression. Through Mukta's experiences, the novel reveals how a practice publicly celebrated as religious devotion is transformed into a mechanism of child exploitation, sexual slavery, and intergenerational trauma. Her journey exposes the interconnected realities of caste discrimination, poverty, and religious manipulation, while Tara's life demonstrates that patriarchal authority continues to regulate women's existence even within socially privileged households. By portraying silence, trafficking, sexual violence, emotional abandonment, and the erosion of personal identity, the novel illustrates the many ways in which women are

constructed as the “Other” within patriarchal society. Yet Trasi does not confine her female characters to the position of passive victims. Instead, she portrays them as individuals who continue to carry memory, resilience, emotional depth, and an enduring desire for dignity and recognition despite relentless adversity. Within this framework, the devadasi tradition emerges as a “sacred cage”, an institution that simultaneously invokes religious sanctity and enforces lifelong captivity. Consequently, Trasi’s novel stands as a significant literary intervention that challenges the continuing realities of gender injustice, caste oppression, and the cultural practices through which violence is legitimized in the name of tradition.

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English Language Education in India: Ancient Roots to Modern Innovation

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ABSTRACT

Education has substantially enhanced human lives and has changed significantly through time. During ancient times, knowledge was primarily passed down by oral traditions, stories, and ancient fables from one generation to the other. These educational approaches had a strong foundation in the cultural and social customs of the era. George Washington Carver (1896), an American agricultural scientist and inventor, defined education as the key to unlock the golden door to freedom. In order to unlock the door of freedom globally, it is necessary for learners to get acquainted with the English language, which is considered a lingua franca in many countries around the world. It not only acts as a global link language but also as an inter-state common connective language among countries. In spite of its prevalence, many countries have adopted English as their second language. With the motto of promoting the quality of education and enhancing the English language teaching and learning process in Indian classrooms, the conventional educational approaches started to change over time, and in this digital era, the adaptation of modern teaching pedagogies and innovative technological tools is found more common in educational platforms. This research work analyses the rationale behind this transition from conventional teaching approaches to modern innovations in educational platforms. It also traces the evolution of the educational system and the emergence of the English language in India and evaluates how English language teaching placed its roots in Indian sands. The study highlights the recent advancements that have occurred in the field of education and the English Language Teaching and Learning process in India.

Keywords: Education, English Language Teaching (ELT), evolution, modern innovations, and advancements.

Introduction

Education is the foundation for raising people's standard of living and enriching their minds, refining them, and enlightening them. In comparison, the English language holds the status of being one of the most extensively spoken languages globally. It is the most commonly spoken foreign language, the language of the media, science, and technology, etc. In a multilingual country like India, English occupies the position of the second language irrespective of its linguistic, cultural, religious, and geographical diversity. English serves as an inter-state connective language of its own, standing as "Indian English." After British

colonisation, English became an essential tool for effective cross-cultural communication due to its widespread use in business, academics, travel, and the internet; thus, knowing it well provides learners with the opportunity to improve their lives on a global scale.

Mehtabul Azam, et al. (2013), in their article “The Returns to English-Language Skills in India,” state that India is a linguistically varied nation with thousands of different languages. Due to the British invasion, the English language played a vital role in facilitating communication between Indian merchants and British settlers. It became essential for the local population in India to acquire proficiency in English in order to thrive in their own land. The substantial influence of English on Indians, combined with its global significance, led to English becoming an official language in India after Independence. As years rolled by, the perspectives of education and language learning changed, and new educational instructions and methodologies emerged. The shifting educational demands and the growing needs of society gave rise to the modern educational system, which rules the current educational platforms. This research work delves into the evolution of the educational system in India and also presents the emergence and evolution of the English language and its teaching and learning process.

Research Statement

This study aims to clarify the changing landscape of the educational system in India and trace the evolution of English language learning in India, characterised by the transition from traditional to digital teaching methods.

Research Questions

- What are the significant changes in English Language education in India?
- What are the major shifts that occurred during the transition of the Indian educational system from conventional teaching to modern innovations?

Objectives

The objectives of the study are,

- to examine the extent of the paradigm shift from traditional to digital modes of education.
- to analyse the evolution of English language education in India.
- to investigate the role of technology in promoting the educational system and English language teaching and learning.

Scope of the Study

The educational system in India underwent various shifts and evolutions across eras. This research work provides a thorough analysis of the rationale for this transition in the

Indian educational platforms, specifically highlighting its shift from traditional to digital methods over the years. Additionally, this study explores the impact of the COVID-19 pandemic on expediting the adoption of digital tools to enhance teaching and learning for learners in the 21st century.

Methodology

The research involves a qualitative study to gain a theoretical understanding of the transition from traditional to digital teaching and learning; basic research is conducted.

Educational Developments in India

Education is a road to success which uplifts the personal, professional, and social standards of an individual, and helps them to make a comfortable living in society. Various studies have been conducted from ancient times to the contemporary to promote education, and various methods and approaches have been introduced, developed, and implemented to enhance the knowledge and skills of the learners. As a result, numerous methods and approaches emerged to rectify the challenges in spreading education and promoting comprehension among the learners. During ancient times, people believed that education was the cornerstone to survive in their community and to rectify their basic needs. As years progressed, education for basic needs turned into education to survive in a rapidly changing world, both socially and economically.

Educational System in India during the Ancient Era

The Indian educational system is most commonly regarded as the first educational movement in the world. Sankaranarayanan Paleeri, in his book *A Brief History of Educational Developments in India* (Paleeri,1), stated that “The ancient centers of education like the Nalanda and Takshasila were identified by British historians during the middle of the 18th century”, which indicates that the educational system in India has been rooted long before the 18th century. It faced numerous changes from the Vedic period to the contemporary period. He also compares the Indian educational system with a banyan tree and states, “The educational system and its development in India resemble the structure of a banyan tree, which has a multitude of branches, roots, and twigs, providing a haven for birds, animals, and numerous creatures, even parasites! Moreover, it is like a forest that serves many lives and the whole of nature itself”(Paleeri 1–2).

Educational developments in India can be categorised into three: ancient, medieval, and modern. The ancient educational system mainly focused on providing knowledge and skills for the learners; monetary benefits were not taken into consideration. According to the ancient educational system, imparting education to others is considered a divine

responsibility. The literary texts were mainly religious, with sermons and rituals. *The Rig Veda* is considered one of the most ancient texts. Later, with these kinds of religious texts emerged texts like *The Mahabharata* - an epic, *Satapatha Brahmana* - a book on nature's physical principles, *Arthashastra* - a book on politics and economics, etc. These literary works served as a seed for the emergence of many other literary texts in India.

During the ancient era of education, Gurus were considered the prime source of knowledge; learners who wished to attain knowledge from the gurus should come under the roofs of gurus, commonly referred to as an *ashram*. Food, clothing, training, and educational materials were common for all groups of learners. Educational materials and methods were designed by the guru himself/herself. The second phase of the ancient educational system arrived when the ashram received monetary benefits from the rulers; eventually, the ashrams came under the control of the ruling party. Decisions regarding the ashram and educational materials were provided to the learners under the influence of the ruling party. Later, gurus visited the learners' homes and provided education based on their preferences, and in exchange for knowledge transfer, they were rewarded with cash or kind. In this phase, education became a commodity to exchange. The later part of this era is regarded as the Brahmanic period or Caste era. During this period, education was provided to the learners based on their caste. (Paleeri)

Educational System in India during the Medieval Era

The educational system in India during the medieval era is divided into two: the Islamic system of education and the Mughal system of education. The reign of the Delhi Sultanate in India is considered the Islamic system of education. In this system, education was given to all in free and precise ways. The education system was divided into two: primary education, which was referred to as 'Maktab', and higher education, which was referred to as 'Madrasah education'. The main motto of the Islamic system of education is to spread the Islamic religion all over India. In Maktab, learners were taught to read *the Quran* with proper pronunciation, and some basic disciplines were taught to learners. Maktab were attached to Masjids. The medium of instruction was in Arabic and Persian. They focused on enhancing the reading, writing, and arithmetic skills of the learners. Learners who fulfilled these criteria of primary education were eligible for higher education - Madrasah, where learners were provided with subject knowledge such as Maths, Science, History, etc., along with professional courses. Women's education was restricted during this period.

The second phase started when Mughal Emperor Akbar ascended the throne. During this phase, the educational system took a proper structure. Education was given to all

regardless of religion, sex, financial background, and power. Women's education was highly promoted, and primary education was given in both mosques and temples. Both Hindu and Islamic religions were given importance. They also established numerous educational institutions and initiated various educational movements. Subjects such as Science, Mathematics, Geometry, Logic, History, Literature, Astronomy, etc., were introduced. The educational system in India during the medieval era came to an end after the fall of the Mughal Empire. The medieval era played a crucial role in the development of the educational system in India.

Educational System in India in the Modern Era

The educational system in the modern era began during the first half of the eighteenth century. The British East India Company played a major role in the development of the modern educational system in India. During the early years of British rule in India, they did not pay much attention to India's politics or educational system since they mainly focused on trade; later, they found out that India was facing an unstable situation both politically and economically. The British took advantage of the situation and came to power, which brought various changes in politics, culture, religion, etc. In the midst of the 18th century, Christian missionaries took charge of the educational system in India. The syllabus was designed to train the people for serving the British in their work and welfare. Traditional education, rooted deeply in Indian culture and traditions, was replaced by the modern educational system, which mainly focused on assisting the English to assert their power all over India.

Educational development in India took several revamps during the modern era. One among them was the Hunter Commission of 1882, also known as the "Indian Education Commission"; this was considered the first education commission in India, chaired by Sir William Hunter. This commission established several resolutions that changed the system of education. Primary education was open to all regardless of status, gender, race, or religion. It paved the way for the disadvantaged sector of India to get their primary education. Secondary and collegiate education were promoted and funded by the government. Many teacher training centres were started to train the teachers to provide quality education to the masses. Several policies were adopted by the educational committee to improve the quality of the curriculum, and the syllabus was designed accordingly to improve the competency of the learners.

Computers started to evolve in educational circles around the 1990's. The evolution of computer - based learning can be categorised into seven phases: Early adoption stage, Personal computers and educational software, Internet and Multimedia Integration, Digital

Learning and Online Education, Mobile Devices and Personalised Learning, Remote Learning and Technological Integration, and Personalised Education. In the early adaptation stage, computers were used in universities and research institutions due to their cost-effectiveness. In the second phase, there was an emergence of subject software where subjects like Math, Science, and Languages were taught, and schools started to adopt basic software. Modern educational approaches were implemented in the educational platforms to overcome the shortcomings that prevailed in systematised classroom approaches. The main focus of modern educational methods is on learners of the twenty-first century, who are gifted with creativity, innovation, and critical thinking. These learners are capable of coming up with creative solutions to any challenging problems. Educators must rely on technology to educate this type of learner.

During the third phase, computers played a vital role in educational classrooms, and in the fourth phase of technological interventions, educators started to use multimedia resources such as songs, videos, pictures, etc., as educational materials inside the classroom environment to make learning more authentic, flexible, and interesting as per the educational needs of the learners. In the Remote Learning and Technological Integrated phase, the expansion of mobile technology leads to mobile education, which promotes anywhere, anytime education, in which learners can access their educational materials from any part of the world. Through Information and Communication Technology (ICT), the learning space is no longer limited to traditional classrooms, shifting educational delivery to the palms of every individual (The Earth Institute, Columbia University and Ericsson, 2016). The growth of educational apps promotes self-learning for learners. Interactive and multimedia content in computer - based education has the potential to engage learners in the learning content more effectively than traditional methods.

The COVID -19 pandemic has opened the door for rapid technological advancement in many disciplines, including education. It accelerated the shift towards technology-based learning. With widespread lockdowns and school closures, educators and students had to adapt quickly to remote learning environments. Online platforms, video conferencing tools, educational apps, and digital resources became crucial for maintaining continuity in education. This change emphasised the digital gap as well as disparities in access to technology and excellent education. Educators had to change their teaching approaches, making use of online platforms and new technologies.

The incorporation of technology into education has become an appropriate tool for providing productive knowledge input for Generation Z and Alpha learners in the current

scenario. Since they were raised in a digital world, they are technically sound by nature, and these learners are commonly referred to as tech-savvy. As these generations step into a rapidly evolving digital world, adopting technology-based learning is a strategic move to equip them with the skills and competencies necessary to thrive in the modern era.

However, the integration of technological tools alone as a medium of instruction inside the classroom environment could possess certain setbacks, such as the possibility of getting addicted, cognitive overload, content distraction, etc. In order to mitigate these challenges, the technological tools should be judiciously utilised in the classroom environment. The synergy of the strengths of conventional and technological resources and adopting them as a medium of instruction as per the needs of the learners could have the potential to offer flexible, engaging, and productive learning outcomes inside the classroom environment.

Evolution of Language Education in India

The historical development of English is typically divided into three major periods: the Old English period, which lasted from the time of the earliest written records in the 7th century to the end of the 11th century; the Middle English period, spanning from the 12th century to the 15th century; and Modern English, which began in the 16th century and continues to the present day. While tracing the origin of the English language in India, it is assumed that the English language entered India through British Colonizers during the late 16th century and early 17th century.

Joybrato Mukherjee and Tobias Bernaisch (2020), in their chapter "The development of the English language in India", have divided the diachronic development of the English language into five phases. The first stage is foundation; it speaks about the transportation of the English language to a new territory through colonisation. The second phase is exonormative civilisation; it is about the influence of English settlers, that is, Britishers, upon native settlers. The third phase is nationalisation, in which the English language has an integral part in every aspect of the native people's life. In this phase, English with proper grammatical structure was given importance. The fourth phase is about the place value of the English language in India after independence. Phase five is about the adaptability of the English language in social contexts and norms, leading to the formation of a unique English variety. Its development spans a wide range of regional and social contexts. The foundation of the English language in India was led by Father Thomas Stephens in 1579. His letter from Goa is considered the first instance of Anglo-Indian literature.

The second half of the 18th century is considered the evolutionary period of Indian

English in India. The English language gained increasing importance over time, as nearly all Indian regions were gradually overpowered by the British colonies. The British East India Company representatives further contributed to the teaching of English to Indians. The East India Company in 1813 sensed the need for modern education. Education received higher priority at that time. After Independence, due to its global importance, the English language was accepted as an official language and a medium of communication, and it gradually became the language of the academic press and education.

The National Council of Educational Research and Training (NCERT) is the entity in charge of the Indian educational system. NCERT's main goal is to advance and carry out research in the area of school education. NCERT also engages and communicates with foreign organisations, participates in international educational conferences, and conducts a variety of training sessions for educators from developing nations. They recommended that English should be taught as a second language. The Government of India introduced ELT in India with the help of the British Council. John Forrester, an educator and instructor who imparted English language skills to Indian teachers, is credited with introducing the concept of the "Structural syllabus." This syllabus was the pioneering framework adopted for language instruction. The Government of India, through the Central Institute of English and Foreign Languages (CIEL), started two institutions to teach English through English Teachers. The first National Congress on Senior English Teacher (NCST) discussed the effectiveness of the structural syllabus and the problems of ELT in India. Later, as a revamping of the structural syllabus designed by John Foster, a new syllabus was formed called "Structural Oral Situational Reading Syllabus."

During the 1960's Noam Chomsky introduced Transformational Grammar (TG), wherein he focused on linguistics, psychology, and education, and it challenged the foundation of the structural syllabus. Chomsky called language as, language is a rule-governed behaviour, not just a group of structures. The communicative approach emerged as a reaction against the artificial quality of "pattern practice" and also against the idea of consciously learning a language with its grammatical structure. Technology-Enhanced Language Learning (TELL) has become an essential component of ELT in the current scenario. With the advancement of technology, the use of computers, mobile devices, and the internet has transformed the way language is taught and learned.

Impact of National Education Policy (NEP) on ELT in India

The National Education Policy (NEP) 2020, approved by the Government of India, represents a landmark reform in the education sector, aiming to make the system more

holistic, flexible, multidisciplinary, and aligned with the needs of the 21st century (Maurya and Sharma 407). NEP 2020 emphasises the importance of multilingualism, wherein learners' mother tongue (L1) is utilised as a medium of teaching for an effective learning outcome. It reinforces the adaptation of bilingualism in an educational platform and stresses the importance of providing culturally relevant educational materials for a holistic learning outcome. It encourages the transition phase of the education system from rote learning to communicative competency and learning-centred approaches.

English language as a lingua franca has become increasingly prominent across every aspect of human life. In order to enhance current generation learners' practical skills for communication, employability, and to promote their global connections, adapting technological tools into educational platforms has become increasingly common in the digital era. "According to NEP 2020, one of the key drivers of the schooling system will be the broad use of technology in learning and teaching for the removal of language barriers, increased access, education planning and oversight" (Nithish 230). Maurya and Sharma, in their research work "Role of Technology and Digital Learning in NEP 2020," also highlight that the National Education Policy (NEP) 2020 places a strong emphasis on the integration of technology into teaching, learning, and educational administration. Thus, NEP 2020 suggest that the integration of technology into educational platform could offer a productive language learning outcome in an educational platform specifically in English as a Second Language (ESL) classrooms, however providing equal technological access to all learners, lack of proper technological assistance in the educational platforms, inadequate training for teachers and learners on proper utilisation of technological tools, limited suitable learning environment, financial constraints, lack of network facilities, etc. were considered as affective barriers for adapting innovative technological tools in educational platforms. In order to mitigate these challenges, offering training programs for proper adaptation of technological tools into educational platforms, providing suitable educational resources, teacher readiness to adapt innovative technological tools, and institutional support were highly important. Therefore, NEP 2020 offers an innovative framework in transforming English Language Teaching (ELT) in India.

Role of the Learners

Learners are responsible for promoting their own learning progress in this technologically upgraded educational setting. The appropriate utilisation of technological tools by being aware of their ethical consideration would optimise the potential of obtaining authentic learning among the learners. The effective learning outcomes in an educational

setting can be attained through active learner participation. Even though traditional teaching approaches assist the learners to gain basic knowledge of the content in a structured way, technological integration into conventional teaching methods makes the learning more authentic and provides experiential learning platforms. It makes the learning process engaging, interactive, and productive. It promotes independent learning and also makes learners active participants in the process of knowledge transfer.

Role of the Educators

Educational practices have changed from ancient oral traditions to contemporary, technologically mediated approaches. However, the essential value of educators in promoting the transfer of knowledge and encouraging growth in learners has persisted. The foundation of education tends to be teachers, who modify their teaching strategies to meet the shifting demands of society and learners. The importance of educators in forming the brains of the next generation is undeniable as we look to the future. In contemporary educational settings, educators not only act as a mediator of knowledge transfer but also as a facilitator to make learning progress feasible for the learners. The adaptation of conventional teaching methods innovatively by integrating technological tools based on the needs of the learners would also optimise learning outcomes. The use of an eclectic approach in a classroom environment acts as an effective teaching pedagogy, which possesses the potential to offer a productive teaching process in a classroom environment.

Findings of the Study

The findings of the study are as follows:

- Conventional teaching approaches provide structured and systematic content delivery, which enables learners to have a strong foundation of the subject matter.
- Traditional teaching approaches require limited technological assistance and high - end training, which is feasible to implement anywhere and anytime.
- In conventional teaching methods, it is easy for educators to add or remove educational content or activities with respect to learners' performance in the classroom environment.
- The educational system has undergone a paradigm shift across eras. Initially, it was teacher-centred, then learner-centred, and now it is learning-centred. Due to this paradigm shift in the educational system, it is important to rely on technological tools for effective learning outcomes
- It offers digital literacy, self-directed, and multidimensional learning for the learners,

wherein learners get the opportunity to access global content and holistic learning outcomes.

- The integration of technology into educational platforms assists learners in enhancing their 21st-century skills such as communication, collaboration, creativity, and critical thinking skills.
- The use of digital education in the classroom will enhance learners' interaction and reduce external distractions, especially among Gen Z and Gen Alpha learners in the current era.
- In comparison with traditional methods of teaching and learning, integration of technology into educational platforms provides learner engagement, enthusiasm, and improved performance among the learners.
- It gives learners greater independence, active participation, and pushes educators to update themselves in this technically sound world.
- The adaptation of digital education promotes flexibility, creativity, and a dedication to inclusion and equity values among learners.
- Exposure to native speakers through technological tools in language classrooms aids learners in language acquisition.
- The incorporation of digital and traditional approaches assists educators in providing innovative, interesting, and productive educational platforms for learners.
- It caters to the educational needs of the current generation of learners effortlessly and makes learning accessible, interactive, engaging, and constructive.
- It is important to offer proper training to the educators for judicious utilisation of technological tools inside the classroom environment.
- Educators' readiness in adapting technological tools also holds equal importance for effective utilisation of technological tools.
- Institutional support in providing proper technological assistance also plays an inevitable role in adapting innovative technological tools inside the educational platforms.

Conclusion

The incorporation of technology into educational platforms has sparked a paradigm shift from traditional to digital approaches in the constantly changing world of education. It is important to recognise that despite technological developments and educational shifts, it is the shared responsibility of both the educators and learners to make the learning process collaborative and effective for productive learning outcomes. This study has looked into the

many facets of this shift, examining the tremendous effects of technology on the processes of teaching and learning as well as its consequences among teachers and learners. In order to create dynamic, participatory, and inclusive learning environments, educators must negotiate an ever-changing environment, adjust to new teaching methods, and use technology in a systematic way.

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Beyond the Identity: An Analysis of Systemic Justice in Shon Faye's *The Transgender Issue*

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ABSTRACT

The paper "Beyond the Identity: An Analysis of Systemic Justice in Shon Faye's The Transgender Issue" analyses Faye's highly influential work The Transgender Issue: An Argument for Justice. It moves the focus from the personal view of narratives to the careful understanding of structures of the systems. While the contemporary discussion about the lives of transgender community only stays for the cultural debate, Faye reframes the experience of transgenders as the central notion of the political and material struggle. By using the intersectionality theory by Kimberle Cranshaw, this paper analysis how transphobia is so deeply connected with deep systemic failures in basic needs to exist as a human being. This paper shows that how Faye neglects the liberal focus on the acceptance and recognition rather than focusing on the universal justice. Through analyzing the intersections of class and gender, this paper gives a clear picture of how the economic instability indirectly affects the transgender people and particularly those who are already marginalized by the state of poverty. Additionally, this paper analysis the medical limitation system, which is a form of biopolitical control, that shows the struggles of the transgender person who fights for their rights. Furthermore, this paper through the intersectional framework of Faye reveals an important truth that the transgender freedom is not a sub issue but it pays a way for the collective freedom. By moving beyond the identity, this paper gives a clear way that by dismantling the cisnormative structures, it provides the justice for the all the marginalized groups.

Keywords: Intersectionality, Freedom, Justice, Transgender, Marginalization.

For a long period, the issues of transgender people have been portrayed as a psychological curiosity and also as a talk of debate by the media among the cisnormative system. And the novel *The Transgender Issue* by Shon Faye puts a great break from this these ideas. She goes beyond the thought of being trapped in the wrong body to how the contemporary society functions.

The main problem of facing the obstacles to live is not in the fate of transgender community but rather it is framed by the society who views them as a pathological being. This paper makes a clear statement that the liberation of the trans people takes a daily test for the sake of the society by the use of the intersectionality theory. Faye's works shows that the disputes for the healthcare liberty, economic allocation and the rights for the transgender

people are all combined together as a connected movement for the universal justice. The *Oxford Review* article states:

Intersectionality Theory, first coined by Kimberle Crenshaw in 1989, is a framework used to understand how various forms of inequality, discrimination, and social identities (such as race, gender, class, sexuality, and disability) intersect and overlap. It emphasizes that people are not defined by a single social category but by multiple interconnected aspects of their identity that can result in unique experiences of privilege or oppression.

One of the most contributions of Faye is that she refuses to showcase the trans identity as a simple social concept. She places the experiences of the trans identity under the class struggle. By seeing it under the lens of intersectionality it is visible that the trans person is not only a subject of gender but an economic one. Through intersectionality, it is visible that the oppression imposed on the trans people is not just an issue of identity and acceptance by the culture but it is deeply interconnected with the survival and inequality. The failure of system proves that the trans liberation is an economic struggle. The *National Library of Medicine* article states that “Drawing on theories of intersectionality and structural injustice, Intersectionality Research for Transgender Health Justice (IRTHJ) posits that social and health inequities affecting transgender populations are result of status quo power relations produced within and between oppressive structures, institutional systems, and socio-structural processes”. She mentions that transphobia is not just a mean word but it is the one which pushes the trans people into the place of poverty. *The University of Edinburgh* article states that “Transphobia is harmful or unfair behaviors or actions a person does based on a fear or dislike of trans people. Transphobia may be targeted at people who are, or who are perceived to be, trans”. She also states that they unreasonably get caught due to the lack of job security, low wages and the things with less benefits. She states that the inclusion which is portrayed in the corporate sectors only leads the transgender people on streets rather than providing benefits to them. So, it is important to note that the housing rights and labor rights must also be the part of trans justice.

The analysis given by Faye about the medical system swipes away the idea that healthcare is a blessing which is provided by the state. She portrays the gender identity clinic as a place which acts as a gatekeeping. By using the concept of biopower, it is evident that the state uses the medicine as a tool to make sure by permitting which kind of bodies are permitted to have a change and which bodies not permitted to change. Towards the

transgender people, the doctors are likely to act as a curer but they act as a person who judge and decides the validity of their presence. *National Library of Medicine* article states:

Transgender identity is a social determinant of health because of the pervasive societal and institutional cisgenderism that assumes that there are two immutable genders (i.e. men and woman) and discriminates against individuals who do not conform to cisgender expectations. Consequently, cisgenderism produces differential levels of social exclusion across health care, employment, social service and educational settings for transgender youth.

Furthermore, she argues that the present medical system pressures the transgender people to act in a standard way. And to be specific about it, they need them to perform by following the stereotypical script by the binary gender. To undergo any hormones changes or surgeries, the trans people always need to prove something to the healthcare authorities. They need to prove that they fit to the stereotypes of traditional male and female categories. And this particular thing creates imbalance in the power system where the state, and which only through the medical authorities who completely holds the right to the autonomy of an individual's body. The *Guardian* article states:

Faye uses analogy to deftly answer complicated question – if being trans is not a mental illness, why does the NHS need to provide treatment for it? She draws a parallel with unwanted pregnancy – being pregnant is not an illness and yet abortion is a vital medical intervention, for want of which people are driven to desperate extremes. Similarly, a trans person needs access to medical transition not because they are ill, but because it is necessary for that person.

The problems in the healthcare autonomy are the place where the issues of the transgender community reveal the hidden connection to the other social movements. Faye compares the struggles of the trans healthcare with the struggles faced by the disabled people. Both the people get into the fight against the medical system, which views and portrays their body as a shattered thing which seeks the help of medical care to fix or cure it rather than helping them.

Both the members fight for the principle of thought that the state or the hospital system should not declare about the changes in one's body of an individual related to the gender. Through this way Faye provides us the visual about how trans individuals are restricted by the healthcare systems through waiting for a long time and deep psychological evaluations. And through this it practices a wider form of control which creates a threat of the bodily autonomy. In the novel she says that "In order to neutralize the potential threat to

social norms posed by trans people's existence, the establishment has always sought to confine and curtail their freedom" (Faye 16). Faye states that when the medical system treats the transition of the transgender people as a psychiatric problem, which is needed to be cured it obviously results in a failure.

Faye states that the problems faced by the transgender people are showcased in the newspapers and media is not done out of concern. Queer theory also argues that the portrayal of transgender people by the media is the result of sensationalism and pathologization rather than showing a real concern. *The Third Voice Reality and Vision* article states that, "Queer theory can be described as a queer critical perspective that aims at transforming the prevailing social norms about gender and sexual orientation". When a particular group is portrayed as a threat to the values of society it creates a sense of fear. When the topic moves around the conversation about the bathrooms, the media intentionally distract the focus of public from the structural problems. When the brings the lives of transgender people as a debate, it shows that the rights of the marginalized community are kept for the public opinions. This shows the that transgender people are outsiders in the cisgender society. The *Harmless* article states that "If trans people are constantly shown in media as one-dimensional, suffering, their primary storyline being about risk and suicide, this can have detrimental effect on trans viewers, including hopelessness about their future, impeded sense of identity, and lack of humanity". She exposes that this sense is constructed by the political systems to always safeguard the power structures which exist.

The major thing is that how the transgender people are treated shows the warning about the health system of a democracy. Her work shows that the transgender community are being used as a testing piece for the control of authority and the complete erasure of the privacy. When the state gets the access to completely erase the bodily freedom of the trans person through the healthcare limitations and by criminalizing of their public presence, it gives a legal precedent. So, when the state has the authority to decide to valid whose body can be accepted simultaneously prolong to target the other groups as well. So obviously the justice for the transgender people acts as a defense for the liberty of every people.

The Transgender Issue is not a request for the tolerance, but it is a quest for a new world. She proves that the issues of the transgenders are not their own issues but it is a human issue. The hardships they face in the denial in the healthcare systems, in housing and portraying them as a threat is not an isolated phenomenon. But it is the attitude of the society which prioritized their own benefits over the other people dignity. Through the lens of intersectionality, this paper proves that the one part of the society cannot be fixed without

fixing it in a complete way. Here Faye does not request for a special place in the society, but she raises a question why the society is built in a way that exclude some communities in the first place. Her work gives a clear statement that the freedom of the transgender people is the true freedom of the human spirit.

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Invisible Chains: The Influence of Cults on Modern Society

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ABSTRACT

This article investigates the role played by cults in modern society, as well as the psychology behind their ability to exist despite negative public perception. Based on the findings of research conducted within the field of Sociology and Psychology, the paper looks at the factors that help in sustaining the activity of cult organizations in modern society, including charismatic authority, ideological conditioning and group isolation, which are described in the article as invisible shackles, used by cults to keep followers under control. In addition, the paper discusses modern recruitment techniques employed by cults, such as making use of vulnerability of an individual, his or her crisis in identity, as well as the promise of inclusion in a community. Finally, the study looks at how cults managed to adapt to modern technology and the Internet, allowing them to spread their ideology even more efficiently.

Keywords: *Cult, Social media, Ideology, Swifties, Fandom*

The word ‘Cult’ is not only applicable to religion but also other fields like marketing, politics and self-improvement and this revolves around a cult leader who instructs people what to do by encouraging and assuring them of a great lifestyle and people blindly believe in them. Charismatic cult leader claims to complete what is missing in their lives. People tend to believe in such things, hoping that they will find the missing piece of themselves if they are part of the cult society. Conspiracy theory is also used in this book as there many scepticisms regarding the social media cults “Conspiracy theories offer a kind of reassurance that things happen for a reason, and can make believers feel special that they’re privy to secrets to which the rest of us ‘sheeple’ are blind” (188).

Scholars distinguish cults, fandoms, and highly committed communities based on authority, ideology, and social structure. While cults typically revolve around charismatic leadership, ideological control, and behavioural regulation (Lalich), fandoms are generally voluntary communities organized around shared admiration for media figures or cultural texts (Jenkins). Highly committed communities may demonstrate intense loyalty without necessarily exhibiting coercive or manipulative characteristics. This distinction is essential when analysing contemporary digital communities.

Non-religious cults such as fitness cults, social media cults, marketing cults and mass media cults have positive aspects as well as negative aspects. Social media cults, create many fan pages and are biased against some popular social media influencers who promote things that are too good to be true. These influencers advertise things like beauty, fitness and lifestyle, which are very unrealistic.

The influencers make their social media platforms more appealing by using promising terms like ‘believe me, I tried and I never regretted’, ‘try this for a week and you’ll see miracles’, ‘this made my skin gleam like glass’, and ‘this is my daily routine’. People who are insecure about themselves begin to believe those words and practice them without any guarantee of success. Influencers promote things for the sake of their own; they work on paid promotions or just social media posts, which makes their earnings by views and likes.

Not all social media influencers promote fake content; only the unreal content goes viral and people believe them blindly. People with a positive mindset can easily overcome these obstacles; they take just the good things and leave the things that could make their lives worse, whereas people who want to fill a void within themselves appear to be stuck in the situation. People in quest of something they lack cannot be satisfied with anything; they continue to search for something that fills their void, which appears to have no specific solutions. They had no idea what could potentially be the remedy to their lack of self-confidence. To acquire views and likes, influencers take advantage of people’s weak mindsets by posting videos that encourage them to live an unrealistic lifestyle. As observed by Fischer in his article *How Do Cults Affect Society*, “The illusion of comfort, having emotional comfort is one of the key qualities a cult needs to be successful. The human need for comfort is one of the things that often lead people to start to turn towards cults in order to quell their fears and anxieties”.

The main factor that differentiates cult and non-cult followers is their thinking. Non-cult followers think independently whereas cult followers strongly depend on their cult leaders. The non-cult followers critically evaluate and then proceed in whatever they do. However, the cult followers have a strong belief that cult leaders would guide them on the right path. The cult followers have a lonely feeling or might have experienced a traumatic past, which makes them believe that they might find a solution to it.

Social media cults are always interconnected with mass media, fitness and multilevel marketing cults, they use social media as their advertising platforms. As people tend to spend most of their time on social media, these advertisements reach them easily. According to Amanda Montell, the author of *Cultish: The Language of Fanaticism*, cult leaders use us-

versus-them techniques to attract people to join them. She says “technique like us-versus-them labels, loaded language, and thought-terminating cliches are crucial in getting people from open, community-minded folks to victims of cultish violence; but importantly, they do not ‘brainwash’ them—at least not in the way we’re taught to think about brainwashing” (70). Cult leaders make their followers believe that they are superior to people who lead a normal life.

The cult leaders make the workout sound fun; they add affirmations to the normal workout. This makes people join the fitness studio. Current people are more into technologies and gadgets; they have become more and more lazy as technology grows. These fitness studios are also advertised through social media as influencer promotions. Amanda Montell says that her father is part of a fitness studio called ‘SoulCycle’. Instead of workout comments, the fitness instructors use affirmations like ‘WILLPOWER’, ‘STRONG’, ‘BRAVE’, and ‘ABUNDANCE’. This has turned into a money-motivated business and people have started investing their money and time into it. Montell has also been a part of the Plant Fitness Membership, for which she has paid \$99 a year.

People who are a part of cult culture make normal people believe that the people who are a part of cult fitness are more holy, superior, and perfect than the rest of the world. The instructors make the people devote their bodies and souls to the fitness culture. According to Montell’s ideology, the followers are psychologically attached to their instructors, she assumes that the gurus hold the answers to their happiness. Even though cult fitness has many positive aspects, people consider it as a ritual and as a daily necessity of life because of how the cult leaders project it. She says:

Alyssa’s box next to one of his most famous quotes, a fitness proverb that would soon sear into her brain: Eat meat and vegetables, nuts and seeds, some fruit, little starch, and no sugar. Keep intake to levels that will support exercise but not body fat. Practice and train major lifts . . . master the basics of gymnastics . . . bike, run, swim, row . . . hard and fast. Five or six days per week. (12)

The above schedule is the CrossFit routine which is likely to be followed by the followers of that particular group. The non-cult followers have a vast viewpoint and ideology; they always think out of the box and think of multiple choices when it comes to decision-making. But the cult followers have a firm belief in something. They have a strong belief in what the cult leaders preach. They believe that the cult leader’s preaching could be the solution to all their problems. The cult followers isolate themselves from their families and friends for various reasons. The major reason for their isolation is the control of their cult

leaders; isolation helps the leaders to gain the cult followers mentally. Isolation helps to stop mingling the thoughts of cult and non-cult followers. The cult followers having a casual relationship with the outsiders might ruin the different ideologies communicating with the outsiders. Another reason they isolate themselves from non-members is they don't believe the non-members' ideology and they think that they might ruin their belief.

Amanda Montell's book *Cultish: The Language of Fanatism* fully explains the concepts and methodology of online marketing. In simple terms, Online Marketing makes the common people do the jobs of the employee instead of recruiting an employee and paying the wages. Here, the sellers of the company are the buyers of the company too. They buy products in bulk and sell them to the people they know, or they use social media as the platform for their sales.

Fitness studios are termed cults because they induce promise into the minds of people with no assurance of results. People believe it as they fantasize about the different lifestyles that these cult cultures promise. People start to lose track when they cannot reach the goal of the cult culture. This can lead some people into self-doubt and mental illness by accusing themselves. People who are part of cult journeys can never go back to the person they were.

Unlike religious cult leaders who restrict the members' social contact, this non-religious cult encourages people to gather more recruiters. People trust their family members to ask to follow their social media page so that they can enjoy great benefits. The same goes for the sales too. Rather than buying a product that is advertised by a stranger or a celebrity, people trust their closest circle, who are their friends or family, to buy the product.

Social media cults are related to religious and also non-religious cults. Cult leaders like Bentinho Massaro claim that he has a higher vibration than humans. He uses social media platforms to attract people to join his community. Unlike Heaven's Gate, which did physical gatherings, they gathered a large number of social media followers and worshiped virtually. As the new age technologies grew, people started to influence people through social media in various categories such as fitness, religious activities, talk shows, beauty, and sales. In her book *Cultish: The Language of Fanaticism* Amanda shows how various cult groups like QAnon and SoulCycle use social media to attract people to join their community. She narrates:

Even Lululemon had its distinctive vernacular. It was printed all over their shopping bags, so customers would walk out of the store carrying mantras like, "There is little difference between addicts and fanatic athletes," "Visualize your

eventual demise,” and “Friends are more important than money” all coined by their so-called “tribe” leader, Lululemon’s founder, Chip Wilson. (Montell 12)

The cult owners try to spread their products by displaying their mantras and logos in bags and they create an atmosphere where they make the people believe that their product is the best. In this context, Behavioural Economic Theory takes place where the buyers are forced to buy high-priced leggings like Lululemon which cost over \$400. Not all the buyers are in good financial growth so they buy with all their pennies which later affects their psychological life thinking about the future and it also affects their financial background.

There is a limit to everything. Being a part of any religious activity without harming oneself or others is important. One can be a runner or a fitness member, but the thing is that losing the true self for the sake of these is not worth it. The key is not losing themselves in anything they do. Upholding themselves in everything they do and prioritizing themselves is a must. One should think before investing their heart and mind into something. “I’m confident there’s a healthy way to do that.” (193).

Taylor Swift is an American singer, songwriter, and actress. She has a massive fan base; they call themselves ‘Swifties’. The word ‘cult’ is used when a large number of people have blind beliefs and practices that revolve around the leader. Taylor Swift can also be said as a cult leader because of their fan base which holds the characteristics of a typical cult. It can be more of an addiction rather than manipulation.

Taylor Swift started her music career in the mid-2000s. Her debut song was “Tim McGraw” which was released in 2006. Her second song released after two years (2008) called “Fearless” became a huge success, this song brought her great recognition. She is the only artist whose songs were ranked as top 10 hits on the Music Billboards, which is her greatest achievement. As her music career gradually grew, her fans also grew worldwide. Her fans were known for their dedication and loyalty. People started worshiping her and her music as if they were worshiping God. The ‘Swifties’ might have related their life with the Taylor Swift songs. Her song “Love Story” which was released in 2008 became iconic to date. People started incorporating the theme of this song “Love Story” in everything including love proposals and weddings and the most iconic line of this song ‘Marry me, Juliet, you’ll never have to be alone’. Not only this song but also other songs by Taylor Swift have created a huge impact on ‘Swifties’ life.

‘Swifties’ have supported Taylor Swift throughout her music career. Critics may have some other views on her songs but her fandom always uplifts her. Taylor Swift’s songs might be mentally soothing for people but for ‘Swifties’ it is everything for them. A recent concert

known as ‘Taylor Swift: The Eras Tour’ is described as her journey throughout her music career. It started in March 2023 and is said to end in November 2024, with 146 shows in total. Only with 56 shows that have been conducted to date, the box office has collected an estimate of 780 million dollars in total. This is insane how people are investing tons of money just to see a singer singing in person, not they spend money on concert tickets but also they spend on her merchandise which is costlier than the other similar products which is available. There is no answer to the question, of why people spend this much on things which have no particular benefit.

Nowadays most of the artists and influencers have been brainwashed. K-pop, K-dramas, and Instagram reel artists who are part of them have been worshiped like gods and goddesses. People spend their money, health, and energy on them without any assured benefits. It only costs their money so much. It’s the artists and influencers who get benefits out of this. They make a luxury and dream-like living out of this. They are never going to meet the billions of people who spend their blood and sweat just to see them once. Thus, not only the spiritual ones called cults, this type of cult also exists in the name of fandom.

One of example this type of cult is BTS: Bangtan Sonyeondan, a Korean K-pop band with seven boys under the Big Hit Music. This group has ruled the globe for over a decade now. The concept of this gold digger band is similar to the ‘Swifties’. Their fandom is called as ‘Army’. Their fandom is to be over 90 million people across the globe. Their fandom is called as “army”. The music reflects the hard work of the artists; it can be appreciated without overdoing it. It is not necessary to adore a composer as a deity or adopt their daily routines in order to comprehend the true essence of music and their labours.

The examination of cult influence underscores that their authority does not stem from explicit coercion but rather from intricate psychological conditioning, deliberate social isolation, and the systematic manipulation of belief frameworks. Operating as mechanisms of ‘invisible constraint,’ cults fundamentally reconstruct individual identities and erode the capacity for critical reasoning, with consequences that frequently extend beyond their membership to affect broader familial and communal structures. The same point is mentioned by Ella O’Keeffe’ in her article *A New Age of Enlightenment* as, “It is important to realise that these groups may reflect as many different aspects of human thought and action as are found in society at large – and that each, in its own way, represents an attempt to solve the common human problem of identity”.

Scholarly discourse within Sociology and Psychology affirms that cult proliferation is most pronounced at the convergence of personal vulnerability, societal uncertainty, and the

fundamental human desire for belonging. Furthermore, their capacity to assimilate contemporary communication technologies amplifies their influence considerably, rendering them a significant and enduring concern within modern societal contexts. In conclusion, the identification and systematic dismantling of these ‘invisible constraints’ remain imperative for the preservation of individual autonomy and the sustenance of a critically conscious and intellectually vigilant society.

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The Afterlife of War: Trauma, Memory, and Reconciliation in Kate Quinn's *The Rose Code*

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ABSTRACT

This paper explores The Rose Code by Kate Quinn in a more personal and emotional way, focusing on how memory and trauma shape the lives of its characters. Instead of treating memory as something distant or passive, the paper shows how the past continues to live within people, influencing their thoughts, feelings, and relationships. Using ideas from trauma theorist Cathy Caruth, it explains that painful experiences are often not fully understood when they happen, but return later, demanding attention. The story follows three women Osla, Mab, and Beth whose lives are deeply affected by their experiences during World War II. Even years later, in 1947, they are unable to escape what they went through. Each of them carries trauma differently: Osla feels guilty about her past choices, Mab tries to bury her grief, and Beth remains completely trapped in her memories. When Beth sends a secret coded message, it forces all three women to confront the past they tried to forget. The paper highlights that memory is both painful and powerful. While it brings back suffering, it also gives the women a chance to understand each other again. Through letters, meetings, and honest confessions, they begin to heal and rebuild their broken friendship. The act of decoding messages becomes a symbol of decoding their own emotions and experiences. In the end, the paper suggests that healing does not come from forgetting the past, but from facing it together. By sharing their memories and accepting the truth, the women find a way to move forward, showing that remembering can lead to forgiveness, connection, and emotional healing.

Keywords: Trauma, Memory, Reconciliation, Narrative Testimony, Emotional Healing.

This paper examines *The Rose Code* by Kate Quinn through the critical frameworks of trauma theory and memory studies, arguing that the novel portrays memory as an active and transformative force that enables healing and reconciliation. While the novel is widely recognized for its portrayal of the women code breakers at Bletchley Park during the Second World War, its deeper significance lies in its exploration of the psychological consequences of war and the emotional process of rebuilding fractured relationships. As Quinn reminds readers, "War meant change" (Quinn 12), suggesting that the war transformed not only nations but also the emotional and psychological lives of individuals. By structuring the narrative across two temporal planes—wartime Britain and post-war Britain in 1947—Quinn demonstrates that the past cannot be confined to history; instead, it continually resurfaces,

demanding acknowledgement, understanding, and reconciliation. Central to this analysis is Cathy Caruth's theory of trauma, which conceptualizes trauma as an experience that is not fully assimilated at the moment of its occurrence. Rather than disappearing, traumatic experiences return belatedly in fragmented memories, recurring dreams, and unresolved emotional conflicts. As Caruth argues, trauma is "experienced too soon, too unexpectedly, to be fully known," and therefore re-emerges in ways that compel survivors to confront and reinterpret their past. This theoretical framework provides a valuable lens for understanding the psychological journeys of the novel's three protagonists—Osla, Mab, and Beth—whose unresolved wartime experiences continue to shape their lives in 1947. Through the recovery of memory, the restoration of trust, and the renewal of friendship, Quinn illustrates that reconciliation is not achieved by forgetting the past but by confronting trauma and transforming painful memories into sources of resilience and mutual understanding.

The novel's dual timeline effectively dramatizes what Caruth describes as the belatedness of trauma. The 1947 narrative does not simply function as a continuation of the past; rather, it becomes the site where suppressed memories return with urgency. Beth's cryptogram serves as the narrative catalyst for this return. On the surface, it appears to be a coded message linked to espionage, yet its deeper function is psychological. It disrupts the apparent stability of Osla and Mab's post-war lives, forcing them to re-engage with memories they had attempted to suppress. In this sense, the cryptogram operates as what trauma theory would describe as a "trigger" a stimulus that reactivates unresolved experiences and compels confrontation. Each of the three women embodies a distinct response to trauma. Osla's experience is marked by guilt and unresolved emotional conflict. Her sense of having abandoned Beth during the war becomes a persistent source of psychological distress, shaping her identity in the post-war period. Osla's emotional burden reflects the painful reality expressed in the novel: "Why and if. The two most painful words in existence" (Quinn 36). The quotation captures her constant regret and the haunting nature of unresolved guilt. Although she outwardly performs the role of a composed and socially successful woman, her internal world is characterized by tension and fragmentation.

Trauma theory allows this condition to be understood not merely as regret, but as the return of an unassimilated past that continues to demand acknowledgment. Mab, by contrast, represents the dynamics of repression and avoidance. Having suffered profound personal losses during the war, she attempts to construct a stable domestic life in its aftermath. However, her refusal to articulate her grief results in what psychological discourse identifies as avoidant coping. Rather than resolving trauma, such strategies often intensify it, as the

repressed material resurfaces in involuntary and disruptive ways. Mab's recurring emotional breakdowns illustrate this process, reinforcing Caruth's assertion that trauma persists precisely because it has not been fully integrated into conscious understanding.

Beth's trajectory provides the most explicit representation of trauma's persistence. Confined within a sanitarium, she is unable to distance herself from her past, which dominates her psychological reality. Beth's emotional displacement is reflected in the statement, "She wanted to go home, and she had no idea where to find it" (Quinn 78). The quotation symbolizes both physical separation and psychological alienation, reinforcing the effects of trauma. Her condition reflects what trauma theorists describe as the pathological persistence of memory, wherein traumatic experiences resist narrative integration and instead remain fixed in the psyche. The threat of lobotomy within the novel serves as a powerful symbolic gesture, representing society's attempt to erase or silence traumatic memory. However, Beth's resistance to this erasure underscores a central argument of the novel: that memory, even when painful, is essential to identity and truth. Despite their differing experiences, Osla, Mab, and Beth are united by their shared connection to Bletchley Park and by their need to revisit the past. Beth's cryptogram functions not only as an individual expression of trauma but also as a collective call to remembrance. From a psychological perspective, trauma often requires witnessing that is, the presence of others who can acknowledge and validate the survivor's experience.

The cryptogram facilitates this process by reuniting the women, transforming isolated memories into a shared narrative. The significance of the 1947 timeline is further reinforced by its historical context, particularly the royal wedding of Princess Elizabeth and Prince Philip. This event symbolizes national recovery, stability, and renewal in post-war Britain. However, within the novel, it also functions as a powerful mnemonic trigger. While the nation celebrates progress, the protagonists are drawn back into their unresolved pasts. This juxtaposition highlights the tension between collective memory and personal trauma. Whereas public narratives often emphasize resilience and continuity, individual experiences of trauma resist such closure, remaining fragmented and unresolved. In this context, memory emerges as a dual force within the narrative. Quinn emphasizes that life continues despite suffering, observing, "But something else went on at the same time war did, and that was life" (Quinn 65). This insight highlights the coexistence of painful memories and the possibility of emotional recovery. On one hand, it acts as a burden, continually disrupting the characters' attempts to move forward. On the other hand, it serves as a necessary mechanism for truth, accountability, and ultimately, healing. This duality is particularly evident in Beth's use of

the cryptogram. While it reflects her inability to escape the past, it also represents her effort to communicate, to be heard, and to reclaim agency over her narrative.

The novel further suggests that healing is not achieved through forgetting, but through the active process of remembering and narrating. Trauma research consistently emphasizes the importance of testimony in the recovery process. By articulating their experiences, survivors are able to transform fragmented memories into coherent narratives. This process is mirrored in the novel through a series of narrative devices, including letters, visits, and confessions. The cryptogram itself functions as a form of written testimony. Their renewed bond illustrates the importance of friendship, expressed through the description of Beth as "the girl who makes life worth living" (Quinn 101). This reflects how emotional support becomes essential for reconciliation and healing. It externalizes Beth's internal experience, allowing her to communicate despite her confinement. For Osla and Mab, receiving the message initiates a process of recollection, bringing previously suppressed memories into conscious awareness. Their subsequent journeys both physical and emotional represent attempts to bridge the distance created by years of silence and misunderstanding. The act of visiting Beth in the sanitarium marks a crucial turning point in the narrative. Confronting her condition forces Osla and Mab to reassess their previous assumptions, particularly their belief in Beth's guilt. This encounter exemplifies the importance of witnessing in trauma recovery. By acknowledging Beth's suffering, they validate her experience and begin to reconstruct a shared understanding of the past. Confession represents the final stage of this process.

The revelation that Giles, rather than Beth, is the true traitor compels a radical reinterpretation of memory. What had once been understood as betrayal is exposed as misjudgement, requiring the characters to confront their own roles in perpetuating silence and misunderstanding. This moment is not merely a plot resolution; it is an emotional and psychological transformation. By articulating the truth, the characters are able to reframe their experiences, shifting from isolation to connection. The novel conceptualizes this transformation as a form of decoding. Just as the characters once deciphered enemy codes at Bletchley Park, they must now decide their own memories and relationships. This metaphor underscores the complexity of trauma, suggesting that understanding the past requires effort, interpretation, and collaboration.

Memory, in this sense, becomes a code that must be worked through rather than avoided. Reconciliation, therefore, is not presented as a simple return to the past, but as a process of reinterpretation. It involves recognizing the limitations of previous understandings and constructing a new, shared narrative. Forgiveness plays a crucial role in this process.

Rather than erasing trauma, forgiveness reframes it, allowing individuals to move forward without denying the reality of their experiences. From a psychological perspective, this corresponds to the concept of narrative integration, wherein fragmented memories are reorganized into a coherent and meaningful whole. For Osla, Mab, and Beth, this integration is achieved through mutual recognition, communication, and shared testimony. Their final reunion signifies not the disappearance of trauma, but its transformation into a source of connection and strength. Beth's realization that "I'm too much a patched-together pot... but at least the pot is fit to hold water" (Quinn 89) beautifully symbolizes psychological recovery. Although trauma leaves permanent scars, it does not prevent individuals from rebuilding meaningful lives.

The novel's emphasis on memory as an active process is further supported by insights from memory psychology, which view memory not as a static record, but as a dynamic reconstruction. Throughout the narrative, the characters' memories evolve as new information emerges and perspectives shift. Beth's perceived "madness" is revealed to be grounded in truth, Mab's grief is contextualized through shared understanding, and Osla's guilt is reinterpreted in light of the broader circumstances. Ultimately, *The Rose Code* presents memory as both a challenge and a necessity. It disrupts, unsettles, and complicates the present, yet it also provides the means for reconciliation and redemption. By integrating trauma theory and memory studies into its narrative structure, the novel offers a nuanced exploration of how individuals navigate the enduring impact of the past. The concluding image of the three women together encapsulates this transformation. Their journey from silence and estrangement to communication and solidarity illustrates the potential of memory to serve not only as a source of suffering but also as a foundation for healing. The "language of the unspoken," which initially signifies repression and distance, is reconfigured into a language of confession, understanding, and emotional connection.

In this way, the novel extends beyond its historical and espionage context to offer a broader reflection on the human condition. It suggests that trauma, while deeply disruptive, does not preclude the possibility of recovery. Rather, through the processes of remembering, narrating, and sharing, individuals can transform their experiences into meaningful narratives that support both personal and collective healing. Thus, this paper argues that memory in the novel functions as a form of code complex, layered, and often difficult to interpret, yet essential for survival. Just as codebreaking was vital during the war, the decoding of memory becomes crucial in the post-war context. Through this parallel, Quinn redefines the act of

remembering as both a psychological necessity and an ethical imperative, positioning memory as the very foundation of redemption.

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The Intersection of Class and Gender: A Study of Sallie Kincaid's Journey in *Hang the Moon*

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ABSTRACT

This paper examines the interplay of class and gender in Hang the Moon, focusing on Sallie Kincaid's journey within the rigid social hierarchy of the American South during Prohibition. It argues that Sallie's experiences are shaped by the simultaneous advantages of class privilege and the limitations imposed by patriarchal norms. Although born into the influential Kincaid family, Sallie's authority is consistently undermined because she is a woman, placing her in a complex position where privilege and marginalization coexist. The paper highlights how power in Claiborne County is structured through wealth, reputation, and male dominance, with women largely excluded from leadership roles. Sallie's early life reflects this inequality, as her brothers are prepared for positions of authority while she is expected to remain obedient. However, her entry into the bootlegging business marks a turning point, enabling her to challenge traditional gender roles and assert her independence. Through resilience, negotiation, and emotional intelligence, Sallie redefines leadership by prioritizing loyalty and cooperation over fear and control. Furthermore, the paper explores the distinction between wealth and power, emphasizing that material privilege alone does not guarantee influence or respect. Sallie's transformation demonstrates that true authority is earned through competence, meaningful relationships, and moral legitimacy. Ultimately, her journey represents both personal growth and social resistance, illustrating how entrenched systems of class and gender can be challenged and reshaped through determination and agency.

Keywords: Privilege, Patriarchy, Hierarchy, Empowerment, Resilience.

In *Hang the Moon*, Jeannette Walls presents the American South as a society shaped not only by Prohibition-era violence and bootlegging but also by rigid structures of class and gender. Set during the Prohibition era (1920–1933), *Hang the Moon* reflects a period when the illegal liquor trade reshaped the economic and social landscape of the American South. The decline of lawful businesses and the rise of bootlegging created new opportunities for wealth and influence, yet these opportunities remained overwhelmingly controlled by men. Women were expected to uphold domestic responsibilities despite their increasing participation in public life. By situating Sallie's story within this historical context, Walls demonstrates how the social realities of Prohibition intensified existing inequalities of class and gender, making Sallie's pursuit of authority both socially unconventional and politically

significant. At the center of this world stands Sallie Kincaid, whose journey is not merely about inheritance or survival but about negotiating her identity within a system designed to confine her. Her life becomes a continuous struggle between what she has been given and what she is permitted to become. The forces of class and gender do not simply exist around her; they define her opportunities, restrict her voice, and shape the way others perceive her.

Sallie is born into privilege as the daughter of Duke Kincaid, from the opening chapters, Walls establishes Sallie's ambiguous position within the Kincaid family. Although she enjoys the privileges associated with the Kincaid name, she is rarely treated as an equal to her brothers. Duke Kincaid's decisions consistently reinforce the belief that leadership belongs to men, while Sallie's opinions are often dismissed despite her intelligence and courage. Through these domestic interactions, Walls reveals that patriarchal authority operates not only in public life but also within the family itself, making Sallie's struggle deeply personal as well as social. one of the most powerful men in Claiborne County. Her family name carries considerable influence, granting her access to resources, protection, and social status. Yet, this privilege remains incomplete. Her position is constantly undermined by her gender, as the society in which she lives assumes that leadership and authority belong exclusively to men. Contemporary feminist theorist Judith Butler argues that gender is not an innate quality but a social construct repeatedly reinforced through cultural expectations (*Gender Trouble*).

Sallie's experiences illustrate this idea, as she is judged not by her abilities but by the gendered roles assigned to her. Her gradual rejection of these expectations demonstrates how gender identities can be challenged and redefined through individual action (Butler). Sallie occupies a paradoxical position: she is both privileged and marginalized simultaneously. This contradiction shapes her inner world, creating a tension between her authentic sense of self and the identity imposed upon her. As Sigmund Freud suggests, "the ego is not master in its own house" (Freud 143), and Sallie's early life reflects precisely this condition. Her desires, ambitions, and abilities are overshadowed by forces beyond her control, particularly the expectations imposed by her father and by society. Within the Kincaid household, patriarchal authority operates as an unquestioned norm. Duke Kincaid rules with a combination of fear, charisma, and control, shaping not only the county but also the lives of his children.

Sallie's brothers are prepared for positions of leadership, encouraged to step into positions of authority, while Sallie herself is expected to remain obedient and silent. Her intelligence and resilience are acknowledged but not valued in the same way. This imbalance is not accidental; it is part of a larger system that defines women as secondary. Sallie

internalizes these expectations, but she also resists them, even if that resistance is initially unspoken. Her exile from the family marks a turning point in her life. Stripped of her place within the Kincaid household, she experiences both personal loss and social displacement. At the same time, Sallie's experience reflects a deeper psychological struggle related to identity formation. As Cathy Caruth explains, Walls portrays Sallie's exile as more than physical separation. Removed from the Kincaid household, she loses not only her home but also the social identity attached to her family name. Her isolation forces her to survive independently, exposing her to hardship and allowing her to develop resilience. Rather than returning as the sheltered daughter of Duke Kincaid, she gradually becomes a woman capable of making difficult decisions on her own. The exile therefore functions as the narrative foundation for her later transformation into a leader. Sallie's exile lingers within her, influencing her choices, her fears, and her determination to reclaim her place. In many ways, she becomes what Caruth describes as someone "possessed by an image or event" (Caruth 5), unable to fully separate herself from the memory of rejection and loss. At the same time, Sallie's experience reflects a deeper psychological struggle related to identity formation. According to Erik Erikson, identity is shaped through conflict and crisis, particularly during moments when individuals are forced to confront who they are in relation to society (Erikson 261).

Sallie's exile functions as such a crisis. Removed from the security associated with her family name, she must begin to define herself independently. This process is neither easy nor immediate. It involves uncertainty, self-doubt, and the gradual realization that identity is not something inherited but something constructed through experience. As Sallie grows older, she becomes increasingly aware of the contradictions within her world. She recognizes that men who are less capable than she is are nevertheless granted authority simply because of their gender, while she is denied opportunities despite her competence. This awareness deepens her sense of injustice but also strengthens her resolve.

Her journey reflects what Julia Kristeva describes as the fluid nature of identity, where the self is never fixed but always in process (Kristeva 11). Sallie is not defined solely by her past or her circumstances; she is constantly evolving, negotiating between the roles imposed upon her and the person she seeks to become. The world of Claiborne County reinforces these tensions through its rigid class structure. Wealthy families like the Kincaids occupy the top of the social hierarchy, while poor farmers and laborers struggle at the bottom. This division creates a system in which power is concentrated in the hands of a few, and survival often depends on one's position within this hierarchy. For Sallie, her class privilege provides a foundation, but it does not guarantee freedom. Her gender limits her ability to

fully access the power associated with her class, placing her in a position of partial inclusion and partial exclusion. Walls carefully depicts Sallie's entry into the bootlegging business as a challenge to conventional gender expectations. From a feminist perspective, Sallie's participation in bootlegging represents more than economic independence; it symbolizes her rejection of the restrictive domestic role assigned to women in early twentieth-century America. Rather than functioning as a passive observer within her father's criminal enterprise, she becomes an active decision-maker whose leadership is based on competence rather than inherited authority. Walls thereby challenges the patriarchal assumption that power and public leadership are exclusively masculine domains. Instead of remaining confined to domestic responsibilities, Sallie actively negotiates with suppliers, earns the loyalty of workers, and makes strategic business decisions. Her competence gradually earns the respect of individuals who initially underestimate her because she is a woman. By succeeding within an illegal trade traditionally controlled by men, Sallie demonstrates that authority is acquired through intelligence, courage, and practical judgment rather than inherited privilege alone. By engaging in bootlegging, she steps into a domain traditionally reserved for men, challenging both social norms and familial expectations. This decision is not merely practical; it is deeply symbolic.

Through business, Sallie begins to assert her agency, transforming herself from a passive recipient of privilege into an active creator of power. In doing so, she embodies Freud's idea that growth involves moving toward greater self-awareness and control, a process captured in his assertion that "where id was, there ego shall be" (Freud 80).

Sallie's actions reflect this movement from constraint to autonomy, as she learns to navigate the world on her own terms. What distinguishes Sallie's approach to power is the way she redefines it. Unlike her father, who relies on fear and domination, she builds relationships based on trust and loyalty. Throughout the novel, Walls repeatedly distinguishes inherited status from earned authority. Sallie's family name initially opens doors, but it cannot secure genuine respect. She earns the confidence of workers, business associates, and members of the community through her decisions and personal integrity. The novel therefore argues that social privilege may provide opportunity, but lasting influence depends upon individual capability and ethical leadership. She understands that authority is not simply about control but about connection. This shift in perspective allows her to succeed in ways that her father could not, creating a more sustainable form of leadership. Her success also forces others to reconsider their assumptions about gender, as she proves that a woman can lead effectively in a male-dominated environment. bell hooks emphasizes that feminism

seeks to challenge systems of domination rather than merely secure equal access to existing structures (*Feminism Is for Everybody*). Sallie's leadership reflects this principle because she does not imitate her father's authoritarian methods. Instead, she establishes authority through cooperation, empathy, and mutual respect, offering an alternative model of leadership that questions patriarchal definitions of power. At the same time, Sallie's journey is not free from internal conflict. The expectations of her society continue to shape her sense of self, creating moments of doubt and hesitation. This tension reflects the complexity of identity formation, as described by Erikson, who emphasizes that identity, is always in dialogue with social expectations (Erikson 263). Sallie must constantly negotiate between who she is and who she is expected to be, balancing her desire for independence with the realities of her environment. Her growing influence further highlights the distinction between wealth and power. While Sallie inherits wealth, she must earn power through her actions. Walls also critiques the assumption that social privilege automatically guarantees authority. Although Sallie's family background grants her access to influential networks, it does not protect her from gender discrimination. Her achievements therefore illustrate the intersection of class privilege and patriarchal exclusion, revealing how women from privileged backgrounds may still experience systemic barriers to leadership. This distinction becomes increasingly clear as she builds her reputation, demonstrating that authority cannot be taken for granted but must be established through competence and trust. Her journey suggests that true power lies not in material resources but in the ability to shape relationships and influence outcomes.

Trauma continues to play a significant role in this process. Sallie's past does not disappear as she gains power; instead, it becomes part of the foundation upon which she builds her identity. Caruth's insight that trauma persists through repetition is evident in the way Sallie's experiences continue to inform her decisions (Caruth 4). Rather than allowing herself to be defined by her trauma, however, she learns to integrate it into her sense of self, transforming it into a source of strength. Similarly, Kristeva's idea that the subject is never fully unified helps explain Sallie's ongoing struggle. She remains divided between her roles as daughter, leader, and woman, navigating the contradictions inherent in each position (Kristeva 133). This fragmentation is not a weakness but a reflection of the complexity of her identity, as she learns to reconcile different aspects of herself.

Ultimately, Sallie's journey is one of reclamation. By the novel's conclusion, Sallie no longer measures herself according to her father's expectations or the patriarchal values of Claiborne County. Her achievements result not from inheritance but from perseverance, strategic thinking, and emotional resilience. Walls leaves readers with the impression that

genuine leadership is inclusive rather than authoritarian, suggesting that social systems based on rigid gender hierarchies can be challenged through individual determination and moral courage. She does not simply accept the roles assigned to her; instead, she actively reshapes them, creating new possibilities for herself and for others. Her leadership challenges the structures of class and gender that define her world, demonstrating that these systems, although deeply entrenched, are not immutable. By placing Sallie's personal journey within the historical realities of Prohibition-era America, Walls suggests that social change emerges through individual acts of resistance against deeply entrenched systems of inequality. Sallie's success not only redefines her own identity but also exposes the instability of patriarchal power structures that depend upon excluding women from positions of authority.

Through resilience, determination, and self-awareness, she transforms her position from one of limitation into one of authority. In this sense, *Hang the Moon* presents Sallie's story as both personal and political. Her struggle for identity is inseparable from the broader social structures that shape her life, reflecting the interconnectedness of individual experience and collective systems of power. By tracing her journey, Jeannette Walls offers a compelling critique of a society in which power is unequally distributed while simultaneously highlighting the possibility of social transformation.

Sallie's story ultimately suggests that identity is not something inherited but something consciously constructed. It is shaped through conflict, refined through experience, and defined by the choices individuals make in the face of social constraint. Her rise to power does not erase the inequalities of her world; rather, it demonstrates that even within restrictive systems, there remains space for resistance, agency, and transformation. Through her journey, Sallie Kincaid emerges not only as a product of her society but also as a powerful force capable of reshaping it.

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Resistance without Weapons: A Study of Psychological Rebellion in “Draupadi”

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ABSTRACT

This paper examines resistance without physical force in Mahasweta Devi's "Draupadi", focusing on the concept of psychological rebellion. The narrative follows Dopdi Mejhen, a tribal woman subjected to state violence and systemic oppression. Despite lacking weapons or social status, Dopdi refuses to yield; her resistance is anchored in mental fortitude and an unwavering rejection of fear, shame, and defeat. The paper contends that Dopdi's rebellion is fundamentally psychological, arising from her deep-seated courage and selfhood. Psychological rebellion, in this context, refers to inward resistance manifested through determination, self-mastery, and the refusal to acquiesce to unjust authority. In "Draupadi", the state wields power through brutality and intimidation, rendering Dopdi physically powerless and brutally mistreated. Yet, the story illustrates that while her body is subjugated, her mind remains autonomous. Dopdi's unbroken spirit stands as a profound act of defiance. Additionally, this paper explores how Dopdi subverts the conventional image of a victim; she does not retreat into silence or shame but instead faces her oppressors with boldness. Her evolution from victim to agent of resistance is at the core of her psychological rebellion. From a feminist standpoint, Dopdi's body—intended as a site of subjugation—emerges as a symbol of protest when she refuses to internalize shame. The insights of Gayatri Chakravorty Spivak are instrumental in reading Dopdi as a subaltern figure whose voice is habitually marginalized. Nevertheless, through her actions, Dopdi asserts her agency and presence. Ultimately, this paper demonstrates that "Draupadi" portrays resistance as an act that transcends physical struggle, emphasizing the formidable capacity of the human mind to confront and undermine oppression.

Keywords: *psychological rebellion, resistance without weapons, feminism, subaltern studies, marginalisation, state violence, body and agency.*

In "Draupadi," Mahasweta Devi masterfully depicts a form of resistance that transcends physical confrontation. The narrative follows Dopdi Mejhen, a Santhal tribal woman singled out by the state during a military crackdown. Captured, interrogated, and subjected to unspeakable brutality, Dopdi endures immense physical suffering. Yet, she refuses to yield to the oppressive forces intent on breaking her spirit. Her rebellion emerges not through violence or retaliation, but through an indomitable psychological strength. This paper contends that Dopdi's rejection of shame, her refusal to accept the role of victim and

her bold defiance of authority exemplify how psychological rebellion can become a profound and transformative mode of resistance - one that challenges domination even when physical power is absent.

Psychological rebellion can be understood as a form of resistance that takes place within the mind. It does not depend on weapons or organized revolt but on inner strength, courage, and the refusal to accept domination. In “Draupadi” the state represents power through violence, surveillance, and fear. The character of Senanayak, the army officer, symbolizes this authority. He believes that through force and discipline, he can control and break Dopdi. However, as the narrative unfolds, it becomes clear that while the state can control Dopdi’s body, it cannot control her mind. Her silence during interrogation and her refusal to provide information become the first signs of her psychological resistance.

The transformation of Dopdi from a hunted tribal woman into a powerful symbol of resistance forms the central focus of the story. At the beginning, she is described as the “most notorious female” (Devi 393), a label that reduces her identity to that of a criminal and reflects the state’s oppressive perception of marginalized individuals. Through such descriptions, the authorities attempt to erase her humanity and portray her solely as a threat to social order. However, as the narrative progresses, Dopdi gradually reclaims her identity through her unwavering resistance and defiant actions. Even after her capture, she refuses to cooperate with the authorities. The narrator notes that “DopdiMejhen does not speak,” and this silence becomes a significant act of psychological rebellion rather than a sign of helplessness. By refusing to provide information, she denies the state the power it seeks over her and asserts control over her own voice and identity.

One of the most striking aspects of Dopdi’s psychological resistance is her rejection of fear. The state depends upon fear, violence, and intimidation to maintain authority and force individuals into submission. Yet Dopdi refuses to surrender to this system of oppression. Even after enduring extreme brutality, she does not display fear, shame, or weakness. Instead, she confronts her oppressors with extraordinary courage and self-possession. In the climactic moment of the story, when she is brought before Senanayak, she refuses to clothe herself. The narrator states, “Draupadi stands before him, naked” (Devi 402). Her nakedness, rather than symbolizing vulnerability, becomes a powerful form of resistance. By rejecting the imposed shame associated with her violated body, Dopdi transforms her body into a site of defiance. Her laughter further intensifies this act of rebellion, demonstrating that she is no longer intimidated by the authority that seeks to control and humiliate her.

This moment becomes even more powerful through Dopdi's direct challenge to authority: "What more can you do? Come on, counter me—come on, counter me?" (Devi 402). These words represent not a physical confrontation but a profound psychological challenge to state power. By openly questioning the authority of the state, Dopdi exposes the limitations of institutional violence. Although the state has exercised its full power through brutality and torture, it has failed to destroy her spirit or force her into submission. Her fearless defiance reveals that true power does not merely exist in weapons or physical force, but in the strength of the human mind and the courage to resist oppression. Through Dopdi's transformation, "Draupadi" ultimately presents resistance as an assertion of dignity, identity, and inner strength against systems of domination.

From a feminist perspective, Dopdi's body becomes a powerful site of resistance and political defiance. The state attempts to use her body as an instrument of control, punishment, and humiliation, reducing her to an object subjected to violence. However, Dopdi radically overturns this power dynamic through her refusal to submit to shame. By refusing to clothe herself after the violence inflicted upon her, she rejects the conventional association between female dignity and modesty. In many patriarchal societies, women are expected to internalize shame, particularly after experiencing sexual violence. Dopdi challenges and subverts this expectation. Her nakedness no longer signifies vulnerability or defeat; instead, it becomes a deliberate act of protest and resistance. As the narrator states, "There isn't a man here that I should be ashamed" (Devi 402). This powerful declaration rejects patriarchal notions that define a woman's honour through her body and exposes the inability of male authority to control her spirit or identity.

Theoretical perspectives further deepen the understanding of Dopdi's resistance, particularly the ideas of Spivak and her concept of the subaltern. In "Can the Subaltern Speak?" Spivak argues that marginalized individuals are often denied the opportunity to speak within dominant systems of power and representation. Dopdi embodies such a subaltern figure. As a tribal woman, she exists outside mainstream social and political structures and is repeatedly silenced by state authority. However, her resistance also complicates Spivak's argument by demonstrating alternative forms of expression beyond conventional speech. Although Dopdi often remains silent, her silence itself becomes meaningful and politically charged. Her laughter, her refusal to obey, and her final act of defiance communicate resistance more powerfully than words. In this sense, Dopdi "speaks" through her body, gestures, and actions, transforming silence into a form of political expression.

In addition to Spivak's theory, Dopdi's resistance can also be examined through feminist ideas of agency and embodiment. Feminist scholars frequently argue that the body functions both as a site of oppression and as a potential site of resistance. This dual role is vividly represented in "Draupadi". While the state attempts to dominate and violate Dopdi's body, she ultimately transforms that very body into a symbol of protest and empowerment. Her refusal to conform to social expectations surrounding femininity, shame, and obedience challenges not only patriarchal norms but also the authority of the state itself. Through this act of resistance, the story highlights the possibility of reclaiming agency even under extreme conditions of oppression and violence. Dopdi's defiance thus becomes a powerful assertion of identity, autonomy, and human dignity against systems of domination.

Another significant aspect of psychological rebellion in the story is its exposure of the limitations of state power. Although the state possesses weapons, authority, and institutional control, it ultimately fails to achieve complete domination over the individual. Dopdi's resistance demonstrates that power is never absolute and that even the most oppressive systems can be challenged through acts of personal defiance. Her rebellion suggests that resistance does not always need to be collective or politically organized; even an individual act of courage can undermine structures of authority and oppression.

Furthermore, the story challenges conventional notions of heroism. In many literary narratives, heroes are often portrayed as figures who physically confront oppression through violence or direct combat. However, Dopdi redefines the meaning of heroism through her psychological resistance. She does not rely on weapons or physical force. Instead, her strength emerges from her ability to endure suffering, reject submission, and confront authority fearlessly. Her rebellion transforms the human body into a site of resistance and asserts the power of inner strength over physical domination. In this way, psychological rebellion becomes an alternative form of heroism rooted in dignity, resilience, and self-awareness.

In conclusion, Draupadi stands as a powerful and uncompromising critique of state violence, patriarchy, and the systematic oppression of marginalized communities. Through the unforgettable character of Dopdi Meihen, Devi demonstrates that resistance does not always emerge through weapons or physical force, but can arise through psychological strength, moral courage, and fearless defiance. Dopdi's refusal to surrender, even after enduring extreme brutality, transforms her from a victim of oppression into a symbol of rebellion and human dignity. By rejecting shame and confronting authority without fear, she

exposes the limitations of institutional power and challenges the structures that seek to silence and dehumanize the subaltern.

More importantly, the story redefines the meaning of resistance itself. Dopdi's body, which the state attempts to violate and control, ultimately becomes a site of protest and empowerment. Her silence speaks louder than words, and her defiance destroys the illusion of absolute authority. In this way, the story not only critiques systems of domination but also celebrates the resilience of those who continue to resist despite oppression. Ultimately, "Draupadi" remains a timeless and deeply relevant literary work that compels readers to confront questions of power, gender, violence, identity, and justice. It leaves behind a lasting message that the human spirit, when driven by dignity and resistance, can never be completely conquered.

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Beyond Binaries: Gender Fluidity and Identity in Arundhati Roy's *The Ministry of Utmost Happiness*

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ABSTRACT

This paper analyses Arundhati Roy's complex portrayal of gender and identity in The Ministry of Utmost Happiness, concentrating specifically on the transgender experience represented by the character Anjum. It examines how Roy carefully develops Anjum's story, from her youth in a conservative Muslim family to her discovery of community and purpose within the Khwabgah, a refuge for transgender individuals. The analysis will explore the narrative strategies utilized to depict Anjum's inner conflicts and societal exclusion, emphasizing the intricacies of her emotional and physical transformations. Additionally, the paper investigates the ways in which the novel actively challenges traditional gender norms and binaries.

Keywords: conservative, community, transgender, narrative strategies, gender

In *The Ministry of Utmost Happiness*, Arundhati Roy presents a powerful exploration of gender identity, belonging, and social exclusion through the life of Anjum, a Hijra whose journey forms the emotional core of the novel. Rather than portraying Anjum merely as a marginalized transgender character, Roy presents her as a complex individual whose life questions rigid ideas of gender, religion, and identity. Anjum's experiences reveal the conflict between the body and the self, the individual and society, and personal identity and cultural expectations. As Judith Butler argues, "gender is always a doing, though not a doing by a subject who might be said to pre-exist the deed" (34). Roy's portrayal of Anjum reflects this idea by showing that gender is not fixed at birth but is continuously shaped through lived experience and social interaction. Through Anjum's life, the novel criticizes heteronormative structures and imagines alternative spaces where dignity, acceptance, and human connection become possible.

Anjum, who is born as Aftab in a conservative Muslim family in Old Delhi, experiences a deep conflict between biological sex and inner identity from childhood. Roy portrays Aftab's early life as one marked by confusion, silence, and emotional isolation. Although society expects Aftab to perform masculinity, the character gradually realizes an inner feminine identity that cannot be suppressed. This conflict illustrates Judith Butler's

argument that “there is no gender identity behind the expressions of gender; identity is performatively constituted by the very ‘expressions’ that are said to be its results” (25). Instead of accepting the gender assigned by society, Aftab slowly embraces the identity of Anjum, demonstrating that gender is a lived reality rather than a biological certainty. Roy therefore presents gender identity as an ongoing process of self-discovery rather than a fixed condition.

Jahanara Begum, Anjum’s mother, represents the tension between maternal love and social expectations. Although she loves her child, she struggles to accept Aftab's gender identity because of cultural and religious pressures. Her decision to conceal the truth reflects a society that often responds to gender difference with silence instead of understanding. This silence becomes another form of exclusion, forcing Anjum to search for acceptance elsewhere. Simone de Beauvoir’s famous observation that “One is not born, but rather becomes, a woman” (283) helps explain Anjum’s transformation. Roy suggests that identity develops through experience, social relationships, and personal choice rather than through biological sex alone. Anjum’s transition is therefore presented not merely as a physical transformation but also as an emotional and psychological journey toward self-acceptance.

Anjum’s arrival at the Khwabgah marks the beginning of her true sense of belonging. The Khwabgah, meaning “House of Dreams,” functions as more than a physical shelter; it is an alternative social space where people rejected by mainstream society create their own family and identity. Hijras, intersex persons, and other gender-nonconforming individuals live together with dignity despite social discrimination. Roy does not portray them as helpless victims but as individuals capable of love, humour, celebration, and resilience. This representation reflects Judith Butler in *Undoing Gender* idea opines, “the critique of gender norms must be situated within the context of the lives as they are lived” (8). The Khwabgah therefore becomes a symbol of resistance, showing that marginalized communities can create meaningful lives outside dominant social structures.

Within the Khwabgah, gender is presented as flexible, performative, and socially constructed rather than biologically fixed. Anjum’s clothing, language, body, and everyday practices become expressions of her authentic identity instead of attempts to imitate womanhood. Roy's portrayal closely reflects Butler's concept of gender performativity, where identity is produced through repeated social actions rather than natural essence. At the same time, Roy integrates traditional Hijra customs such as blessings, ceremonies, and communal rituals into the wider cultural landscape of India, demonstrating that the Hijra community possesses its own history, traditions, and social significance. Through Anjum’s journey, *The*

Ministry of Utmost Happiness ultimately argues that identity cannot be confined within binary categories. Instead, Roy celebrates gender diversity as an essential part of human experience and challenges readers to reconsider conventional definitions of gender, belonging, and humanity.

Anjum's life undergoes a significant transformation after witnessing the violence of the Gujarat massacre. The traumatic experience forces her to leave the familiar world and seek refuge in a cemetery, where she gradually establishes the Jannat Guest House. The cemetery becomes a symbolic space that exists between life and death, exclusion and acceptance, allowing Roy to question the rigid boundaries imposed by society. Rather than presenting trauma only as suffering, Roy shows how it can become the beginning of rebuilding identity. This idea reflects Cathy Caruth's argument as, "trauma is always the story of a wound that cries out" (4). Anjum's decision to remain in the cemetery is therefore not an escape from society but a refusal to accept the social structures that once rejected her. Her survival itself becomes an act of resistance against violence and exclusion.

The Jannat Guest House represents Roy's vision of an inclusive community where marginalized people find dignity and belonging. It becomes a home for Hijras, Dalits, abandoned children, political dissidents, and even neglected animals, creating an alternative model of society based on compassion rather than hierarchy. Instead of defining family through blood relationships or social status, Roy presents family as a community formed through shared suffering and mutual care. Judith Butler in *Undoing Gender* observes that "we're undone by each other. And if we're not, we're missing something" (23). This idea explains the relationships within the Jannat Guest House, where care and emotional support replace traditional ideas of kinship. Ironically, Anjum, once rejected by society, becomes the nurturing centre of this unconventional family, demonstrating that belonging is created through empathy rather than social acceptance.

Roy further strengthens this idea through the novel's polyphonic narrative structure. The stories of Anjum, Tilo, Musa, Saddam Hussain, and others intersect without forming a single linear narrative. This fragmented structure reflects the fluid nature of identity itself. Instead of presenting identity as fixed or unified, Roy portrays it as constantly shaped by history, politics, gender, caste, and religion. Stuart Hall argues, "identity is not as transparent or unproblematic as we think. Perhaps instead of thinking of identity as an already accomplished fact, we should think of identity as a 'production'"(222). Roy's narrative reflects this understanding by showing that Anjum's identity is continuously reconstructed

through changing experiences rather than determined by birth alone. The novel therefore rejects essentialist definitions of both gender and identity.

Gender identity in the novel cannot be separated from religious and political violence. As a Muslim Hijra, Anjum experiences multiple forms of marginalization that intersect with each other. Her survival during the Gujarat riots illustrates how religious identity and gender nonconformity make certain bodies especially vulnerable within systems of majoritarian nationalism. Kimberlé Crenshaw's concept of intersectionality explains that different forms of oppression operate together rather than separately (140). Roy demonstrates this through Anjum's experiences, showing that discrimination based on gender cannot be understood without considering religion, class, and political power. Yet Anjum refuses invisibility. Her continued existence becomes a political statement against a society that attempts to erase marginalized lives. Roy thus transforms Anjum's body into a site of both vulnerability and resistance.

Anjum's role as the emotional centre of the Jannat Guest House also redefines motherhood and family. Her adoption of Zainab challenges the widespread belief that motherhood belongs only to cisgender women. Through care, responsibility, and emotional commitment, Anjum reclaims a social role often denied to transgender individuals. Roy portrays motherhood not as a biological function but as an ethical practice based on compassion and responsibility. Similarly, characters such as Saddam Hussain and Miss Udaya Jabeen become part of a chosen family built on mutual trust rather than biological ties. These relationships demonstrate that trauma can create solidarity instead of isolation. Roy therefore expands the meaning of kinship by showing that families can be created through love, care, and shared experiences rather than inherited structures.

At the centre of *The Ministry of Utmost Happiness* is Roy's powerful critique of the gender binary. Through Anjum's life as a Hijra, the novel questions the rigid distinction between male and female that dominates patriarchal society. Simone de Beauvoir's famous statement, "One is not born, but rather becomes, a woman" (283) provides an important theoretical framework for understanding Anjum's journey. Roy similarly suggests that gender is shaped through social experience rather than biological destiny. At the same time, the novel remains rooted in the Indian cultural tradition of the Hijra community, acknowledging both its historical significance and the violence faced by its members. Roy neither romanticizes nor victimizes the Hijra identity; instead, she presents it as a complex social reality that challenges binary understandings of gender while exposing the inequalities that continue to marginalize gender-diverse people.

The novel's title, *The Ministry of Utmost Happiness*, is deeply ironic. Although it suggests an official promise of happiness, the narrative reveals that genuine happiness cannot be granted by institutions or political authority. Instead, Anjum creates her own space of hope through resistance, compassion, and community. Her life demonstrates that dignity is achieved not through conformity but through the courage to exist authentically despite social rejection. Roy ultimately presents Anjum as more than a victim of discrimination; she becomes a survivor, caregiver, and symbol of resilience. By challenging the categories of male and female, insider and outsider, normal and abnormal, Roy offers a powerful critique of exclusionary social systems while imagining a more inclusive vision of humanity. The novel therefore encourages readers to recognize gender diversity as an essential part of human existence and to imagine societies where every individual has the right to live with dignity, belonging, and what Roy calls the "utmost happiness."

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Personal Conflict, Trauma, Mother and Daughter relationship in Madhuri Vijay's *The Far Field*

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ABSTRACT

Madhuri Vijay's first novel, The Far Field, provides a captivating examination of identity, sorrow in modern India. Located between Bangalore and the vast area of Kashmir, the novel traces the emotional and physical experiences of Shalini, a young lady facing the death of her mother. This paper analyzes The Far Field through a socio-political and literary perspective. It centres on significant motifs like emotional solitude, the quest for self-discovery, the emotional effects of unresolved sorrow, and the intricate representation of the Kashmir dispute. The book highlights the significance of compassion, introspection, and moral accountability in a broken world. The Far Field ultimately functions as both a heartfelt maturation narrative and a strong contemplation on the toll of apathy in the presence of political injustice.

Keywords: Political Conflict, Identity, Displacement, Trauma

Political identity serves as a vital component in *The Far Field* by Madhuri Vijay. The book demonstrates how politics and violence affect the everyday lives of ordinary people in Kashmir. Shalini, the main character, begins her journey for personal reasons, but upon reaching Kashmir, she realizes that the region is filled with silence, fear, and pain caused by years of ongoing conflict. For her, the conflict was just information she absorbed, while in Kashmir it was a routine reality. The reader observes the impact of political conflict on people's households, families, and discussions from her viewpoint.

In the villages, Shalini notices the prominent presence of the Indian army. Many villagers have lost their loved ones, others have disappeared, and no one knows where they are. Bashir Ahmed, previously close to Shalini and her mother, also disappears, becoming a symbol of Kashmir's anguish. Shalini begins to understand that for these people, conflict is not remote but affects every facet of existence. The book demonstrates how political strife erodes trust between people. Shalini notices that people find it difficult to communicate their thoughts freely. They select their phrases with caution because they worry that someone might be listening in. This silence signifies fear. Families cannot find peace as they live in constant fear of assaults or unanticipated acts of violence. Amina and her son Riyaz, who

welcome Shalini, also hold this fear inside them. Shalini realizes that even simple gestures of kindness are shaped by the political environment.

The story also illustrates the link between individual life and political life. Shalini's private grief over her mother is linked to the pain of Kashmiri families who have suffered losses in the conflict. Shalini feels loneliness from her private grief, whereas the individuals in Kashmir bear a collective sadness that is amplified by its political and historical origins. This helps her understand that her journey encompasses not only her personal experiences but also the wider setting of the environment she has stepped into.

The Far Field emphasizes the personal dimension of political strife through Bashir Ahmed, Amina, and Riyaz. They are not fighters, but common people who strive to live with honour. Nonetheless, they are forced to remain in a condition of uncertainty and constant worry. This makes us reflect on the unfairness of innocent people carrying the brunt of political disputes. Their silence and suffering echo stronger than any political speech. The book demonstrates that political conflict encompasses more than merely governments and borders; it impacts ordinary people whose lives are broken by it. Shalini's experience demonstrates how silence, suspicion, and grief permeate daily life in Kashmir. Madhuri Vijay may not offer solutions, but she reveals the deep impact of fear and violence on the reader.

Trauma is an intense emotional injury that occurs when an individual experiences an event too shocking to manage. It involves not just bodily harm, but primarily the mind and feelings. Trauma frequently arises from events such as death, violence, abuse, loss, or struggle. It is an experience that runs in the mind and continues to impact an individual even after it has concluded. Individuals who experience trauma might endure feelings of sadness, fear, guilt, anger, or confusion for an extended period. At times, they struggle to communicate their emotions, and the trauma remains quietly within them. It can cause individuals to feel disconnected from others and even from themselves, as the burden of pain is too great to reveal.

Trauma appears as an important theme to depict how individuals and societies carry the marks of history. Novels, poems, and plays often portray trauma, broken families, silence, fragmented memories, and struggles for self-identity. Trauma in literature isn't solely communicated through explicit violence; it can also be represented through omissions, silences, or the difficulties characters face in expressing their experiences. This makes trauma an important subject as it connects personal experiences to wider stories of war, colonization, and conflict. Many modern and postcolonial writers use trauma to depict how societies remember pain and how individuals carry invisible injuries. Balaev, M. "The Nature of

Trauma in American novels” states, “Trauma is portrayed as having the ability to permeate subsequent generations.”

In *The Far Field*, Madhuri Vijay presents trauma not merely as an individual psychological experience but as a collective historical condition shaped by the prolonged political conflict in Kashmir. Rather than focusing solely on Shalini's personal grief, the novel gradually shifts the reader's attention to the larger suffering of Kashmiri families who continue to live under violence, surveillance, and loss. Through characters such as Amina and Riyaz, Vijay demonstrates that trauma extends beyond physical violence into emotional and cultural memory. The recurring disappearances, military presence, and constant fear create what Cathy Caruth describes as trauma's “belated” nature, where painful experiences continue to return and shape the present (4). As Shalini travels through Kashmir, she realizes that her own bereavement is only one fragment of a much larger landscape of suffering. Vijay captures this emotional awakening when she observes that grief had become the language of the valley. The novel therefore transforms trauma from a private emotion into a shared political experience that affects an entire community across generations.

Silence functions as one of the novel's most significant representations of trauma. The inability of Kashmiri civilians to narrate their experiences reflects both fear and emotional exhaustion. Their silence is not a sign of forgetting but of memories too painful to articulate. This political silence mirrors the emotional silence within Shalini's own family. Her relationship with her mother is marked by unspoken emotions, hidden histories, and unanswered questions. As Shalini admits that there were things she had never asked her, things she had never told her. This parallel suggests that silence itself becomes a form of inherited trauma, connecting personal memory with collective history. From a trauma-theoretical perspective, silence becomes a testimony of suffering that language alone cannot adequately express. Vijay thus challenges conventional narratives by showing that what remains unsaid often carries greater emotional weight than spoken words.

The mother–daughter relationship forms the emotional centre of the novel and motivates Shalini's journey. Although her mother appears emotionally distant, her influence continues to shape Shalini's identity long after her death. Their relationship is characterized by affection complicated by emotional restraint, misunderstanding, and regret. Instead of portraying motherhood through sentimental ideals, Vijay presents it as emotionally fragmented and psychologically complex. Shalini's search for Bashir Ahmed is therefore not simply an investigation into her mother's past but an attempt to reconstruct her own fragmented identity. Marianne Hirsch's concept of postmemory helps explain this

relationship, as Shalini inherits emotional wounds and unanswered questions that were never directly communicated but continue to shape her life (5). Her journey becomes an effort to recover both her mother's hidden history and her own sense of self.

Critically, *The Far Field* suggests that trauma is transmitted across generations through memory, silence, and emotional absence rather than through direct experience alone. The novel resists offering political resolutions or emotional closure. Instead, Vijay portrays healing as an ongoing process of witnessing, remembering, and acknowledging loss. Shalini ultimately recognizes that her mother's imperfections do not diminish her love; rather, they reveal the complexity of human relationships shaped by grief and silence. By interweaving personal mourning with Kashmir's political history, Vijay demonstrates that individual identity cannot be separated from historical violence. Trauma, therefore, becomes both a personal inheritance and a collective social reality. The novel invites readers to recognize that memory, silence, and loss are not merely themes but ethical responsibilities, urging them to bear witness to stories that history often attempts to erase.

The relationship between Shalini and her mother in Madhuri Vijay's *The Far Field* is characterized by emotional ambiguity, silence, and psychological distance rather than conventional maternal warmth. Vijay deliberately departs from the idealized image of motherhood by portraying Shalini's mother as enigmatic, emotionally reserved, and unpredictable. Although Shalini remains deeply attached to her mother, she also experiences emotional insecurity because her mother's affection is rarely expressed openly. This paradoxical relationship illustrates what Marianne Hirsch identifies as the transmission of emotional memory across generations, where "postmemory characterizes the experience of those who grow up dominated by narratives that preceded their birth" (5). Even after her mother's death, Shalini continues to live under the influence of her mother's unresolved emotions, demonstrating that maternal absence can shape identity as profoundly as maternal presence. As Shalini reflects, "I had spent my life trying to understand her," suggesting that memory becomes an ongoing process of emotional reconstruction rather than nostalgic remembrance.

The death of Shalini's mother functions as the novel's central psychological catalyst. Instead of providing emotional closure, bereavement intensifies Shalini's search for meaning and compels her to revisit fragmented childhood memories. These recollections gradually reveal that her mother's emotional distance originated not from a lack of love but from her own unspoken suffering. Cathy Caruth argues that trauma is "not locatable in the simple violent or original event but in the way that its very unassimilated nature returns to haunt the

survivor later on” (4). This theoretical insight illuminates Shalini’s experience, as her mother’s emotional wounds continue to influence her long after death. Vijay therefore presents grief not as an isolated emotional response but as an inherited psychological condition that transforms memory into a site of continuous interpretation.

Silence emerges as the defining feature of the mother–daughter relationship and functions as both an emotional and narrative strategy. Shalini’s mother rarely explains her thoughts, motivations, or emotional conflicts, leaving significant gaps in her daughter’s understanding. The mysterious relationship between her mother and Bashir Ahmed remains one such unresolved absence that ultimately motivates Shalini’s journey to Kashmir. As Shalini admits, “there were questions I had never asked, answers I had never received.” These omissions are not narrative weaknesses but deliberate representations of trauma’s resistance to language. Dori Laub observes that traumatic experiences often remain “an event without a witness”, making silence itself a powerful form of testimony (75). Vijay employs this silence to demonstrate that emotional truths are frequently communicated through absence, secrecy, and incompleteness rather than explicit confession.

Despite the emotional distance that separates them, the relationship between Shalini and her mother remains fundamentally rooted in love. Their affection is expressed less through verbal intimacy than through memory, longing, and emotional persistence. Following her mother’s death, Shalini’s search for Bashir Ahmed becomes more than a physical journey; it becomes an attempt to recover fragments of her mother’s hidden life and to reconstruct her own fractured identity. This search reflects Hirsch’s concept of postmemory, where inherited emotions become central to one’s sense of self despite the absence of direct experience. Through this process, Shalini gradually recognizes that her mother was neither emotionally detached nor emotionally complete but an individual burdened by private struggles that she could never fully articulate. Vijay thereby rejects simplistic representations of motherhood and instead portrays maternal identity as historically, emotionally, and psychologically complex.

More broadly, the mother–daughter relationship symbolizes the difficulty of communication across generations. Emotional inheritance in *The Far Field* occurs not only through spoken narratives but also through silence, memory, and unresolved grief. Shalini ultimately comes to accept her mother not as an idealized parent but as a flawed human being shaped by vulnerability and emotional conflict. This recognition represents her emotional maturity and suggests that understanding often emerges through empathy rather than certainty. By intertwining personal memory with psychological trauma, Vijay demonstrates

that familial relationships are inevitably marked by contradictions, where love coexists with distance, and remembrance becomes an ethical act of witnessing. The novel ultimately argues that the complexities of maternal love cannot be measured through emotional expression alone but through the enduring influence that memory continues to exert upon identity.

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Marriage as Survival: A Feminist Reading of Domestic Space and Social Reality in Margaret Atwood's *Habitation*

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ABSTRACT

This paper offers a feminist reading of Margaret Atwood's Habitation, arguing that the poem reimagines marriage as an evolving space of negotiation rather than a stable domestic institution. Through imagery of liminality, domestic space, and survival, Atwood challenges traditional assumptions of marriage as a source of security and fulfilment, revealing its emotional and psychological complexities. Drawing on feminist theories of Simone de Beauvoir, Betty Friedan, Kate Millett, Judith Butler, and other critics, the study examines how the poem exposes the gendered expectations embedded within patriarchal marriage. The analysis further situates Atwood's vision within contemporary social realities, particularly in the Indian context, by considering emotional labour, digital representations of marital life, and marriage-related distress reflected in National Crime Records Bureau statistics. By connecting literary analysis with present-day social concerns, the paper demonstrates the enduring relevance of Habitation as a critique of domestic ideology and a powerful exploration of survival, resilience, and gendered experience.

Keywords: Marriage, Feminism, Domestic space, Emotional labour, Social reality, Margaret Atwood

The institution of marriage has long been culturally constructed as a site of stability, fulfillment, and social legitimacy, particularly for women. Within patriarchal frameworks, marriage is often presented as the ultimate destination of security and identity. However, in *Second Sex*, Simone de Beauvoir argues that woman has historically been positioned as, “the Other,” confined within patriarchal roles that reinforce dependence and restrict autonomy (26). This ideological construction underlies the romanticized vision of marriage as a protective and fulfilling institution. In *Habitation*, Margaret Atwood challenges this narrative by presenting marriage not as a stable structure, but as a fragile and evolving condition marked by uncertainty and survival.

Atwood's opening assertion, “Marriage is not a house or even a tent,” directly rejects the conventional metaphor of marriage as a form of shelter. Traditionally, as Gaston Bachelard's *The Poetics of Space* suggests, the house symbolizes intimacy, safety, and psychological stability (4). By denying both the permanence of the “house” and the

provisional security of the “tent,” Atwood destabilizes the assumption that marriage provides protection. Instead, the poem situates the relationship in a space of exposure and vulnerability. As Betty Friedan argues in *The Feminine Mystique*, domestic life often fails to deliver the fulfillment it promises, leaving women trapped in roles that obscure dissatisfaction (15).

The poem’s recurring imagery of “edges” further emphasizes the instability of marital space. References to “the edge of the forest” and “the edge of the desert” evoke liminal zones that resist fixed definition, symbolizing transition and uncertainty. At the same time “the edge of the receding glacier” introduces the idea of gradual erosion, suggesting emotional distance and the fragility of connection. This depiction aligns with Kate Millett’s *Sexual Politics*, that personal relationships are shaped by underlying power structures that often disadvantage women (23). Marriage, in this sense, becomes a site where these power dynamics are negotiated rather than resolved.

The representation of domestic space in the poem further challenges the idealized notion of home. The image of “the unpainted stairs / at the back where we squat / outside, eating popcorn” presents an incomplete and marginal environment. The “unpainted stairs” signify a lack of finish, while the positioning “at the back” suggests exclusion from the central, idealized space of domestic life. In *The Madwoman in the Attic*, Sandra Gilbert and Susan Gubar argue, domestic spaces in literature often reflect the constraints imposed on women within patriarchal systems (89). Atwood’s imagery exposes the gap between the ideal of domestic perfection and the reality of lived experience.

The concluding line, “we are learning to make fire,” shifts the focus from spatial instability to the theme of survival. Fire symbolizes warmth, sustenance, and continuity, yet the phrase “learning to make” indicates that these qualities require effort and are not inherent to the relationship. Judith Butler’s concept of gender performativity in *Gender Trouble* suggests that roles within relationships are not natural but are repeatedly enacted (33). Marriage thus emerges as a site of ongoing negotiation, where stability must be actively constructed.

The tone of the poem reinforces this interpretation. The lines “painfully and with wonder / at having survived even / this far” suggest that endurance, rather than fulfillment, defines the marital experience. Coral Ann Howells mentions Atwood’s work frequently explores themes of survival and adaptation, while Sherrill Grace in her work *Violent Duality: A Study of Margaret Atwood* highlights the tension between opposing forces such as stability

and instability in her writing (41). These critical perspectives underscore the poem's portrayal of marriage as a complex and often precarious condition.

The concerns articulated in *Habitation* resonate strongly with contemporary social realities, particularly in the Indian context, where marriage continues to function as both a cultural ideal and a source of psychological strain. In the age of digital representation, platforms such as Instagram construct an idealized image of marital harmony, emphasizing visual perfection while concealing emotional complexities. However, emotional labour remains disproportionately borne by women, revealing the persistence of gendered expectations within modern relationships.

The influence of digital culture further intensifies the gap between the idealized and lived realities of marriage. Social media platforms such as Instagram and Facebook play a significant role in constructing and circulating images of marital perfection, often emphasizing curated moments of happiness while excluding conflict, labour, and emotional strain. This selective representation creates what may be understood as a performative model of marriage, where individuals feel compelled to align their relationships with socially validated standards. In this context, marriage becomes not only a private institution but also a public performance shaped by digital visibility. The pressure to maintain this illusion of perfection can intensify dissatisfaction and emotional stress, particularly when personal experiences fail to match these idealized portrayals. Atwood's depiction of marriage as a space of uncertainty and continuous effort thus stands in stark contrast to the polished narratives promoted through social media, revealing the persistence of hidden struggles beneath the surface of contemporary relational life.

Statistical evidence further underscores this disparity between perception and reality. According to the National Crime Records Bureau, marriage-related issues accounted for over 9,000 suicides in India in 2023, representing nearly five percent of total cases (NCRB). Between 2016 and 2020, more than 37,000 individuals died by suicide due to marital problems, with only a small percentage linked to divorce, indicating that individuals are more likely to endure distress within marriage than to exit it (NCRB). Furthermore, over 66 percent of suicide victims in India are married individuals, suggesting that marriage often intensifies rather than alleviates emotional and social pressures (NCRB). These findings strongly echo Atwood's depiction of marriage as a space of survival rather than security.

Figure 1: Marriage-Related Distress in India (Based on NCRB Data)

Category	Data (India)
Total suicides (2023)	1,71,418

Marriage-related suicides (2023)	~9,043
No. of total suicides	~5%
Total (2016–2020) marriage suicides	37,591
Married victims (overall suicides)	~66%

As illustrated in Figure 1, the persistence of marriage-related distress highlights the gap between the idealized perception of marriage and its lived reality. The data reinforces Atwood's argument that marriage is not a stable refuge but a condition requiring continuous negotiation and endurance. These statistics demonstrate that marriage cannot be understood solely as a private emotional bond but also as a social institution shaped by unequal expectations and gendered responsibilities.

Ultimately, Atwood's *Habitation* dismantles the romantic myth of marriage by presenting it as an evolving space of negotiation rather than guaranteed security. Through feminist perspectives and contemporary social realities, the poem exposes how domestic relationships continue to be shaped by gendered expectations, emotional labour, and unequal power structures. By connecting literary representation with present-day realities, this study demonstrates that Atwood's vision remains profoundly relevant to feminist literary criticism and contemporary debates on marriage, identity, and survival.

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Reimagining Macbeth: A Comparative Study of the Tragic Hero and Noir Antihero in Shakespeare's *Macbeth* and Jo Nesbø's *Macbeth*

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ABSTRACT

This study presents a comparative analysis of William Shakespeare's Macbeth and Jo Nesbø's modern adaptation, examining the transformation of the protagonist from a classical tragic hero to a noir antihero. Utilizing a theoretical Framework of Aristotelian tragedy and noir theory, the paper explores how the core theme of ambition shifts across different historical and genre contexts. While Shakespeare focuses on a moral downfall driven by supernatural influence and individual fate, Nesbø reimagines the narrative with a realistic, corrupt urban environment shaped by social trauma and systematic decay. Ultimately, the analysis demonstrates that while the destructive nature of ambition remains a timeless literary theme, its portrayal reflects the evolving cultural and social anxieties of the Jacobean and modern eras.

Keywords: Ambition, Tragic Hero, Noir Antihero, Moral Corruption

Introduction

William Shakespeare is widely regarded as one of the greatest playwrights in English literature. His works explore universal themes such as ambition, power, love, betrayal, and human weakness. Among his tragedies, *Macbeth* is considered as one of the most powerful and thought-provoking plays. It was written in the early seventeenth century. The play presents the tragic story of a brave Scottish warrior whose overwhelming ambition leads him to commit terrible crimes. Through the rise and fall of its protagonist, Shakespeare examines the destructive consequences of an uncontrolled desire for power. The play shows how ambition, when combined with moral weakness and external influence, can lead to psychological suffering and ultimate downfall.

In *Macbeth*, the protagonist is initially introduced as a loyal and courageous soldier who earns the respect of his king and fellow warriors. However, his encounter with the witches awakens a deep ambition within him. When they greet him with the prophecy, "All hail, Macbeth, that shalt be king hereafter!" (Shakespeare 1.3.50), the idea of power begins to grow in his mind. At first, Macbeth is uncertain and disturbed by the thought of committing murder, admitting that "my thought, whose murder yet is but fantastical, / Shakes so my

single state of man” (Shakespeare 1.3.138–139). Nevertheless, the prophecy and Lady Macbeth’s encouragement gradually influence him to pursue the throne.

Encouraged by Lady Macbeth, Macbeth eventually murders King Duncan and becomes the king of Scotland. This act marks the beginning of his moral and psychological decline. Although he achieves power, he cannot escape the guilt that follows his crime. After the murder, he expresses deep remorse, saying, “Will all great Neptune’s ocean wash this blood / Clean from my hand?” (Shakespeare 2.2.78–79). As the play progress, Macbeth becomes increasingly consumed by fear, guilt, and suspicion. His desire to maintain power leads him to commit further acts of violence, transforming him from a noble warrior into a ruthless tyrant. Shakespeare uses this transformation to show that ambition can destroy both the individual and the society around him.

The character of Macbeth is often discussed in relation to the concept of the tragic hero, which is a central element in classical tragedy. A tragic hero is usually a noble or respected person who possesses a tragic flaw that eventually leads to his downfall. In Macbeth’s case, his tragic flaw is his overwhelming ambition and desire for power. Although he understands the moral consequences of his actions, he continues on a path of violence and betrayal. His internal conflict, guilt, and eventual destruction make him one of the most memorable tragic figures in English literature.

In the twenty-first century, the story of Macbeth was reimaged by the Norwegian writer Jo Nesbø in his novel *Macbeth*. Nesbø’s work is a part of the Hogarth Shakespeare project, which invites contemporary writers to reinterpret Shakespeare’s plays for modern readers. In this retelling, the story is moved from medieval Scotland to a dark and crime-ridden industrial city. Instead of royal courts and castles, the narrative unfolds within a corrupt system of police power, criminal gangs, and political influence. Through this change in setting, Nesbø adapts Shakespeare’s tragedy into a modern crime narrative.

In Nesbø’s version, Macbeth is no longer a medieval warrior but a police officer who rises to power within a corrupt system. His ambition is influenced not only by prophecy but also by crime, drugs, and the desire for control in a violent urban environment. At one point in the novel, Macbeth reflects on the nature of power and realizes that “power was the only thing that could silence the chaos around him” (Nesbø 134). This realization pushes him deeper into corruption and violence. As a result, the character takes on the qualities of a noir antihero, a morally complex figure who operates within a dark and corrupt world.

This paper therefore examines how the character of Macbeth changes when Shakespeare’s classical tragedy is transformed into a modern noir narrative. By comparing

Shakespeare's play with Nesbø's novel, the study explores how ambition shapes the protagonist and leads to his moral decline. The paper argues that while Shakespeare presents Macbeth as a classical tragic hero whose downfall results from his tragic flaw, Nesbø reimagines him as a noir antihero shaped by the corruption and violence of modern society.

Literature Review

Many scholars have studied *Macbeth* and discussed its major themes such as ambition, guilt, moral conflict, and the idea of the tragic hero. Critics often describe Macbeth as one of the most complex characters in Shakespeare's tragedies. One of the most influential critics, A. C. Bradley, explains that Macbeth is not an evil person at the beginning of the play. Instead, he is a brave soldier who slowly falls into wrongdoing because of temptation and ambition. Bradley writes that "Macbeth is not naturally cruel; he is tempted and gradually persuaded to commit evil" (Bradley 295). This view shows that Macbeth's tragedy happens because of his inner weakness and his desire for power.

Another important topic in critical studies is ambition and moral downfall. Many scholars argue that ambition is the main reason for Macbeth's destruction. At the beginning of the play, Macbeth is respected by King Duncan and praised for his bravery in battle. However, after hearing the witches' prophecy that he will become a king, he begins to imagine the possibility of gaining power. Bradley explains that Macbeth's strong imagination makes him think deeply about the consequences of his actions even before he commits them (Bradley 296). Because of this, he experiences fear and doubt, but he still chooses to follow his ambition. As a result, ambition becomes the force that pushes him toward murder and tyranny.

Critics also study the theme of guilt and psychological conflict in the play. After Macbeth kills King Duncan, he immediately begins to feel guilt and fear. His mind becomes troubled, and he starts seeing visions and ghosts. According to the critic Harold Bloom, Macbeth's imagination is very powerful and it causes his mental suffering. Bloom states that "Macbeth's imagination is both his greatness and his ruin" (Bloom 517). This means that the same imagination that makes Macbeth thoughtful and intelligent also leads to his destruction. His visions, such as the ghost of Banquo, show that his conscience continues to trouble him even after he becomes king.

Another area that scholars frequently discuss is the supernatural elements in the play. The witches play an important role in shaping Macbeth's actions. Some critics believe that the witches control Macbeth's destiny, while others argue that they only reveal the ambition already present in him. Bradley suggests that the witches do not force Macbeth to commit

crimes but instead “appeal to the evil already latent in his nature” (Bradley 300). In this interpretation, Macbeth is still responsible for his actions because the witches only encourage the desires that already exist within him.

In recent years, scholars have also started studying modern adaptations of Shakespeare’s works. One important example is the novel *Macbeth* written by Jo Nesbø. This novel retells Shakespeare’s story in a modern setting. Instead of a medieval kingdom, the story takes place in a dark industrial city where crime and corruption are common. Because of this change in setting, many critics say that the novel belongs to the genre of noir crime fiction, which usually presents morally complex characters and a gloomy atmosphere.

Scholars studying Nesbø’s adaptation explain that the character of Macbeth is presented as a modern antihero. In this version, Macbeth is a police officer who rises to power in a corrupt system. His ambition is influenced not only by prophecy but also by drugs, crime, and political manipulation. Critics argue that this change reflects modern society, where power and corruption often exist together. As a result, Nesbø’s character is different from Shakespeare’s tragic hero because he lives in a morally uncertain world where the line between good and evil is unclear.

Although many studies discuss Shakespeare’s tragic hero and others examine modern adaptations of *Macbeth*, there are still few studies that directly compare the transformation of Macbeth from a tragic hero into a noir antihero. Most research focuses either on Shakespeare’s original tragedy or on the modern adaptation separately. Therefore, this study aims to fill this research gap by comparing the character of Macbeth in both texts and examining how ambition shapes his transformation in different historical and social contexts.

Historical and Genre Context

Macbeth written by William Shakespeare around 1606, reflects the social and political concerns of Jacobean England. During this time, people strongly believed in the divine right of kings, which means that the king was chosen by God and therefore should not be challenged or overthrown. Any attempt to harm the king was considered both a political crime and a religious sin. The play was also written shortly after the Gunpowder Plot, a failed conspiracy in which a group of men tried to kill King James I and destroy the English Parliament. Because of this event, many people in England were anxious about betrayal, political violence, and threats to the king’s authority. Shakespeare’s tragedy reflects these fears by showing how the murder of a rightful king leads to chaos, guilt, and destruction.

The structure of Shakespeare’s play also follows the ideas of classical tragedy described by the Greek philosopher Aristotle. According to Aristotle, a tragedy usually

presents a noble character whose downfall is caused by a tragic flaw, also called *hamartia*. This flaw leads the character to make serious mistakes, which eventually bring about suffering and destruction. Aristotle explains that tragedy should evoke emotional responses in the audience, stating that, “tragedy... through pity and fear effect[s] the proper purgation of these emotions” (Aristotle 13). Macbeth fits this model of a tragic hero. At the beginning of the play, he is a brave and respected warrior who serves his king faithfully. However, his tragic flaw is ambition, which slowly leads him to commit terrible crimes. As Macbeth murders King Duncan and later commits other violent acts to protect his power, he becomes a tyrant. In Shakespeare’s tragic world, supernatural forces such as the witches appear to influence events, and the natural moral order must eventually be restored through justice.

In contrast, the novel *Macbeth*, written by Jo Nesbø in 2018, places the story in a completely different setting. Instead of medieval Scotland, the story takes place in a dark and unnamed industrial city during the 1970s. This city is filled with crime, corruption, drug trafficking, and political manipulation. The atmosphere of the novel is similar to that of noir crime fiction, a genre that usually portrays a bleak world where morality is unclear and characters struggle within corrupt systems.

Because of this new setting, the character of Macbeth is also very different. In Nesbø’s version, he is not a noble warrior or a Scottishthane. Instead, he is a SWAT police officer who rises through the ranks in a corrupt police department. His past is marked by poverty, childhood trauma, and drug addiction. These experiences shape his personality and influence his desire for power. Rather than being guided mainly by prophecy and supernatural forces, Nesbø’s Macbeth is shaped by the violent and unstable society around him. His ambition grows as he becomes involved in crime networks and political conspiracies. The novel therefore presents a character who is deeply flawed and morally uncertain.

Critics often describe such characters as noir antiheroes. Unlike the traditional tragic hero, who usually has a clear sense of morality but fails because of a tragic flaw, the noir antihero operates in a world where moral boundaries are blurred. According to the film and literature critic James Naremore, noir protagonists “struggle less with moral choice than with moral chaos” (Naremore 20). This idea helps explain the character of Nesbø’s Macbeth. He does not simply struggle between right and wrong; instead, he lives in a world where corruption and violence are everywhere, making moral decisions extremely difficult.

The transformation of Shakespeare’s story into a modern noir narrative shows how literature changes according to the concerns of different historical periods. Shakespeare’s

play reflects the fears of Jacobean England, especially the fear of political betrayal and the violation of divine authority. The murder of a king in the play represents a disturbance of the natural and moral order. Nesbø's novel, on the other hand, reflects the anxieties of modern society, where corruption, crime, and addiction often influence systems of power. By placing the story in a dystopian urban environment, Nesbø shows how ambition and the desire for control can grow within a broken social structure.

Therefore, the movement from Elizabethan tragedy to modern noir fiction not only changes the setting of the story but also reshapes the inner struggle of the protagonist. Shakespeare presents Macbeth as a tragic hero whose downfall is caused by ambition and moral conflict. Nesbø, however, presents him as a noir antihero, a character shaped by trauma, corruption, and the harsh realities of modern society. This shift demonstrates how the same story can reflect the fears and values of different times and cultures.

Theoretical Framework

This study uses two important literary theories to understand how the character of Macbeth changes from a tragic hero to a noir antihero. The first theory comes from the Greek philosopher Aristotle, who explains the idea of tragedy in his work *Poetics*. Aristotle states that a tragic hero is usually a person of high position whose downfall is caused by a fatal flaw, known as *hamartia*. He also explains that tragedy should create emotional responses in the audience. According to Aristotle, tragedy works "through pity and fear effecting the proper purgation of these emotions" (Aristotle 10). This means that when audiences watch the suffering of the hero, they feel sympathy and fear, which help them understand the consequences of human weakness and moral failure.

The character of Macbeth in Macbeth closely follows this classical model of tragedy. At the beginning of the play, Macbeth is a noble and respected warrior who serves King Duncan faithfully. However, his strong ambition becomes his tragic flaw. His desire for power leads him to murder the king and seize the throne. Even though he commits terrible crimes, Macbeth is aware of his moral decline. His feelings of guilt, fear, and psychological conflict make him a complex tragic hero. Because the audience can see both his ambition and his suffering, they experience pity and fear as his downfall unfolds.

In contrast, the idea of the noir antihero comes from modern film and literary criticism. Scholars such as Paul Schrader and James Naremore explain that noir protagonists are very different from classical tragic heroes. These characters usually live in dark and corrupt societies where moral values are unclear. According to Schrader, noir stories often present "a world of moral ambiguity and social corruption" (Schrader 54). In such a world,

characters struggle not only with their own weaknesses but also with the corruption that surrounds them. Naremore similarly argues that noir heroes face a chaotic moral environment rather than a clear moral conflict (Naremore 19).

This idea helps explain the character of Macbeth in *Macbeth* written by Jo Nesbø. In this modern retelling, Macbeth is not a noble warrior but a police officer working in a violent and corrupt city. His life is influenced by drug addiction, political manipulation, and criminal networks. Because of these influences, his ambition becomes connected to a larger system of corruption. His struggle is not only personal but also social. The world around him is already morally broken, and this environment shapes his actions and decisions.

Unlike Shakespeare's tragic hero, who experiences a clear moment of moral realization, Nesbø's Macbeth exists in a darker and more uncertain world. His ambition leads him into deeper corruption, and his downfall reflects the collapse of the society around him. Therefore, his character fits the model of the noir antihero, a figure who is flawed, morally complex, and trapped in a corrupt environment.

Using these two theoretical perspectives, Aristotelian tragedy and noir theory helps us understand how the character of Macbeth changes across time and literary genres. Shakespeare's version presents a tragic hero whose personal flaw leads to his downfall within a moral universe that ultimately restores order. Nesbø's version, however, presents a noir antihero whose fall reflects the corruption and instability of modern society. Through this comparison, it becomes clear that while the theme of ambition remains central in both works, the meaning of the protagonist's struggle changes according to the cultural and historical context of each text.

Character Transformation: From Tragic Hero to Noir Antihero

The character of Macbeth changes significantly when we compare Macbeth with Macbeth. Shakespeare presents Macbeth as a classical tragic hero, a noble figure whose ambition leads to moral collapse and tragic downfall. In contrast, Nesbø reimagines Macbeth as a noir antihero, a morally complex character shaped by a corrupt social system. By examining both texts, it becomes clear that the same character can reflect very different ideas about power, morality, and human weakness.

Macbeth as a Tragic Hero in Shakespeare

In Shakespeare's play, Macbeth first appears as a brave and loyal warrior who serves King Duncan with great courage. Early in the play, he is praised for his heroic actions on the battlefield. A soldier describes him as "for brave Macbeth—well he deserves that name" (Shakespeare 1.2.16). This introduction establishes Macbeth as a respected figure who has

earned honour through his loyalty and bravery. The idea of the tragic hero was explained by the philosopher Aristotle in *Poetics*. Aristotle argues that tragedy should create emotional responses in the audience. He explains that tragedy works “through pity and fear effecting the proper purgation of these emotions” (Aristotle 13). Macbeth fits this pattern because his downfall is caused by a tragic flaw that is his ambition.

The witches’ prophecy awakens this ambition. When they greet him by saying, “All hail, Macbeth, that shalt be king hereafter!” (Shakespeare 1.3.50), Macbeth begins to imagine a future where he holds royal power. According to the critic Stephen Greenblatt, Shakespeare often shows how political ambition can disturb both personal morality and social order. Greenblatt notes that “Shakespeare’s tragedies reveal the dangerous desire for power that lies within human nature” (Greenblatt 175). This idea helps explain why Macbeth begins to consider murdering Duncan even before Lady Macbeth persuades him.

Another important aspect of Macbeth’s character is his moral awareness. Even when he plans to kill Duncan, he understands that the act is morally wrong. He admits that his only motivation is “vaulting ambition” (Shakespeare 1.7.27). This moment shows the internal conflict within Macbeth’s mind. The scholar Jonathan Dollimore argues that Shakespeare’s tragedies often portray characters who recognize their moral failures but are unable to escape them. Dollimore writes that tragedy exposes “the destructive consequences of human ambition and political power” (Dollimore 89).

After murdering Duncan, Macbeth begins to experience intense guilt and psychological disturbance. His conscience troubles him deeply, and he imagines that the blood on his hands can never be washed away. He cries, “Will all great Neptune’s ocean wash this blood clean from my hand?” (Shakespeare 2.2.78). According to the critic Marjorie Garber, Shakespeare often explores how guilt affects the human mind. Garber explains that “Macbeth’s tragedy lies in the conflict between his imagination and his actions” (Garber 719). Because of this conflict, Macbeth becomes increasingly fearful and paranoid.

As the play continues, Macbeth transforms from a loyal soldier into a tyrannical ruler. His ambition pushes him to commit further crimes, including the murder of Banquo. Eventually, rebellion rises against him, and he is defeated by Macduff. His death represents the tragic fall of a once noble hero. The audience feels pity because Macbeth was once honourable, and fear because his ambition led him to destruction.

Macbeth as a Noir Antihero in Nesbø

In *Macbeth*, the character of Macbeth is presented in a very different way. Instead of a medieval warrior, he is a police officer working in a corrupt city dominated by crime, drugs,

and political manipulation. This modern setting changes the nature of Macbeth's character and his moral struggles. Nesbø's protagonist is shaped by trauma and addiction, which influence his decisions and ambitions. He rises through the ranks of the police department but becomes involved in corruption and criminal activity. Unlike Shakespeare's character, whose ambition is awakened by supernatural prophecy, Nesbø's Macbeth is influenced by the violent environment around him.

The critic Mark T. Conard explains that noir narratives often portray characters trapped in corrupt societies. Conard writes that noir fiction presents "a dark vision of society where corruption and moral uncertainty dominate" (Conard 23). This description closely matches the world of Nesbø's novel. Another scholar, Lee Horsley, notes that noir protagonists are often morally ambiguous figures who operate within unstable social systems. Horsley explains that "the noir hero is usually flawed and trapped in a corrupt environment" (Horsley 45). This idea applies directly to Nesbø's Macbeth, whose actions are shaped by the crime networks and political conspiracies around him.

As Macbeth gains power in the city, he becomes increasingly violent and ruthless. His ambition pushes him toward betrayal and murder in order to maintain authority. However, unlike Shakespeare's tragic hero, Nesbø's character does not experience the same level of moral reflection. Instead, he appears trapped in a world where corruption is already widespread. Eventually, his rule collapses as violence and political conflict increase. His downfall reflects not only his personal ambition but also the corruption of the society in which he lives.

Comparison

When the two texts are compared, it becomes clear that the character of Macbeth changes according to literary tradition and historical context. Shakespeare's Macbeth follows the Aristotelian tragic hero model, in which a noble character's tragic flaw leads to downfall and emotional catharsis for the audience. In contrast, Nesbø's Macbeth represents the modern noir antihero. Instead of living in a structured moral universe, he operates within a corrupt society where justice and morality are uncertain. His character reflects modern anxieties about crime, corruption, and political power.

Therefore, the transformation of Macbeth from tragic hero to noir antihero demonstrates how literature adapts classic stories to new social and cultural environments. While Shakespeare focuses on moral conflict and tragic downfall, Nesbø presents a darker vision of ambition shaped by corruption and social instability.

Ambition and Psychological Collapse

Ambition is one of the most important forces that shapes the character of Macbeth in both *Macbeth* by William Shakespeare and *Macbeth* by Jo Nesbø. In both works, ambition drives Macbeth toward power, but it also leads to his psychological collapse and destruction. However, the way ambition is presented in the two texts is different. Shakespeare's play belongs to classical tragedy, where ambition appears as a moral flaw within the hero. In contrast, Nesbø's novel reflects the dark tone of noir fiction, where ambition is strongly influenced by social corruption, trauma, and power struggles.

In Shakespeare's tragedy, Macbeth is first introduced as a brave and loyal warrior. He serves King Duncan faithfully and earns respect for his courage. However, the witches' prophecy awakens a powerful desire in him. When they greet him with the promise of kingship, Macbeth begins to imagine a future where he holds ultimate power. Even before committing the crime, he understands that his motivation is dangerous. He openly admits that he has "vaulting ambition, which o'erleaps itself" (Shakespeare 1.7.27). This moment reveals that Macbeth is aware of the moral consequences of his desire. The critic Harold Bloom explains that Macbeth's ambition grows from his imagination and inner desire for greatness. Bloom notes that "Macbeth's tragedy lies in the power of his own imagination" (Bloom 515). In other words, Macbeth destroys himself because he allows his ambition to control his thoughts and actions.

As Macbeth moves forward with his plan to kill Duncan, his mind begins to experience intense psychological pressure. After committing the murder, he immediately feels the weight of guilt. He imagines hearing a mysterious voice saying, "Sleep no more! Macbeth does murder sleep" (Shakespeare 2.2.47). This hallucination shows that Macbeth's conscience is deeply disturbed. In Shakespeare's tragic universe, guilt acts as a moral punishment for wrongdoing. The scholar Stephen Greenblatt explains that Shakespeare often portrays the struggle between power and morality. Greenblatt observes that "Shakespeare's tragedies explore the destructive desire for power" (Greenblatt 179). Macbeth's psychological suffering reflects this conflict between ambition and moral responsibility.

Macbeth's mental collapse becomes even clearer as the story progresses. In order to secure his power, he orders the murder of Banquo and later the slaughter of Macduff's family. These acts reveal how ambition has transformed him into a tyrant. At the same time, Lady Macbeth also begins to suffer from overwhelming guilt. During her sleepwalking scene, she desperately tries to wash imaginary blood from her hands while crying, "Out, damned

spot! Out, I say!” (Shakespeare 5.1.30). The critic Marjorie Garber explains that guilt in Shakespeare’s tragedies often appears through disturbing psychological images. Garber writes that “Macbeth’s imagination becomes the source of his torment” (Garber 722). Because of this torment, both Macbeth and Lady Macbeth gradually lose their mental stability.

While Shakespeare focuses on moral guilt and psychological conflict, Nesbø’s novel presents ambition within a modern noir setting. In Nesbø’s version, Macbeth is not a medieval warrior but a police officer in a corrupt city dominated by drugs, crime, and political manipulation. His ambition develops in response to his difficult past. As a child, he experienced poverty and abandonment, and as an adult he becomes addicted to a powerful drug called “brew.” These experiences shape his desire for power and control.

In this modern world, ambition is connected less with moral transgression and more with survival and influence. Nesbø expresses this idea through the statement “Power doesn’t corrupt. It reveals”(Nesbø 212). This line suggests that power simply exposes the true nature of individuals who already live in a corrupt system. The noir genre often portrays such morally uncertain environments. The scholar Mark T. Conard explains that noir narratives present “a bleak vision of society filled with corruption and moral ambiguity” (Conard 23). This description perfectly fits the world of Nesbø’s novel.

Because of this environment, Macbeth’s psychological collapse in the novel appears different from the collapse seen in Shakespeare’s tragedy. Instead of experiencing spiritual guilt, he suffers from paranoia, addiction, and traumatic memories. His hallucinations and violent reactions are often connected to drug withdrawal and emotional instability. The critic Lee Horsley notes that noir protagonists are often trapped in dark social systems. Horsley writes that “the noir hero is shaped by a corrupt environment that limits moral choice” (Horsley 47). Nesbø’s Macbeth reflects this idea because his actions are deeply influenced by the violent society around him.

Another important feature of noir fiction is the sense that characters cannot escape their past. The film critic Paul Schrader explains that noir characters are often “trapped by their past and doomed to repeat it” (Schrader 11). This description clearly applies to Nesbø’s Macbeth. His ambition pushes him toward power, but his past trauma and addiction constantly pull him toward destruction. Unlike Shakespeare’s tragic hero, who recognizes his moral failure, Nesbø’s protagonist remains trapped in a cycle of violence and corruption.

When the two texts are compared, it becomes clear that ambition and psychological collapse are shaped by their literary traditions. Shakespeare’s Macbeth follows the structure

of classical tragedy, where ambition appears as a personal flaw that destroys a noble hero. His guilt is spiritual and moral, leading to madness and death. In contrast, Nesbø's Macbeth represents the modern noir antihero. His ambition grows within a corrupt society, and his psychological collapse results from addiction, trauma, and political violence rather than moral reflection. Despite these differences, both works ultimately show that ambition can be destructive when it is driven by the desire for absolute power. Whether in the moral universe of tragedy or the dark world of noir fiction, Macbeth's story demonstrates how the pursuit of power can lead to psychological breakdown and the loss of human identity.

Conclusion

This comparative study of William Shakespeare's *Macbeth* and Jo Nesbø's modern reimagining demonstrates that while the destructive nature of ambition remains a universal literary theme, its expression is radically reshaped by the generic and historical frameworks of Aristotelian Tragedy and noir fiction. By tracing the evolution of the protagonist from a classical tragic hero defined by moral failure and spiritual guilt to a noir antihero shaped by systematic corruption and social trauma, this research highlights a fundamental shift in how literature conceptualizes human agency and downfall.

The originality of this study lies in its synthesis of these two distinct theoretical traditions to bridge the gap between classical and contemporary literary criticism. While existing scholarships often examine these texts in isolation, this analysis provides a new perspective on how the noir genre functions as a modern vehicle for Shakespearean themes, replacing the divine order of the Jacobean era with the moral chaos of a dystopian urban environment. This shift suggests that the modern protagonist's struggle is no longer just an internal battle of the soul, but a reflection of a broken social structure.

Ultimately, this research contributes to Shakespeare adaptation studies by illustrating the enduring elasticity of the *Macbeth* narrative. It confirms that Shakespeare's work provides a timeless foundation for exploring power and corruption, even as its heroes evolve to reflect the anxieties of a more cynical, modern world. By placing these two versions of Macbeth in direct conversation, this study offers a framework for future scholars to examine how other classical archetypes might be reimagined through the lens of modern genre conventions.

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ஒளவையும் பெண்மையின் மாட்சியும்

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கட்டுரைச் சுருக்கம்

ஒளவையார் பெண்களைப் பற்றி முன்வைக்கும் கருத்துகள் வெறும் அறிவுரைகள் மட்டுமல்ல அவை ஒரு சமூகம் சிதையாமல் இருப்பதற்கான வாழ்வியல் சுதந்திரங்கள். ஒளவையார் பெண்களை வெறும் போகப் பொருளாகவோ அல்லது பலவீனமானவர்களாகவோ ஒருபோதும் கருதியதில்லை. மாறாக, ஒரு குடும்பத்தின் மங்கலமாகவும், சமூகத்தின் அறக் காவலர்களாகவும் அவர்களைக் கண்டார். இல்லறப் பெண்கள் எப்படி மாண்புடன் திகழ வேண்டும் என்பதையும், ஒழுக்கம் தவறும் பெண்கள் சமூகத்திற்கு எப்படித் தீங்காக முடிவார்கள் என்பதையும் அவர் மிகத் தெளிவாகப் படம்பிடித்துக் காட்டியுள்ளார். கணவனுக்கும் மனைவிக்கும் இடையிலான உறவு, குடும்ப ஒழுக்கம் போன்றவற்றை இவர் கடுமையாகச் சாடியும் போற்றியும் பாடியுள்ளார். ஒழுக்கமே பெண்களின் உண்மையான அழகு என ஒளவையார் எடுத்துரைக்கின்றார். ஆரம்பகால வளர்ச்சிக்காகத் தியாகம் செய்த தாயை ஒருபோதும் மறக்கக் கூடாது என்பதை ஒளவையார் தனது பாடல்களில் ஆணித்தரமாகப் பதிவு செய்துள்ளார்.

முன்னுரை

தமிழ் இலக்கிய வரலாற்றில் சங்க காலம் முதல் பிற்காலம் வரை “ஒளவையார்” என்றபெயர் ஒரு தனிப்பெரும் ஆளுமையாகத் திகழ்கிறது. “கற்றது கைம்மண்ணளவு கல்லாதது உலகளவு” என்று முழங்கிய ஒளவையார். தமிழகத்தின் பட்டிதொட்டியெங்கும் அறியப்பட்டவர். குழந்தைகளுக்கான “ஆத்திசூடி” முதல் பெரியவர்களுக்கான “நல்வழி” வரை அனைத்து வயதினருக்கும் அறம் புகட்டியவர். ஒளவையாரின் பாடல்களில் சமூகத்தின் சரிபாதியாக விளங்கும் பெண்களைப் பற்றியும், அவர்களின் பண்புகள், கடமைகள் மற்றும் சமூகச் சிக்கல்கள் குறித்தும் மிக ஆழமான கருத்துகள் இடம்பெற்றுள்ளன. இக்கட்டுரை ஒளவையார் காட்டும் இல்லறப் பெண்கள் மற்றும் பொதுமகளிர் குறித்த பார்வையை விரிவாக ஆராய்கிறது.

ஒளவையார்

தமிழ்ப் புலவர் வரிசையில் குறிப்பிடப்படும் ஒளவையார் ஒருவரே என்று பொதுவான கருத்து நிலவினாலும், வரலாற்று ரீதியாக மூவர் இருந்ததாக ஆய்வாளர்கள் கருதுகின்றனர். சங்க கால ஒளவையார் கி.பி. முதலாம் நூற்றாண்டில் வாழ்ந்ததாகவும் சங்க இலக்கியப் பாடல்களைப் பாடியவர் என்ற கருத்து ஆய்வாளர்களால் முன் வைக்கப்படுகிறது. அதியமான் நெடுமான் அஞ்சி எனும் குறுநில மன்னனின் மிகநெருங்கிய நண்பராகவும், அவைப் புலவராகவும் திகழ்ந்தவர். அதியமானுக்கும் தொண்டைமானுக்கும் இடையே போர் மூளவிருந்த சூழலில், அதியமானின் தூதராகச் சென்று தொண்டைமானின் ஆயுதக் கிடங்கைப் புகழ்வது போலப் பாடி, போரைத் தடுத்தவர். தனக்குக் கிடைத்த “சாவா மருந்தாகிய” நெல்லிக் கனியைத்தான் உண்ணாமல், தமிழ் தழைக்க வேண்டும் என்ற நோக்கில் ஒளவையாருக்கு அதியமான் வழங்கிய நிகழ்வு இவரது காலத்தில்தான் நிகழ்ந்தது. புறநானூறு, அகநானூறு, நற்றிணை, குறுந்தொகை ஆகிய தொகுப்புகளில் இவரது பாடல்கள் இடம் பெற்றுள்ளன.

இடைக்கால ஔவையார் கி.பி. 10 - 12 ஆம் நூற்றாண்டின் சோழர் காலத்தைச் சேர்ந்தவர். சமயப் பாடல்களிலும் சமூகப் பணிகளிலும் ஈடுபாடு கொண்டவராக அறியப்படுகிறார். கடையேழு வள்ளல்களில் ஒருவரான பாரியின் மறைவுக்குப் பிறகு, ஆதரவற்ற நிலையில் இருந்த அவரது மகன்களான அங்கவை மற்றும் சங்கவைக்கு மணம் முடித்து வைக்க இவர் பெரும் முயற்சி எடுத்தார். சேர, சோழ, பாண்டியமன்னர்களை ஒருசேரக் கண்டு அறிவுரை கூறும் ஆற்றல் கொண்டவராக இவர் சித்தரிக்கப்படுகிறார். புகழ்பெற்ற “விநாயகர் அகவல்” எனும் பக்திப் பிரபந்தம் இவரால் பாடப்பட்டதாகக் கருதப்படுகிறது.

பிற்கால ஔவையார் கி.பி. 12 ஆம் நூற்றாண்டுக்கு பின் பள்ளிக் குழந்தைகள் முதல் பெரியவர்கள் வரை அனைவரும் அறிந்த நீதி நூல்களை வழங்கியவர். “தமிழ் மூதாட்டி” என்று நாம் உருவகப்படுத்தும் வடிவம் இவருக்குப் பொருந்தும். ஆகர வரிசையில் அறக்கருத்துகளைச் சொன்ன முதல் நூல் ஆத்திசூடி. ஆழமான வாழ்வியல் உண்மைகளை ஒரே வரியில் விளக்குவது கொன்றைவேந்தன் ஆகும். மூதுரை மற்றும் நல்வழியானது உவமைகள் மூலம் மனிதப் பண்புகளை விளக்கும் பாடல்கள் கொண்டவை.

இல்லறப் பெண்களின் மாண்பு

ஒரு சமூகம் செம்மையாக இயங்க அதன் அடிப்படையான குடும்பம் சிறப்பாக இருக்கவேண்டும். குடும்பத்தின் அச்சாக ஔவையார் பெண்களைக் கருதுகிறார். “இல்லாள்”, “மனைவி”, “இல்லத்தரசி” எனப் பலநிலைகளில் பெண்களை அவர் அடையாளப்படுத்துகிறார். இல்லறத்தின் மகிழ்ச்சியாக ஔவையார் மனைவியின் மாண்பைப்பற்றிப் பேசும்போது, ஒரு நல்ல மனைவி அமைந்த வீட்டில் குறைபாடுகள் இருக்காது என்கிறார். இதனை,

"இல்லாள் அகத்திருக்க இல்லாதது ஒன்றில்லை" (மூதுரை பாடல்: 21)

என்னும் வரிகள் உணர்த்துகின்றன. அன்பு, அடக்கம், அமைதி, பொறுமை, பணிவு ஆகிய நற்பண்புகளைக் கொண்ட மனைவி இருக்கும் வீடே உண்மையான இல்லறம். மாறாக, கணவனுடன் எப்போதும் முரண்பட்டு, கடுஞ்சொற்கள் பேசும் மனைவி அமைந்தால், அந்தவீடு “புலி வாழும் புதர்” போன்றதாகிவிடும் என்று எச்சரிக்கிறார். திருவள்ளுவர்,

"இல்லதென் இல்லவள் மாண்பானால் உள்ளதென்"

இல்லவள் மாணாக் கடை" (வாழ்க்கைத் துணைநலம் :குறள்- 53)

முனைவி நற்பண்பு உடையவளாக இருந்தால் அங்கு இல்லாதது என்று எதுவுமில்லை என்று வள்ளுவர் கூறிய கருத்தையே ஔவையாரும் வழிமொழிகிறார். ஒரு பெண்ணின் மென்மையான குணமே அவளது குடும்பத்தைக் காக்கும் அரணாகும்.

இல்லறப் பெண்களுக்கு ஔவையார் கூறும் எச்சரிக்கைகள்

ஒரு குடும்பத்தின் கௌரவம், பாரம்பரியம் மற்றும் நற்பண்புகளுக்கு மாறாக நடக்கும் பெண், அந்த வீட்டிற்குத் தெய்வமாக இருப்பதற்குப் பதில் எமனாக மாறுவாள் என்று ஔவையார் எச்சரிக்கிறார். கணவனின் குடும்ப வழக்கங்களை மதிக்காமலும், பெரியோர்களைப் பேணாமலும் நடக்கும்போது குடும்பத்தின் அஸ்திவாரம் தகர்கிறது.

இத்தகைய பெண்ணால் அந்த வீட்டில் மகிழ்ச்சி மறைந்து, எப்போதும் மரணப் யத்திற்கு இணையான மன உளைச்சலே மிஞ்சும் என்பதை ஔவையார் சாடுகிறார்.

"துடியாப் பெண்டிர் மடியில் நெருப்பு" (கொன்றைவேந்தன்: 41)

இந்தப் பாடல் மிகவும் ஆழமான எச்சரிக்கையைத் தருகிறது. "துடித்தல்" என்பது இங்கே கணவன் துன்பப்படும்போது அவரோடு இணைந்து வருந்துவதைக் குறிக்கும். கணவன் வறுமையிலோ, நோயிலோ வாடும்போது அவனுக்கு ஆறுதலாக இல்லாமல், இரக்கமில்லாமல் இருக்கும் பெண் மடியில் கட்டிய நெருப்பைப் போன்றவள். மடியில் நெருப்பைக் கட்டிக்கொண்டு ஒருவன் எப்படி நிம்மதியாக இருக்க முடியாதோ, அதேபோல் அன்பில்லாத பெண்ணுடன் வாழும் ஆணின் வாழ்வு மெல்ல மெல்ல அழிந்துவிடும். நெருப்பு எப்படித் தன்னைத் தாங்கிய துணியையே எரிக்குமோ, அப்படி இப்பெண் தான் சார்ந்த குடும்பத்தையே அழித்துவிடுவாள். "ஓத்தாரும் ஒவ்வாதார்" எனும் கருத்தின்படி, கணவன்-மனைவி இடையே மன ஒற்றுமை இல்லாவிட்டால் அந்த இல்லறம் நரகத்திற்குச் சமமானது. கணவனின் குறிப்பறிந்து செயல்படாத பெண், குடும்ப அமைதியைக் குலைக்கிறாள். கணவன் ஒன்று நினைக்க, மனைவி அதற்கு நேர்மாறாகச் செயல்படுவது தொடர்ந்தால், அங்கு செல்வம் தங்குவதில்லை. மாறாகப் பூசல்களே மிஞ்சும்.

பெண்களின் உண்மையான அழகு

உலகியல் ரீதியாக பெண்கள் ஆபரணங்களை விரும்புவது வழக்கம். ஆனால், ஔவையார் ஒரு பெண்ணிற்குச் சிறந்த அழகு எவை என்பதை அழகாக எடுத்துரைக்கிறார். கொன்றை வேந்தனில் இடம்பெற்ற பேதைமை என்பது அறியாமை அல்ல. வஞ்சனையற்ற தூய மனதைக் குறிக்கிறது. ஔவையாரின் கொன்றை வேந்தனில் வரும் "கற்பெனப்படுவது சொல் திறம்பாமை" என்ற வரிகளில் இவ்வாறு கூறுகிறார். திருவள்ளுவர் கூறியது போல, ஒரு பெண்ணைச் சிறை வைத்துப் பாதுகாப்பதை விட, அவளே தன்னைத் தனது ஒழுக்கத்தால் பாதுகாத்துக் கொள்வதே மேலானது.

பொருட்பெண்டிர் குறித்த அறிவுரை

சமூகத்தில் ஒழுக்கச் சிதைவைத் தடுக்கும் நோக்கில், ஔவையார் ஆண்களுக்குப் பல எச்சரிக்கைகளை விடுத்துள்ளார். "மைவிழியார்" அல்லது "தையல்" என்று அவர் குறிப்பிடுவது பெரும்பாலும் பொருளுக்காக அன்பு காட்டும் பெண்களையே.

"தையல் சொல் கேளேல்" என்பதில் வரும் தையல் என்பது செயற்கையாகத் தங்களை அழகுபடுத்திக் கொண்டு ஆண்களைக் கவரும் பெண்களைக் குறிக்கும். இவர்களின் பேச்சைக் கேட்டு ஒருவன் மயங்கினால் அவனது வாழ்வு சீரழியும். செயற்கை அழகின் போலித்தன்மை பற்றி பேசும் போது இவ்வாறு கூறுகிறார்.

விலை மகளிரின் பின்னால் செல்லும் ஒருவன், கல்லைத் துணையாகக் கொண்டு ஆற்றைக் கடக்க முயல்பவனைப் போன்றவன் என்கிறது நல்வழி. கல் எப்படி ஆற்றில் மூழ்குமோ, அதுபோல இத்தகைய பெண்களின் தொடர்பும் ஒருவனைச் சமூகத்தில் மூழ்கடித்துவிடும்.

"போதந்தனம் கல்வி பொன்றவரும் காலம் அயல்

மாதார்மேல் வைப்பான் மனம்" (நல்வழி :பாடல்- 36)

விலை மகளிர் மீது ஆசை கொள்ளும் ஒருவனுக்கு அவனது அறிவும் செல்வமும் கல்வியும் அழியும் காலம் நெருங்கிவிட்டது என்று ஔவையார் எச்சரிக்கிறார்.

தாய்மையின் சிறப்பு

ஔவையார் காட்டிய “தாய்மை” என்பது வெறும் உறவுமுறை சார்ந்தது மட்டுமல்ல. அது ஒரு வாழ்வியல் தர்மமாகவும், இறைநிலைக்கு இணையாகவும் போற்றப்படுகிறது. கண்ணுக்குத் தெரியாத இறைவனைத் தேடி அலைவதைவிட, கண்ணெதிரே வாழும் பெற்றோரே முதல் தெய்வம் என்கிறார் ஔவையார்.

“அன்னையும் பிதாவும் முன்னறி தெய்வம்” (கொன்றைவேந்தன்:1)

என்பதில் அன்னையை முதலாவதாக வைத்துள்ளார். தந்தை உலகைக் காட்டுபவர் என்றால், தாயே அந்தத் தந்தையையும் உலகையும் குழந்தைக்கு அறிமுகம் செய்பவர். ஒருவர் எத்தனை தான தருமங்கள் செய்தாலும், அறச் செயல்களில் ஈடுபட்டாலும், வீட்டில் இருக்கும் தாயைப் போற்றாவிடில் அந்த அறங்கள் பயன் தராது என்பது ஔவையின் கருத்தாகும். கோயிலுக்குச் சென்று செய்யும் வழிபாட்டைவிட, தாயின் சொற்களைக் கேட்டு நடப்பதே ஒருவனுக்குச் சிறந்த ஒழுக்கத்தைத் தரும்.

தாயிற் சிறந்ததொரு கோயிலும் இல்லை என்பதில் கோயில் என்பது அமைதி, தாய்மை மற்றும் அருள் கிடைக்கும் இடமாக கருதப்படுகின்றன. ஔவையார் ஒரு தாயையே நடமாடும் கோயிலாக உருவகப்படுத்துகிறார். கோயில் இல்லாத ஊரில் குடியிருக்க வேண்டாம் என்று சொன்ன அதே ஔவை, தாய் இல்லாத வாழ்வு பாதுகாப்பு அற்றது என்பதையும் உணர்த்துகிறார். ஔவையார் தந்தை வழிச் சமூகத்தில் வாழ்ந்தாலும், தாய்மையின் மேன்மையை எப்போதும் உயர்வாகச் சொல்கிறார். மற்ற உறவுகள் ஒருவன் செய்யும் பிழைகளைக் கண்டு தண்டிக்கும். ஆனால், “பெண் நீர்மைக் கற்பு அழியா ஆற்றல்” என்று சொன்ன ஔவை, தாயின் பொறுமையையும் மன்னிக்கும் குணத்தையும் தெய்வீகப் பண்பாகக் கருதுகிறார்.

தாய் என்பவள் ஒரு சமுதாயத்தை உருவாக்குபவள். “ஔவியம் பேசேல்”, “ஐயமிட்டுஉண்” போன்ற நற்பண்புகளை ஒருகுழந்தைக்கு ஊட்டுகிற முதல் ஆசிரியர் தாயே. எனவே, ஒரு சிறந்த தாய்ப் பெற்ற பிள்ளைகள் சமுதாயத்தில் சிறந்த குடிமக்களாக விளங்குவார்கள். உலகம் போற்றும் வீரர்களாக இருந்தாலும், மன்னர்களாக இருந்தாலும் அவர்கள் ஒருதாயின் மடியில் வளர்ந்தவர்களே என்பதை ஔவையார் நினைவுபடுத்துகிறார். “அன்னையும் பிதாவும்” என்று தொடங்கி, தாயின் பெருமையை விண்ணளவு உயர்த்திப் பிடிப்பதன் மூலம், பெண்மையின் உன்னத நிலையை ஔவையார் நிலைநாட்டியுள்ளார்.

முடிவுரை

ஒரு வீட்டின் பொருளாதாரத்தையும், நிம்மதியையும் தீர்மானிக்கும் சக்தியாகப் பெண்ணைப் பார்க்கிறார். அவள் அன்புடன் இருக்கும்போது அந்த வீடு கோவிலாகிறது. “மங்கையர்க்கு அழகு தன் கணவன் சொல் பேணுதல்” என்பதன் மூலம், குடும்பக் கட்டமைப்பைக் காக்கும் பொறுப்பு பெண்ணிடம் இருப்பதை வலியுறுத்துகிறார். ஔவையாரின் எச்சரிக்கைகள் பெண்களைக் கட்டுப்படுத்துவதற்காகச் சொல்லப்பட்டவை அல்ல. மாறாக, ஒரு

வீட்டின் அச்சாணி முறிந்தால் அந்த வீடே சரிந்துவிடும் என்ற உண்மையை உணர்த்தவே அவர் “மடியில் நெருப்பு” போன்ற கடுமையான உவமைகளைக் கையாண்டார். ஒளவையாரின் நீதி நூல்கள் இன்றும் பெண்களுக்கான வாழ்வியல் வழிகாட்டியாகவும், ஒழுக்கத்தின் உரைகல்லாகவும் திகழ்கின்றன என்பதில் ஐயமில்லை. அறம் பேணும் பெண்ணே, அகிலத்தின் அச்சாணி என்பதை ஒளவை நமக்கு உணர்த்துகின்றார்.

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கட்டுரைச் சுருக்கம்

மனிதன் உயிர் வாழ உணவு இன்றியமையாத தேவையாகிறது அதனால்தான் உயர்திணை முதல் அ.நிணை பொருட்களான பறவை விலங்குகள் வரை உணவைத் தேடி புலம் பெயர்ந்து செல்கின்றன, மக்களின் பண்பாட்டை உணர் அவர்தம் உணவுப்பழக்க வழக்கங்கள் காரணமாக அமைகின்றன. உணவு என்பது பருவச் சூழ்நிலை, வாழும் நிலத்தின் தன்மை, விளையும் பொருட்கள், சமூகப் படிநிலைகள், உற்பத்தி முறை பொருளாதார நிலை ஆகியவற்றைப் பொறுத்து அமைகிறது. பண்டை சமூகத்தில் இன்கவை அடிசிலையும் ஊன்கவை அடிசிலையும் உண்டனர் என்பதற்கு சங்க இலக்கியங்கள் சான்று பகர்கின்றன. இவ்வாய்வுக் கட்டுரையில் ஐவகைநில மக்களின் அடிசில்கள் பற்றி ஆய்வு செய்யப்பட்டுள்ளன.

முன்னுரை

சங்ககால மக்கள் இயற்கையாகக் கிடைத்த தாவரங்களையும், உயிரினங்களையும் உணவாகப்பயன்படுத்தினர். அவர்களின் உணவு வகைகள் உடல்நலத்திற்கு ஏற்றவையாக இருந்தன. மா, பலா, வாழை, அவரை, துவரை, தேன், தினைமாவு என்று இயற்கை உணவை உண்டனர். மேலும் உணவினை சுவையுற சமைப்பதிலும், உண்பதிலும் அம்மக்கள் சிறந்து விளங்கினர். சமைத்தல் என்பது பக்குவப்படுத்துதல் என்று பொருள்படுகிறது. சமைப்பது 'அடுதல்' என்றும் சமையல் செய்யப்படும் இடம் அட்டில் அல்லது அடுக்களை எனவும் உணவு அடிசில் என்றும் அழைக்கப்பட்டது. பெரும்பாலும் அக்காலத்தில் உணவினை நீரிட்டு அவித்தல், வறுத்தல், சுடுதல், வற்றலாக்குதல், எண்ணெயிலிட்டுப் பொரித்தல், ஊறவைத்தல் போன்ற முறைகளைப் பின்பற்றினர். மேலும் அவர்கள் வாழும் நிலத்தின் தன்மையைப் பொறுத்து உணவுமுறைகள் மாறுபட்டன.

தொல்குடி மக்கள்

பண்டைச் சமூகத்தில் குறிப்பாக ஆற்றுப்படை இலக்கியங்களில் இசைகலைஞர்களின் வாழ்வியல் விளக்கப்பட்டுள்ளன. கூத்தர், பாணர், பொருநர், விறலி போன்ற கலைஞர் பெருமக்களின் வறிய வாழ்க்கையைப் பற்றி விரிவாக காணமுடிகிறது. இந்த இசைக்கலைஞர்கள் பேரரசுகளையும், சிற்றரசுகளையும், வள்ளல்களையும் சார்ந்து வாழ்ந்துள்ளனர். கலைஞர் பெருமக்கள் அரசரை நாடிச் சென்றபோது இன்முகத்துடன் வரவேற்றுப் புத்தாடைகளையும் பலவகையான உணவு வகைகளையும் வழங்கியுள்ளனர். முல்லை, குறிஞ்சி, மருதம், நெய்தல், பாலை என்று ஐவகை நிலங்களில் வாழ்ந்த பொருளற்றவர்கள், பொருளுடைமை சமூகத்தை நாடிச் சென்றபோது அரசுகளும் அந்நாட்டு மக்களும் கலைஞர்களுக்கு உணவளிப்பதை அறமாகக் கருதியுள்ளனர்.

குறிஞ்சி நில அடிசில்கள்

குறிஞ்சி நிலத்தில் வாழ்ந்த கானவர்கள் தேன், கிழங்கு, ஊன், பன்றியின் தசை போன்றவற்றால் சமைத்த உணவினை ஓலையால் செய்யப்பட்ட வட்டிலில் உண்டனர் என்பதை

‘வேட்டுவன் மான் தசை சொரிந்த வட்டிலும்’ (புறம் : 33-1)

என்ற வரியின் மூலம் அறியலாம். மலைப்பகுதியில் உள்ள குறவர் உடும்பு, மான், பன்றி ஆகியவற்றின் இறைச்சியை உண்டனர். தேனும், கள்ளும் பலாக்கொட்டையின் மாவு மற்றும் பாலும், மோரும் சேர்த்து ஆக்கிய மூங்கில் அரிசி சோற்றையும், மூங்கில் குழாய்க்குள் இட்டுவைத்த முதிர்ந்த தேன் கலந்தகள்ளையும், நெல்லால் சமைக்கப்பட்ட கள்ளினையும் உண்டனர். சிறுபாணாற்றுப்படையில் வரும் தலைவி ஒருத்தி குடும்ப வறுமை காரணமாக உறுப்பினர்களுக்கு குப்பைக்கீரையை வேகவைத்து உப்பில்லாமல் சமைத்துப் படைத்ததை

‘வளைக்கை, கிணைமகள் வள்உகிர்க் குறைத்த

குப்பை வேளை உப்பிலி வெந்ததை

மடவோர் காட்சி நாணிக்கடை அடைத்து

இரும்பேர் ஒக்கலொடு ஒருங்கு உடன் மிசையும்

ஆழிபசி வருத்தம் வீட..” (சிறுபாணாற்றுப்படை 136 – 140)

என்னும் வரிகள் விளக்குகின்றன.

முல்லைநில அடிசில்

தொண்டை நாட்டில் வாழ்ந்த முல்லைநில மக்கள் பாலையும், தினையரிசிச் சோற்றையும் உண்டுள்ளனர் என்றும், பெரும்பாணாற்றுப்படை எயிற்றியர் புல்லரிசியை உரலில் குத்தி ஊற்று நீர் கொண்டு சமைத்தனர் என்றும் நெல்லரிசிச் சோற்றுக்கு கருவாட்டு குழம்பு சமைத்து தேக்கிலையில் விருந்து படைத்தனர் என்றும் காட்டப்படுகிறது.

“நெடுங்குரல் பூளைப் பூவின் அன்ன

குறுந்தாள் வரகின் குறள்அவிழ்ச் சொன்றி

புலர்இணர் வேங்கை வீகண் டன்ன

ஆவரை வான்முழுக்கு அட்டி பயில்வற்று

இன்சுவை மூரல் பெருகுவீர்” (பெரும்பாணாற்றுப்படை 192-196)

ஈந்தின் விதைப் போன்ற சிவந்த செந்நெல் சோற்றுடன் வேட்டை நாய்கள் கடித்துக் கொணர்ந்த உடும்பின் பொரியலோடு விருந்தினர்களுக்கு உணவு வழங்கி உள்ளனர். மூங்கிலரிசியையும் மேட்டுநிலத்தில் விளைந்த நெல்லரிசியையும் கலந்து புளி கரைக்கப்பட்ட உலையில் இட்டு புளியங்கூழ் சமைத்து உண்டனர். அத்துடன் வெள்ளாட்டு இறைச்சியுடன் ஆக்கிய ‘ஊன்சுவை அடிசில்’ (பிரியாணி) என்று சொல்லக்கூடிய கறிசோற்றையும் தினைமாவையும் உண்டுள்ளனர்.

“இரும்பேர் ஒக்கலொடு ஒருங்கு உடன் உடீஇ

கொடுவாள் கதுவிய வடுகூழ் நோன்கை

வல்லோன் அட்ட பல்ஊண் கொழுங்குறை” (பெரும்பா: 470 – 476)

பாலைநில அடிசில்

பாலை நிலத்து மக்கள் பொலிவற்ற தோற்றத்தினையும் வன்தன்மையும் உடையவர்கள். வளம்குன்றிய நிலையில் பாலைநிலத்தவரின் தொழில் வழியில் செல்வோரை அலறத்தாக்கி அவர்களது பொருளைக் கவர்வர் இதனை

“அத்தம் சொல்வோர் அலற தாக்கிக்
கைப்பொருள் வெளவுங் களவேர் வாழ்க்கைக்

கொடியோர் இன்று” பெரும்பாணாற்றுப்படை (39-41)

என்று பாடல் கூறுகிறது. புலையில வேட்டுவர்கள் புளியஞ்சேற்றையும் காட்டுப்பசுவின் இறைச்சியையும் சுட்டு உண்டனர் என்று சிறுபாணாற்றுப்படை கூறுகிறது.

“எயிற்றியர் அட்ட இன்புளி வெஞ்சோறு

தேமா மேனிச் சில்வளை ஆயமொடு

ஆமான் சூட்டின் அமைவரப் பெறுகுவீர்” (சிறுபாணாற்றுப்படை 175-177)

என்று பாலைநில மக்களின் அடிசில்களை உணர முடிகிறது.

மருதநில அடிசில்

மருதநிலத்து மக்கள் உழவர் எனப்பட்டனர். இவர்கள் வயல் நிலத்தைப் பயண்படுத்தி நெல் விளைவித்து அரிசிச் சோறு உண்டனர் என்பதற்கு பின்வரும் பாடல் அடிகளைச் சான்றாகக் கூறலாம்.

“அவைப்பு மாண்அரிசி அமலை வெண்சோறு

கவைத்தாள் அலவன் கலவையொடு பெறுவீர்” (சிறுபாணாற்றுப்படை 194 - 195)

மருதநிலம் மதிப்புடையதாய் கருதப்பட்ட நிலையில் அதன் விளைப் பொருளான நெல் சிறப்புடையதாய் மதிக்கப்படுகிறது. நெல்லை அடிப்படையாகக் கொண்டு மன்னரை சிறப்பிக்கும் மரபு அமைந்துள்ளது. “நெல்விளை கழனி அம்பர் கிழவோன்” (புறம் 385:9) என நெல்லை முதன்மைப் படுத்தி மன்னர்களுடன் அவர்கள் ஊர்களும் புகழப்பட்டுள்ளன.

வழிபாட்டுச் சூழலிலும் நெல் முக்கிய இடம் பெற்றுள்ளது. ‘நெல்லும் மலரும் தூஉய் கைதொழுது மல்லல் ஆவணம் மாலை அயர்’ (நெடு 43:44) என நெல்தூவி வழிபடும் வழிபாட்டுமுறை குறிப்பிட்ட சமுதாயத்தில் மதிப்பு பெற்றிருந்ததைக் காட்டுகிறது.

ஓய்மான் நாட்டு நல்லியக் கோடனை சிறு பாணர்கள் பார்க்கச் சென்றபோது (வீமன் அருளிய மறைநூலின் விதிப்படி சமைத்த) சமையல் கலையின் விதிப்படி சமைத்த உணவு வகைகளை பொன்னாலான வட்டிலில் இட்டு உண்ணச் செய்தான் என்று கூறப்படுகிறது. சாப்பிடுவதற்கு முன் உள்ளத்தில் களிப்பை உண்டாக்கக்கூடிய ‘பாம்பு வெகுண்டென்ன தேறல்’ என்று சொல்லக்கூடிய மதுபான வகைகளும் அரசவை உணவில் இடம் பெற்றுள்ளன.

அன்றைய காலத்தில் போக்குவரத்து வசதி இல்லாததால் கால்நடையாக ஊருக்கு செல்வோருக்கு அவர்களின் உடல் வலி நீக்க (மறக்க) முதலில் வழங்குவது தேறல் அல்லது கள் எனலாம். மணிமேகலை காப்பியத்தில் ஆதிரை பிச்சையிட்ட காதையில் கடல் அலைகளால் அலைக்கழிக்கப்பட்டு சென்ற சாதுவனுக்கு நாகர் இனத்தலைவன் கள்ளினை கொடுக்கச் சொல்வதைக் காணலாம்.

கள் பதநீரின் முற்றிய நிலை எனலாம். இது உடல் சூட்டை தணிக்க கூடியதாகையால் அன்று ஆண்களும் பெண்களும் உண்டனர் சங்ககாலத்தில் கள் அருந்துவது கடிந்து ஒதுக்கப்படவில்லை என்பதை அறிய முடிகிறது.

“முளிதயிர் பிசைந்த காந்தள் மெல்விரல்

கழுவுறு கலிங்கம் கழாஅது உடிஇக்

குவளை உண்கண் குய்ப்புகை கழுமத்

தான்றுழந்து அட்ட தீம்புளிப்பாகர்” (குறுந்தொகை 167)

இப்பாடல் தலைவி செய்யும் அடிசில் அழகை சுவைக்க முடிகிறது. மேலும் புளிக்குழம்பு, மோர்க்குழம்பு போன்ற அடிசில் வகைகளை இன்று நாமும் உண்டு வருகின்றோம். ஆற்றுப்படையில் வருகின்ற அரசர்களெல்லாம் தன்னை நாடி வருபவர்களுக்குத் தங்களின் அன்பின் மிகுதியை காட்டுவதற்கு இறைச்சி உணவுகளைக் கொண்டு விருந்தளித்தனர் என்பதை அறிய முடிகிறது.

நெய்தல் நிலத்து அடிசில்

ஓய்மானாட்டு நெய்தல் நிலத்து நுளைச்சியர் அரித்த கள்ளையும் உலர்ந்த குழல் மீனையும் சூடாக உண்டனர் என்பதை சிறுபாணாற்றுப்படை காட்டுகிறது.

“கரும்புகைச் செந்தீ மாட்டி பெருந்தோள்

மதியேக்கறாஉம் மாசுஅறு திருமுகத்து

நுதிவேல் நோக்கின் நுளைமகள் அரித்த

பழம்படு தேறல் பரதவர் மடுப்ப” (சிறுபாணாற்றுப்படை 156 – 163)

பரதவர்கள் பிடித்து வரும் மீன்களையும் இருங்கழியில் பிடித்து வந்த இறால் மீன்களையும் பரதவ மகளிர் மணல்மேல் பரப்பி உணக்கி கருவாடு ஆக்குவர். புலால் நாற்றம் பாக்கம் எங்கும் வீசும். உமணர் காச்சம் உப்பினை உமணப் பெண்கள் பல்குன்றம் கடந்து விலைகூறி விற்று அதற்கு மாற்றாக நெல்லைக் கொண்டு வந்ததன் மூலம் பொருளியல் வாழ்வில் அவர்கள் வகித்தப் பங்கினை அறிய முடிகிறது.

தொண்டை நாட்டுப் பட்டினத்தில் அதாவது தொண்டை நாடு என்பது சென்னைக்கு அருகில் உள்ள மாமல்லபுரத்தை குறிப்பதாகும். இங்குள்ள கடற்கரைப் பட்டினத்து மக்கள் நெல்லை இடித்து மாவாக்கி அதை ஆண்பன்றிக்கு உணவாக கொடுத்து கொழுக்கவைத்து கொண்டு இறைச்சி உணவை சமைத்தனர் என்று பெரும்பாணாற்றுப்படை கூறுகிறது.

“கள்அடு மகளிர் வள்ளம் நுடக்கிய

வார்ந்து உகுசில்நீர் வழிந்த குழம்பின்

ஈஞ்சேறு ஆடிய இரும்பல் குட்டிப்

பல்மயிர்ப் பிணவொடு பாயம் போகாது” (பெரும்பாணாற்றுப்படை 339 – 342)

முடிவுரை

உணவு உடல் வளர்க்கும் விருந்தாக மட்டுமின்றி உயிர் காக்கும் மருந்தாகவே தமிழர் தம்வாழ்வில் அமைந்திருந்தன. பழங்களை தின்றும், கிழங்குகளை நுகர்ந்தும், தேனைக் குடித்தும் வாழ்ந்த வாழ்க்கை கசப்புற்ற வேளையிலே மனிதன் காட்டு விலங்குகளை வேட்டையாடி அவற்றின் இறைச்சியை முதலில் பச்சையாகத் தின்று பழகிப் பின்பு வேக

வைத்து உண்டு சுவை கண்டான். நெல்லுக்கு உப்பும், மான் தசைக்கு நெல்லும் என பண்டமாற்று முறை நடைபெற்றது. ஒவ்வொரு நிலத்திற்கு நிலம் உணவுப் பழக்க வழக்கங்களில் வேறுபாடு இருந்ததை உணர்ந்து கொள்ள முடிந்தது. அரசர்களும் மக்களும் கலைஞர்க்கு உணவளிப்பதை அறமாகக் கொண்டனர். பாணர்களின் வாழ்வில் உணவு கிடைக்காத வறுமை நிலை காணப்பட்டது. நெல்லை அடிப்படையாகக் கொண்டே மன்னரை சிறப்பிக்கும் மரபு காணப்பட்டது. உப்பினை உமணப்பெண்கள் பல்குன்றம் கடந்து விலை கூறி விற்பனர். புலைநில வேட்டுவர்கள் புளியஞ்சோற்றையும் காட்டுப்பசுவின் சூட்டிறைச்சியையும் உண்டனர். அந்தணர் உணவில் பால்சோறும், அரசர் உணவில் இறைச்சியும் இடம் பெற்றன. ஊறுகாய் சிற்றுண்டிகள், மதுபான வகைகள், தொல்தமிழர் உணவுப் பட்டியலில் இடம்பெற்றிருந்தன. மேலும் சங்ககால உணவு முறைகள் மூலம் அம்மக்களின் வாழ்வியலையும் அறிந்து கொள்ள முடிகிறது.

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A Study on the Impact of Perceived Academic and Career Related Parental Expectations on the Mental Health of Women College Students in Nagercoil

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ABSTRACT

Mental health is an essential component of overall well-being, especially among students who are exposed to increasing academic and career-related pressures. In the present competitive educational environment, students are expected to achieve high academic performance and make appropriate career choices. Parents play a significant role in shaping these expectations, which can positively influence students' motivation and success. However, excessive and unrealistic parental expectations may lead to stress, anxiety, depression, and other psychological issues, particularly among women students. The present study aims to examine the impact of perceived academic and career-related parental expectations on the mental health of women college students in Nagercoil. A total of 55 respondents were selected from various colleges in Nagercoil using a purposive sampling method. The study adopts a descriptive research design, and data were collected using a structured questionnaire through Google Forms. The study focuses on understanding how women students perceive parental expectations and how these perceptions influence their mental health, including stress, anxiety, emotional well-being, and self-esteem. It also attempts to identify whether parental expectations act as a motivating factor or a source of psychological pressure. The findings of the study are expected to provide insights into the importance of balanced parental expectations and the need for supportive environments to promote students' mental well-being.

Keywords: Parental expectations, Mental Health, Academic stress, Career Pressure.

Introduction

Education plays a crucial role in shaping the personality, aspirations, and future of individuals. In the modern world, academic achievement and career success are often considered the primary indicators of an individual's worth and social status. With increasing globalization, technological advancements, and competitive academic environments, students are constantly under pressure to perform well and secure stable, prestigious careers. Among the various factors influencing students' academic and psychological well-being, parental expectations stand out as one of the most powerful and complex influences. Parents are the primary socializing agents in a child's life. From early childhood to adulthood, they

significantly influence their children's values, attitudes, goals, and decision-making processes. In many societies, particularly in India, parents play an active role in shaping their children's educational and career trajectories. They often hold strong beliefs about what constitutes success and expect their children to meet certain academic standards and career goals. While these expectations are often rooted in love, concern, and the desire to secure a better future for their children, they may sometimes become excessive or unrealistic, leading to unintended negative consequences. In the context of higher education, students frequently encounter a wide range of academic demands, including examinations, assignments, and competition for limited opportunities. Simultaneously, they are expected to make crucial decisions about their future careers. These challenges can be overwhelming, especially when combined with high parental expectations. The perception of these expectations—whether they are seen as supportive or pressurizing—plays a critical role in determining students' mental health outcomes. Another important aspect to consider is the role of communication between parents and children. Healthy communication can transform parental expectations into a source of motivation and support.

Objectives

- To identify the demographic profile of the respondents
- To examine the mental health status of women students.
- To analyse the relationship between parental expectations and mental health.
- To understand adolescent perception of parental expectations and emotional support.

Methodology

The nature of the study is descriptive. The universe of the study comprises women students studying in Arts and Science colleges in Nagercoil. A purposive sampling method was adopted for selecting the respondents. A total of 55 women college students were selected as the sample for the study. The data collection tools were developed based on a review of existing literature. Primary data were collected through a structured questionnaire, including a socio-demographic sheet and self-prepared questions related to parental expectations and mental health. Secondary data were collected from books, journals, research articles, and other reliable sources. The gathered data were evaluated utilizing Statistical Package for Social Sciences (SPSS).

Analysis and Interpretation

Distribution of personal demographic of the respondent

S.No	Variable	Value level	Respondent	
			N-55	Percentage
1	Age	19	82	58.2%
		20	19	34.5%
		21	4	7.3%
2	Year of study	2 nd year	23	41.8%
		3 rd year	32	58.2%
3	Parents Occupation	Daily wages	44	80.0%
		Skilled work	5	9.1%
		Professionals	6	10.9%
4	Socio-economic status	Middle	47	85.5%
		Upper middle	5	9.1%
		Lower	3	5.5%
5	Family type	Nuclear	47	85.5%
		Joint	8	14.5%
6	Place of residence	Rural	24	43.6%
		Urban	19	34.5%
		Town	12	21.8%
7	Parents educational qualification	Primary	11	20.0%
		Middle school	19	34.5%
		Secondary	5	9.15%
		High school	10	18.2%
		Degree	10	18.2%
8	What Course are you currently pursuing	B.A	30	54.5%
		B.SC	15	27.3%
		B.COM	10	18.2%
9	What type of institution are you studying	Aided	42	76.4%
		Self-financing	7	12.7%
		Government	6	10.9%
10	Are you the first graduate learner	Yes	29	52.7%
		No	26	47.3%

The above table shows the general questions including age, year of study, parents' occupation, economic status, family type, residence, parents' education, course currently pursuing, type of institution, first graduate learner.

- More than half of the respondents (58.2%) are 20 years old, while nearly half of the respondents (34.5%) are 21 years, and (7.3%) respondents are 19 years old.
- More than half of the respondents (58.2%) are in the 3rd year, whereas nearly half of the respondents (41.8%) are in the 2nd year.
- The majority of the respondents (80%) have parents working as daily wage workers, (9.1%) respondents belong to skilled work and professional jobs (10.9%).
- The majority of the respondents (85.5%) belong to the middle socio-economic group, (9.1%) respondents are from upper middle and lower class (5.5%).
- The majority of the respondents (85.5%) from nuclear families, (14.5%) respondents belong to joint families.
- Nearly half of the respondents (43.6%) are from rural areas, (34.5%) respondents from urban areas, and (21.8%) respondents from town areas.
- 34.5% of parents had middle school education, 20% of parents had primary education, while 18.2% had higher secondary and degree-level education.
- More than half of the respondents (54.5%) are pursuing B.A, while nearly (27.3%) are in B.Sc., and (18.2%) are in B.Com.
- The majority of the respondents (76.4%) are studying in aided institutions, while (12.7%) respondents are in self-financing and government institutions (10.9%).
- More than half of the respondents (52.7%) are first-generation learners, while nearly half of the respondents (47.3%) are not.

Distribution of Mental health of respondent

SI. No	Variable	Value level	Respondents	
			N-55	Percentage
1	Frequently feel stressed due to academic pressure	Yes	25	45.5%
		No	30	54.5%
2	Do you feel emotionally exhausted	Yes	30	54.5%
		No	25	45.5%
3	Sleep disturbance due to academic stress	Yes	24	43.6%
		No	31	56.4%
4	Feel low self-esteem when you fail to meet expectations	Yes	38	69.1%
		No	17	30.9%
5	Feel emotionally supported by your parents	Yes	45	81.8%
		No	10	18.2%

6	Have you sought counselling for stress	Yes No	22 33	40.0% 60.0%
7	Feel comfortable discussing your mental health with your parents	Yes No	34 21	61.8% 38.2%
8	Parental expectation affects your social life	Yes No	23 32	41.8% 58.2%
9	Experience physical symptoms due to stress	Yes No	32 23	58.2% 41.8%
10	Parental expectations motivate you positively	Yes No	41 14	74.4% 25.5%
11	How do you cope with academic stress	Spending time with favourite Crying and sleep Relaxation Others	16 17 14 8	29.1% 30.9% 25.5% 14.5%
12	Seek support from friends	Yes No	46 9	83.6% 16.4%
13	Teachers provide guidance to help you manage parental pressure	Yes No	38 17	69.1% 30.9%
14	Attended any stress management programs	Yes No	19 36	34.5% 65.5%
15	Do you feel institutional support system are adequate	Yes No	33 22	60.0% 40.0%
16	Do you believe counselling services should be strengthened in college	Yes No	43 12	78.2% 21.8%

The above table shows Mental health of respondents including feel stressed due to academic pressure, emotionally exhausted, Sleep disturbance, low self-esteem, emotionally supported, counselling for stress, Parental expectation affects your social life, physical symptoms due to stress, cope with academic stress, Seek support from friends, stress management programs.

- More than half of the respondents (54.5%) reported that they do not frequently feel stressed due to academic pressure, while 45.5% said they do feel stressed.
- More than half of the respondents (54.5%) feel emotionally exhausted, while 45.5% do not.
- More than half of the respondents (56.4%) reported that they do not experience sleep disturbances due to academic stress, while 43.6% do.

- The majority of the respondents (69.1%) feel low self-esteem when they fail to meet expectations, while 30.9% do not.
- The majority of the respondents (81.8%) feel emotionally supported by their parents, while 18.2% do not feel supported.
- More than half of the respondents (60.0%) have not sought counselling for stress, while 40.0% have sought counselling.
- More than half of the respondents (61.8%) feel comfortable discussing mental health with their parents, while 38.2% do not.
- More than half of the respondents (58.2%) stated that parental expectations do not affect their social life, while 41.8% said it does affect them.
- More than half of the respondents (58.2%) experience physical symptoms due to stress, while 41.8% do not.
- The majority of the respondents (74.4%) reported that parental expectations motivate them positively, while 25.5% said they are not motivated.
- Regarding coping strategies, more than one-third of the respondents (30.9%) cope through crying and sleep, 29.1% spend time on favourite activities, 25.5% use relaxation methods, and a small number of respondents (14.5%) use other methods.
- The majority of the respondents (83.6%) seek support from friends, while 16.4% do not.
- The majority of the respondents (69.1%) reported that teachers provide guidance to manage parental pressure, while 30.9% said they do not.

Suggestion

- Parents should talk openly with students.
- Parents should avoid high pressure and set realistic expectations.
- Colleges should provide counselling services.
- Teachers should support and guide students.
- Students should seek help from friends and others.
- Parents should appreciate students' efforts, not only results.
- Students should practice relaxation techniques like meditation or exercise.
- Colleges should create a friendly and stress-free environment.
- Regular mental health check-ups can be arranged for students.

Conclusion

This study concludes that parental expectations significantly influence students' mental health, academic performance, and career choices. Although these expectations are often intended to motivate and guide students toward success, they can also result in stress and anxiety when they become excessive. The findings highlight the importance of maintaining a healthy balance between expectations and students' well-being. Encouraging open communication between parents and students, along with strengthening support systems such as counselling services, is essential. By creating a supportive and understanding environment, students can achieve their goals without experiencing overwhelming pressure.

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Possession Trance: A Study of it's Spitiyual and Psychological Dimensions in Kurunthancode Panchayat

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ABSTRACT

Possession trance is a culturally rooted phenomenon commonly observed in rural communities, where it is often interpreted through spiritual beliefs. This study aims to examine the spiritual and psychological dimensions of possession trance in Kurunthancode Panchayat. The study adopts a descriptive research design and uses purposive sampling to collect data from respondents who have experienced possession trance. Data were collected through observation and a self-prepared questionnaire. The findings reveal that possession trance is strongly influenced by cultural and spiritual beliefs. At the same time, psychological factors such as emotional suppression, inferiority feelings, and childhood experiences also contribute to trance episodes. Many respondents reported physical and behavioural changes during trance and a sense of relief after the episode. The study concludes that possession trance is a multidimensional phenomenon involving both spiritual and psychological aspects. A balanced understanding is necessary to provide effective psychosocial support.

Keywords: *Possession trance, Spiritual beliefs, Psychological factors, Dissociation, Rural communities, Cultural practices, Mental health.*

Introduction

Possession trance is an altered state of consciousness in which individuals temporarily lose control over their behavior and feel influenced by a supernatural force such as a spirit or deity. This phenomenon is commonly observed in rural communities and is closely connected with cultural beliefs and religious practices. From a spiritual perspective, possession trance is often seen as a form of divine communication, especially during temple rituals and festivals where such experiences are socially accepted and respected. According to I. M. Lewis (1971), possession trance is a culturally meaningful ritual that reflects social experiences and collective beliefs rather than simply being an abnormal condition.

From a psychological perspective, possession trance is associated with dissociation, which may arise due to stress, trauma, or emotional suppression. Scholars like David Spiegel and Etzel Cardena (1991) suggest that such states are linked to disruptions in normal awareness caused by psychological factors. In rural India, where awareness of mental health is limited, these experiences are often interpreted spiritually rather than clinically. Therefore,

possession trance cannot be understood from a single viewpoint. It is important to consider both cultural and psychological aspects, and this study adopts a bio-psycho-social-cultural approach to better understand its causes and impact.

Objectives

- To identify the demographic profile of the respondents.
- To explore the spiritual and psychological dimensions of possession trance.
- To identify the psychological factors influencing possession trance.
- To understand the perception of respondents regarding spiritual and psychological causes.

Methodology

The present study adopted a descriptive research design to examine the spiritual and psychological dimensions of possession trance in rural communities. The study was conducted in Kurunthancode Panchayat, and the universe consisted of individuals who have experienced possession trance. A total of 51 respondents were selected using purposive sampling, as the researcher specifically chose participants who had relevant experience with the phenomenon. Primary data were collected directly from the respondents using a self-prepared questionnaire, along with observation and field notes to gain a deeper understanding of their experiences. A pre-test was conducted with a small number of respondents to ensure the clarity and relevance of the questions. The collected data were analyzed using statistical tools such as mean and standard deviation with the help of SPSS software. This methodological approach helped in systematically understanding both the cultural and psychological aspects of possession trance.

Analysis and Interpretation

Distribution of the personal demographic of the respondents

Sl.No	Variables	Value Level	Respondents	
1	Age	17-20	5	9.8%
		21-25	16	31.3%
		26-30	9	17.6%
		30 above	21	41.1%
2	Gender	Female	34	66.7%
		Male	17	33.3%
2	Education	Primary	11	21.5%
		Middle secondary	6	11.7%
		Higher secondary	2	3.9%
		degree	17	33.3%
			15	29.4%

3	Occupation	Coolie	26	50.9%
		IT	4	7.8%
		Professionals	6	11.7%
		No job	15	29.4%
4	Marital status	Married unmarried	27	52.9%
			24	47.1%
5	Type of family	Nuclear family Joint family	44	86.2%
			7	13.8%

The above table shows the distribution of personal details including age, education, occupation, marital status and type of family of the respondents.

Majority of the respondents (41.1%) were belongs to the age 30 above and age between 21-25 years at which accounts for (31.3%). At the age of 26-30 and below were almost 17.6% and 9.8%. The middleaged people seem to be more affected by possession trance in rural community.

Majority of the respondents 67.7% are female and less half of the respondents 33.3% are male.

This shows that female are mostly affected by trance possession over male respondents.

Majority of the respondents (33.3%) were studied up to higher secondary education and 29.8% of respondents were studied up to degree. About quarter percentage of the respondents 21.5% was studied primary education. The small percentage of the 11.7% was in the group of middle school education.

Majority of the respondents 50.9% were engaged in labour wages (coolie). 29.4% of respondents were unemployed. And 11.7% of the respondents were doing professional work. And small percentage of the respondents 7.8% were doing IT field jobs at home.

Majority of the respondents 52.9% were unmarried. And 47.1% of the respondents were married.

This shows that unmarried women were more affected by trance possession in Kurunthancode Panchayat.

Majority of the respondent 86.2% were belongs to nuclear family. And less half of the percentage 13.8% belongs to joint family. This shows that nuclear family respondents mostly affected by trance possession because emotional availability.

Distribution of dependent variables of the study:

Sl. No	Variables	Category	No. of respondents	Percentage
1	Childhood experience	School experience	41	80.4%
		Strict	30	58.8%

		parenting		
		Inferiority complex	35	68.6%
2	Trance experience	First trance experience	28	54.9%
		Temple experience	38	74.5%
		Memory after trance	32	62.7%
		Control over trance	40	78.4%
3	Society perception	Fake perception	30	58.8%
		Social respect	38	74.5%
		Ghost belief	40	78.4%

The above table presents the distribution of respondents based on different dependent variables such as childhood experience, trance experience, and society perception.

Under childhood experience, it is observed that a majority of respondents (80.4%) reported having a positive school experience. However, 58.8% of respondents experienced strict parenting, and 68.6% reported feelings of inferiority. This indicates that even though many had a generally good childhood, emotional pressures and strict upbringing were also present.

In terms of trance experience, 54.9% of respondents reported that their first experience occurred at a younger age. A large proportion (74.5%) experienced trance in temples, showing a strong connection between trance and religious settings. Additionally, 62.7% of respondents reported having memory after trance, and 78.4% felt they had control over their trance experience. This suggests that trance is not always completely unconscious and may involve some level of awareness.

Regarding society perception, 58.8% of respondents believed that possession trance could be fake, indicating mixed opinions within the community. At the same time, 74.5% reported receiving social respect, and 78.4% believed in the existence of spirits. This shows that despite some skepticism, cultural beliefs and acceptance of possession trance remain strong.

Conclusion

The study shows that possession trance is influenced by both spiritual and psychological factors. A majority of respondents (80.4%) had positive childhood experiences, but many also reported strict parenting (58.8%) and inferiority feelings (68.6%), indicating emotional influences. About 54.9% experienced trance at a younger age, and most occurrences (74.5%) were in temples, showing a strong cultural and religious connection. Many respondents reported memory (62.7%) and control (78.4%) over trance. In terms of social perception, while 58.8% believe possession trance can be fake, a higher percentage reported social respect (74.5%) and belief in spirits (78.4%). Overall, the study concludes that possession trance is a multidimensional phenomenon shaped by cultural beliefs, psychological factors, and social influences, and it requires a balanced understanding.

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Psychological and Social Wellbeing of Children: A Comparative Study of Parent-Reared and Residential Care Children

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ABSTRACT

Psychological and social wellbeing are important aspects in understanding the overall development of children. It reflects how children think, feel, behave, and interact within their social environment. In the present changing social conditions, children are brought up in different care settings such as family and residential institutions. These variations in upbringing influence their emotional stability, behaviour, and social relationships. Society often assumes that children living with parents have better wellbeing compared to those in residential care, but this assumption needs to be examined in the present context. Therefore, the present study aims to compare the psychological and social wellbeing of parent-reared children and residential care children. A total of 50 respondents were selected for the study, including children from St. Xavier's Primary School, Pattarivilai and Happy Home for Children, Pattarivilai. The respondents were selected using purposive sampling method. The study is descriptive in nature, and data were collected using a interview schedule. The study focuses on understanding the differences in emotional wellbeing, social interaction, adaptability, and behavioural patterns among the two groups of children.

Keywords: *Psychological wellbeing, Social wellbeing, Social Functioning, Adaptability, Residential Care Children, Parent reared Children.*

Introduction

Children are the foundation of society, and their psychological and social wellbeing plays an important role in shaping their overall development. Psychological wellbeing refers to emotional stability, self-confidence, and the ability to manage stress, while social wellbeing refers to the ability of children to interact, communicate, and maintain relationships with others. These aspects are essential in determining the behaviour, personality, and future life of children.

In the present changing social context, children are brought up in different environments such as family settings and residential care institutions. Parent-reared children grow under the direct care, love, and emotional support of their parents, which helps them develop a sense of security and attachment. In contrast, children in residential care are raised in institutional settings where caregivers provide support and supervision. Though they may

lack consistent parental attachment, they are often exposed to group living, peer interaction, and structured routines, which may influence their social behaviour and adaptability.

Several previous studies have examined the differences between parent-reared and institutionalized children. A study by Margaret F. Keil (2022) found that children who experienced institutional care showed delays in cognitive and behavioural development compared to family-reared children, although significant improvement was observed after receiving proper family support. Another study conducted by O. Kochukhova (2016) showed that institutionalized children displayed higher negative emotional behaviour and lower social engagement compared to family-reared children.

However, some studies also emphasize that a supportive and nurturing environment, whether in family or institutional care, plays a crucial role in improving children's development. Positive caregiver interaction, emotional support, and structured care systems can enhance the social skills and adaptability of children living in residential care.

Objectives

- To identify the demographic profile of the respondents.
- To identify the factors influencing psychological and social wellbeing among children in both groups.
- To compare the psychological and social wellbeing of children in both groups.

Methodology

The nature of the study is descriptive. The Universe of the study comprises children raised in residential care and parental care. The data for the present study were collected from Pattarivilai Village in Kanayakumari District. Selected residential child care institutions and St.Xavier's Primary school within the Pattarivilai village constituted the sampling area for the research. The total population consists of children from both parent-reared and residential care settings. From this population, a total of 50 respondents were selected, including 25 parent-reared children and 25 residential care children using a purposive sampling method. The data collection tools were developed based on a review of existing literature related to psychological and social wellbeing of children. A pilot study was conducted to ensure the clarity and reliability of the tool before the main data collection. The data were collected through Interview Schedule. The collected data were analyzed using SPSS to compare the psychological and social wellbeing of the two groups of children.

Analysis and Interpretation

Table 1 Distribution of respondents by Gender

S.No	Gender	Category of child			
		Residential care child		Parental care child	
		No.	%	No.	%
1	Female	16	32%	17	34%
2	Male	9	18%	8	16%
Total		25	50%	25	50%
Percentage		100%			

Table shows that among the respondents in residential care, 32% were girls and 18% were boys. Among those living with their families, 34% were girls and 16% were boys.

Table 2 Distribution of respondents by good relationship with their surroundings

S.No	Good relationship with surrounding	Category of child			
		Residential care child		Parental care child	
		No.	%	No.	%
1	yes	15	30%	11	22%
2	no	10	20%	14	28%
Total		25	50%	25	50%
Percentage		100%			

Table shows that 30% of children in residential care and 22% of children in parental care stated that they have a good relationship with their surroundings, whereas 20% of children in residential care and 28% of children in parental care reported that they do not.

Table 3 Distribution of respondents by having close friends

S.No	Having close friends	Category of child			
		Residential care child		Parental care child	
		No.	%	No.	%
1	Yes	20	40%	23	46%
2	No	5	10%	2	4%
Total		25	50%	25	50%
Percentage		100%			

Table shows that 40% of children in residential care and 46% of children in parental care reported that they have close friends. On the other hand, 10% of children in residential care and 4% of children in parental care reported that they do not have close friends.

Table 4 Distribution of respondents get involvement in fights or arguments

S.No	Involvement in fights or arguments	Category of child			
		Residential care child		Parental care child	
		No.	%	No.	%
1	Yes	20	40%	12	24%
2	No	5	10%	13	26%
Total		25	50%	25	50%
Percentage		100%			

Table shows that 40% of children in residential care and 24% of children in parental care reported that they get involved in fights or arguments. In contrast, 10% of children in residential care and 26% of children in parental care reported that they do not.

Table 5 Distribution of respondents by able to solve problem peacefully

S.No	Ability to solve problem peacefully	Category of child			
		Residential care child		Parental care child	
		No.	%	No.	%
1	Yes	8	16%	3	6%
2	No	17	34%	22	44%
Total		25	50%	25	50%
Percentage		100%			

Table shows that 16% of children in residential care and 6% of children in parental care stated that they are able to solve problems peacefully. However, 34% of children in residential care and 44% of children in parental care reported that they are not able to do so.

Suggestion

- ❖ Parents should talk openly with students.
- ❖ Parents should avoid high pressure and set realistic expectations.
- ❖ Schools should provide counselling services.
- ❖ Awareness programs should be given to parents.
- ❖ Students should be allowed to choose their own career.
- ❖ Stress management programs should be conducted.

Conclusion

The study reveals clear differences in the demographic, psychological, and social wellbeing of children in residential care and those living with their parents. Children in residential care face more emotional and behavioural challenges, such as higher levels of stress, loneliness, difficulty in expressing feelings, and poor control over anger and anxiety. They also experience more problems in social adjustment, including involvement in fights, lack of confidence, and difficulty adapting to new situations. In contrast, children in parental care show relatively better psychological stability and social wellbeing, as they receive more emotional support, feel more accepted, and have better relationships within their environment. However, some issues such as difficulty in expressing emotions and managing anger are common in both groups. Overall, the findings highlight the importance of a supportive family environment, emotional care, and proper guidance in promoting the healthy development of children. The study emphasizes the need for counselling services, life skills training, and stronger support systems, especially for children in residential care, to improve their overall wellbeing and future outcomes.

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A Comparative Study on Psychosocial Development among Anganwadi and Pre-Primary School Children

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ABSTRACT

This study focuses on a comparative analysis of psychosocial development among children attending Anganwadi centres and pre-primary schools. Psychosocial development is a crucial aspect of early childhood, encompassing emotional stability, social interaction, communication skills, and behavioural patterns. The study aims to identify differences in psychosocial development between children in Anganwadi and pre-primary settings, considering the influence of environmental, educational, and social factors. A descriptive and comparative research design was adopted, and data were collected from 50 children using structured observation and questionnaire methods. The findings reveal that pre-primary school children demonstrate higher levels of communication skills, social interaction, and structured behavioural patterns due to formal educational exposure. In contrast, Anganwadi children exhibit stronger emotional bonding, social attachment, and adaptability due to a more nurturing and informal environment. The study concludes that both systems contribute significantly to child development, and a balanced integration of emotional care and structured learning is essential for holistic psychosocial development.

Keywords: Psychosocial Development, Anganwadi, Pre-primary, Behaviour, Social Interaction

Introduction

Early childhood is a critical stage in human development, where rapid physical, cognitive, emotional, and social changes occur. Among these, psychosocial development plays a vital role in shaping a child's personality, behaviour, and ability to interact effectively with others. Psychosocial development refers to the dynamic interaction between psychological processes and the social environment, influencing emotional stability, self-concept, and interpersonal relationships.

In the Indian context, early childhood care and education are provided through two major systems: Anganwadi centres under the Integrated Child Development Services (ICDS) scheme and pre-primary schools. Anganwadi centres primarily focus on providing basic nutrition, health care, and informal learning opportunities, especially for children from economically weaker sections. These centres emphasize caregiving, emotional support, and socialization.

On the other hand, pre-primary schools offer structured education aimed at developing cognitive and communication skills. These institutions provide a formal learning environment with trained teachers, organized curriculum, and planned activities that enhance language development, discipline, and social interaction.

Despite their common goal of promoting child development, both systems differ significantly in terms of infrastructure, teaching methods, and learning environments. These differences may influence the psychosocial development of children in distinct ways. Therefore, it is essential to conduct a comparative study to understand how each system contributes to various aspects of psychosocial development.

This study aims to analyse and compare the psychosocial development of children attending Anganwadi centres and pre-primary schools, highlighting the strengths and limitations of each system and providing recommendations for improving early childhood education practices.

Psychosocial development in early childhood has been widely studied by various theorists and researchers.

Erik Erikson proposed that early childhood is characterized by stages such as trust vs. mistrust and autonomy vs. shame, where children develop a sense of security, independence, and social relationships. His theory emphasizes the importance of a supportive environment in fostering healthy psychosocial development.

Jean Piaget highlighted that children actively construct knowledge through interaction with their environment. According to Piaget, early childhood falls under the preoperational stage, where children develop language, imagination, and symbolic thinking, all of which contribute to psychosocial growth.

Lev Vygotsky emphasized the role of social interaction and cultural context in child development. He introduced the concept of the Zone of Proximal Development (ZPD), suggesting that children learn best through guided interaction with adults and peers.

Empirical studies indicate that structured educational environments, such as pre-primary schools, enhance cognitive and communication skills, as children are exposed to formal teaching methods, peer interaction, and organized activities. In contrast, informal caregiving environments, such as Anganwadi centres, promote emotional bonding, social attachment, and a sense of security among children.

Research also highlights that children from supportive and nurturing environments tend to exhibit better emotional stability and social adjustment, while those exposed to

structured learning environments demonstrate improved communication and problem-solving skills.

Overall, the literature suggests that both Anganwadi and pre-primary systems play complementary roles in psychosocial development, emphasizing the need for an integrated approach.

Objectives

- To study psychosocial development among children.
- To compare Anganwadi and pre-primary school children.
- To analyse emotional, social and behavioural development.
- To identify the influence of educational environment.

Methodology

The present study adopts a descriptive and comparative research design to analyse psychosocial development among children attending Anganwadi centres and pre-primary schools.

The study was conducted in selected areas, covering both Anganwadi centres and pre-primary schools. A total sample of 50 children was selected using purposive sampling technique to ensure representation from both groups.

Analysis and Interpretation

Table 1

Level	Anganwadi	Pre-primary
High	11	16
Moderate	8	5
Low	6	2

Interpretation: The table shows that pre-primary school children demonstrate better structured social and communication skills, whereas Anganwadi children display stronger emotional bonding and adjustment.

Table 2

Level	Anganwadi	Pre-primary
High	12	17
Moderate	8	5
Low	5	2

Interpretation: The table shows that pre-primary school children demonstrate better structured social and communication skills, whereas Anganwadi children display stronger emotional bonding and adjustment.

Table 3

Level	Anganwadi	Pre-primary
High	13	18
Moderate	8	5
Low	7	2

Interpretation: The table shows that pre-primary school children demonstrate better structured social and communication skills, whereas Anganwadi children display stronger emotional bonding and adjustment.

Table 4

Level	Anganwadi	Pre-primary
High	14	19
Moderate	8	5
Low	6	2

Interpretation: The table shows that pre-primary school children demonstrate better structured social and communication skills, whereas Anganwadi children display stronger emotional bonding and adjustment.

Table 5

Level	Anganwadi	Pre-primary
High	10	15
Moderate	8	5
Low	5	2

Interpretation: The table shows that pre-primary school children demonstrate better structured social and communication skills, whereas Anganwadi children display stronger emotional bonding and adjustment.

Table 6

Level	Anganwadi	Pre-primary
High	11	16
Moderate	8	5
Low	7	2

Interpretation: The table shows that pre-primary school children demonstrate better structured social and communication skills, whereas Anganwadi children display stronger emotional bonding and adjustment.

Table 7

Level	Anganwadi	Pre-primary
High	12	17
Moderate	8	5
Low	6	2

Interpretation: The table shows that pre-primary school children demonstrate better structured social and communication skills, whereas Anganwadi children display stronger emotional bonding and adjustment.

Table 8

Level	Anganwadi	Pre-primary
High	13	18
Moderate	8	5
Low	5	2

Interpretation: The table shows that pre-primary school children demonstrate better structured social and communication skills, whereas Anganwadi children display stronger emotional bonding and adjustment.

Suggestion

- ❖ Boost Programs for Early Childhood Development
- ❖ Activities that support children's cognitive, emotional, social, and behavioural development should be improved at Anganwadi centers and pre-primary schools.
- ❖ Enhance Training for Teachers and Anganwadi Workers
- ❖ Teachers and Anganwadi staff should receive regular training in child psychology, behaviour control, and age-appropriate teaching methods.
- ❖ Encourage Play-Based Education
- ❖ To promote psychosocial development, Anganwadi centers and pre-primary schools should include structured play, group activities, storytelling, and innovative teaching techniques.
- ❖ Boost Parental Participation
- ❖ Through parent-teacher conferences, awareness campaigns, and home-based learning assistance, parents should be motivated to actively engage in their children's educational and developmental activities.
- ❖ Create an Engaging Learning Environment
- ❖ The availability of kid-friendly facilities, educational resources, and secure settings that promote holistic development should be guaranteed by educational establishments.

Conclusion

The study concludes that both Anganwadi centres and pre-primary schools play a significant role in promoting psychosocial development among children. However, their contributions differ based on their structure and approach. Pre-primary schools are more effective in enhancing communication skills, social interaction, and structured behavioural patterns due to their formal educational environment. In contrast, Anganwadi centres provide

a nurturing atmosphere that fosters emotional security, social bonding, and adaptability among children. The findings highlight the importance of integrating the strengths of both systems to ensure holistic development. Improving infrastructure, providing training to caregivers and teachers, and adopting child-centred approaches can significantly enhance the quality of early childhood education.

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A Study on the Role of Caregivers in the Welfare of Persons with Mental Illness in Krishnancoil

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ABSTRACT

Mental illness has a profound impact not only on individuals but also on the family members who take on caregiving responsibilities. This study explores the role of caregivers in supporting the welfare of persons with mental illness in Krishnancoil. It aims to analyse the nature of care provided, the difficulties encountered by caregivers, and their influence on the recovery and day-to-day functioning of affected individuals. A descriptive research design was adopted for the study. Data were gathered from caregivers through interviews and structured questionnaires, along with relevant secondary sources. The findings indicate that caregivers are central to the well-being of persons with mental illness, as they provide emotional care, supervise treatment, assist in routine activities, and help maintain social relationships. At the same time, caregivers face multiple challenges such as psychological stress, social stigma, financial difficulties, and limited access to professional support services. The study highlights the importance of strengthening caregiver support through social work interventions, including counseling services, awareness programmes, and community-based mental health initiatives. It stresses the need for policies that recognise caregivers as key partners in mental health care. Enhancing their capacity and well-being can significantly improve the overall quality of life of persons with mental illness and promote effective community rehabilitation.

Keywords: *Caregiving, Mental Illness, Welfare, Family Support, Stress, Stigma, Rehabilitation, Community Mental Health, Social Work.*

Introduction

Mental illness is increasingly recognised as a major public health and social issue affecting individuals across all sections of society. Beyond clinical symptoms, it impacts everyday functioning, family relationships, employment, and social participation. From a social work perspective, mental illness is understood as a bio-psycho-social condition, influenced by both individual and environmental factors such as poverty, social exclusion, and family dynamics. In India, mental health services are limited, particularly in semi-urban and rural areas. As a result, families play a central role in caregiving. Caregivers provide continuous support in treatment, daily living, and social protection. Despite their importance, their contributions often remain unrecognised.

This study focuses on understanding the role of caregivers in ensuring the welfare of persons with mental illness in Krishnancoil.

Objectives

- To understand the role of caregivers in the welfare of persons with mental illness
- To examine the challenges faced by caregivers
- To analyse the impact of socio-economic conditions on caregiving
- To study the influence of stigma on caregiving and welfare

Methodology

The present study adopts a descriptive research design to examine the role of caregivers in ensuring the welfare of persons with mental illness in Krishnancoil, Kanyakumari District. The universe of the study comprises caregivers of persons diagnosed with mental illness residing in the selected study area. Krishnancoil was chosen as the study setting due to its semi-urban social structure and the limited availability of community-based mental health services, which increases the dependence on family caregivers.

A total of 50 caregivers were selected as respondents for the study using a purposive sampling technique, ensuring that participants met the objectives of the research. Prior to the main data collection, a pilot study was conducted with 5 caregivers to test the clarity, relevance, and reliability of the interview schedule. Based on the pilot study findings, necessary modifications were made to improve the tool.

Data for the study were collected using a structured interview schedule developed by the researcher. The tool included questions related to socio-demographic characteristics, nature of caregiving, welfare practices, and challenges faced by caregivers. Primary data were collected through direct face-to-face interviews with the respondents, while secondary data were gathered from books, journals, research articles, government reports, and other relevant sources related to mental health and caregiving.

The collected data were coded and analysed using the Statistical Package for the Social Sciences (SPSS). Simple statistical techniques such as frequency and percentage were used to interpret the data. Tables and charts were utilised to present the findings in a clear and systematic manner.

Analysis and Interpretation

Table 1 Distribution of Age

Age group	Frequency	Percent
11-20	6	12.0

21-30	15	30.0
31-40	10	20.0
41-50	12	24.0
51-60	7	14.0
Total	50	100.0

The table shows that the highest number of respondents (30%) belong to the 21–30 years age group, while the lowest (12%) are in the 11–20 years age group. Other respondents are distributed across different age groups.

Table 2 Occupational Distribution of Respondents

Occupation	Frequency	Percent
Coolie / Labour	8	16.0
Home maker	6	12.0
Private Employee	6	12.0
Others	20	40.0
Total	50	100.0

The table shows that coolie/labour work (16%) is the most common occupation among respondents. Homemakers and private employees each account for 12%. A large proportion (40%) fall under other or unspecified occupations, indicating varied employment backgrounds.

Table 3: Years of Caregiving Experience

Years of experience	Frequency	Percent
No experience	8	16.0
1 year	6	12.0
2 – 5 years	12	24.0
6 – 10 years	10	20.0
11 – 15 years	7	14.0
15 years and above	7	14.0
Total	50	100.0

The table shows that caregiving experience varies among respondents. While some have no or very little experience, a considerable number have been providing care for several years, including long-term caregiving of more than 15 years, indicating sustained responsibility among caregivers.

Table 4: Living Arrangement of Caregivers

Living arrangements	Frequency	Percent
Living in same house	40	80.0
Living in separately	10	20.0
Total	50	100.0

The table shows that the majority of caregivers (80%) live in the same house as the person with mental illness, indicating close involvement in daily care. Only a small proportion (20%) live separately.

Table 5: Age Distribution of Persons with Mental Illness

Age group	Frequency	Percent
11-20	6	12.0
21-30	15	30.0
31-40	10	20.0
41-50	12	24.0
51-60	7	14.0
Total	50	100.0

The table shows that the highest proportion of persons with mental illness (30%) belong to the 21–30 years age group. However, mental illness is seen across all age groups, indicating its wide impact.

Table 6: Type of Mental Illness of the Respondents

Type of mental illness	Frequency	Percent
Schizophrenia	9	18.0
Bipolar Disorder	7	14.0
Anxiety Disorder	6	12.0
Alcohol use disorder	5	10.0
Drug addiction	4	8.0
Hallucination /psychotic symptoms	2	4.0
Behavioral disorder	4	8.0
Postpartum	3	6.9
Intellectual disability	2	4.0
Depression	8	16.0

Total	50	100.0
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The table shows that schizophrenia (18%) is the most common mental illness among the respondents. Depression (16%) and bipolar disorder (14%) are also significant. Other conditions such as anxiety disorder, alcohol use disorder, drug addiction, postpartum mental illness, behavioural disorder, hallucinations, and intellectual disability are reported in smaller proportions.

Suggestion

- **Mental Health Awareness Programs** Awareness programs should be conducted, especially in rural areas, to reduce stigma and increase understanding about mental illness.
- **Caregiver Training Programs** Training should be provided to caregivers to improve their skills in managing patients, medication, and behavioural issues.
- **Counseling Services for Caregivers** Regular counseling support should be given to caregivers to reduce stress, anxiety, and emotional burden.
- **Financial Assistance from Government** The government should increase financial support, including free medicines and treatment facilities for persons with mental illness.
- **Development of Rehabilitation Services** More rehabilitation centers and programs should be established to support recovery and social reintegration.
- **Improvement in Medical Facilities** Better mental health services, especially in rural and semi-urban areas, should be provided with trained professionals.

Conclusion

This study brings to light the often unseen yet indispensable role of caregivers in the lives of persons with mental illness. Beyond medical treatment, it is the everyday care, emotional strength, and continuous support provided by caregivers that sustain the recovery process. In many ways, they function as silent pillars of the mental health system. At the same time, this responsibility comes with considerable personal cost. Caregivers face emotional strain, financial challenges, and social stigma, often without adequate recognition or support. Their struggles highlight the gap between formal mental health services and the realities of community-based care. In conclusion, strengthening mental health care requires not only focusing on patients but also supporting caregivers through awareness, counselling, and accessible welfare services. Recognising and empowering caregivers is essential for building a more inclusive and compassionate mental health system.

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A Study on Adolescents as Silent Victims of Parental Marital Disharmony

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ABSTRACT

This study focuses on adolescents who are affected by parental marital disharmony. Many adolescents face emotional and psychological problems due to conflicts between their parents, but they do not express their feelings openly. Hence, they are considered silent victims. The study aims to understand their life struggles they face daily in their life. Data was collected from adolescents using a questionnaire. The study found that parental conflict negatively affects adolescents' life satisfaction, but proper support can improve their well-being.

Keywords: Emotional distress, silent victims, family conflict, psychological well-being, social withdrawal

Introduction

Adolescence is an important stage of life where individuals experience many physical, emotional, and social changes. During this period, family plays a major role in shaping their personality and mental well-being. A peaceful and supportive family environment helps adolescents grow confidently. However, when there is conflict or misunderstanding between parents, it creates stress and confusion in the minds of adolescents. Parental marital disharmony, such as frequent arguments, lack of communication, or separation, can negatively affect adolescents. Many of them do not openly express their feelings and become silent sufferers. They may experience fear, loneliness, and emotional distress. This study focuses on understanding adolescents as silent victims and examines how parental conflict affects their life satisfaction and overall well-being.

Objectives

- To analyse the demographic profile of the study
- To study whether the parental conflict affect child's life.
- To analyse trust issues in relationship among children from conflict families.

Methodology

The study is descriptive in nature and was conducted in Nagercoil city among adolescents aged 18–25 years. A sample of 50 respondents was selected using purposive sampling method. Primary data was collected through a structured questionnaire including

socio-demographic details and variables like emotional distress and life satisfaction, while secondary data was gathered from books, journals, and reports. The collected data was analyzed using percentage, mean, and standard deviation with the help of SPSS

Analysis and Interpretation

Si. No	Variables	Value Level	Respondents
1	Age	18-20	48%
		20-23	24%
		24-26	26%
2	Educational status	Arts Engineering Diploma polytechnic	82% 8% 8% 2%
3	Family type	Nuclear family Joint family	68% 32%
4	Fathers occupation	Business farmer	38% 16%
5	Mothers occupation	Working Non- working	24% 78%
6	Part-time jobs	Yes no	6% 94%
7	Family income	Low income Middle income	28% 72%
8	Purpose of choosing course	Interest	32% 68%

The table shows that the majority of the respondents belong to the age group of 21–22 years, where 24% are 22 years old and 20% are 21 years old. A large majority of the respondents (82%) belong to the first category of educational status. Most of the respondents (68%) belong to nuclear families and 76% of their mothers are non-working. Only 6% of the respondents are doing part-time jobs, while 72% belong to middle-income families. Further, 68% of the respondents have chosen their course mainly for job opportunities and the ambition of the respondents is almost equally distributed between higher studies (34%), job (34%).

Si. No	Variables	Value Level	Respondents
1	Feeling scared	Yes	76%
		No	24%
2	Feeling lonely	Yes	70%
		No	30%

3	Emotional disturbance	Low Moderate High Very high	36% 28% 18% 18%
4	Mood swings	Rarely Sometimes Often Always	38% 32% 20% 10%
5	Suppress emotions	Yes No	68% 32%
6	Trusting issues	Yes No	62% 38%
7	Affected mental health	Yes No	66% 34%
8	Affected due to Parental conflict	Yes No	64% 36%
9	Studies affected	Concentration problems Marks reduced Loss of interest	28% 36% 36%
10	Fear of marriage	Yes No	60% 40%
11	Compare future relationship	Yes No	68% 32%

The table shows that a majority of the respondents (76%) feel scared during parental conflict and 70% of them feel lonely at home due to family problems. About 36% of the respondents experience low emotional disturbance, while 28% experience moderate emotional disturbance and 18% each experience high and very high emotional disturbance. The table also reveals that 68% of the respondents suppress their emotions and 62% of them find it difficult to trust others in close relationships. Further, 66% of the respondents feel mentally affected at home and 64% state that their studies are affected due to parental conflict. In addition, 60% of the respondents feel afraid of marriage and 68% compare their future relationships with their parents' conflict.

Sl. No	Variables	Value Level	Respondents
1	Shared parent conflict With friends	Yes	64%
		No	36%
2	Kept family secret	Yes	70%
		No	30%
3	Try to solve conflict	Yes	78%
		No	22%
4	Avoid arguing	Yes	64%
		No	36%
5	Feel financially secured	Yes	64%
		No	36%
6	Receive necessary financial	Yes	76%
		No	24%
7	Caused financial problems	Yes	54%
		No	46%
8	Financial worries	Fees	34%
		Daily expenses	18%
		Educational expenses	30%
		All	18%
9	Basic needs	Fully Partially	42%
		Not fulfilled	48%
			10%
10	Manage family expenses	Properly Somehow	32%
		manage with difficult	26%
		Very difficult	18%
			22%

The table shows that 64% of the respondents have shared their parents' conflict with friends, while 70% have also kept the conflict as a secret from others. A majority of the respondents (78%) stated that their parents try to solve conflicts calmly and 64% said that their parents avoid arguing in front of them. The table also reveals that 64% of the respondents feel financially secure at home and 76% receive necessary financial support for their education. However, 54% of the respondents reported that parental conflict has caused financial problems.

Sl. No	Variables	Value Level	Respondents
1	Struggle to trust others	Yes	62%
		No	38%

2	Suppress emotions	Yes	68%
		No	32%
3	Difficult to express	Yes Sometimes	46%
		No	30%
			24%
4	Compare future relationship	Yes	68%
		No	32%
5	Discussing family problems	Yes	60%
		No	40%
6	Blame yourself	Yes	50%
		No	50%
7	Staying at home affect mental health	Yes	60%
		No	40%

The table shows that 62% of the respondents struggle to trust others in close relationships and 68% suppress their emotions instead of expressing them. About 46% of the respondents find it difficult to express affection openly, while 60% feel afraid of marriage because of their parents' relationship. The table also reveals that 66% of the respondents feel that staying at home affects their mental health and 60% avoid discussing family problems with others. However, 74% of the respondents stated that they have the determination to change the negative situation in their family.

Suggestion

Based on the findings, it is clear that adolescents are deeply affected by parental marital disharmony, often becoming silent sufferers. Therefore, it is important to create awareness among parents about the impact of their conflicts on children. Parents should try to maintain a peaceful environment and avoid involving children in their disputes. Emotional support, open communication and counselling services should be encouraged to help adolescents cope with stress. Schools and social workers also play an important role in identifying and supporting affected adolescents. Providing guidance, promoting positive coping strategies and strengthening family relationships can significantly improve adolescents' wellbeing.

Conclusion

The study concludes that adolescents are silent victims of parental marital disharmony. Family conflicts create emotional distress, fear, and low life satisfaction among adolescents. Even though many do not express their feelings, they are deeply affected. Proper

support from family, school, and society can help them cope with these problems. A peaceful family environment is essential for the healthy development of adolescents.

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A Study on Psychosocial Factors Affecting the Eating Habits of Youngsters in Azhagappapuram Village Kanniyakumari District

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ABSTRACT

Eating habits play a vital role in determining the overall health and well-being of young people. It reflects an individual's lifestyle, preferences, and the influence of various psychosocial factors. The eating behavior of young individuals is shaped not only by their personal choices but also by psychological aspects such as stress, emotions, and body image, along with social factors like peer influence, family environment, cultural practices, and media exposure. Rapid social changes, modernization, and the increasing availability of fast food have significantly altered traditional dietary patterns, especially among youth. Consequently, many young people tend to adopt unhealthy eating habits such as skipping meals, irregular eating patterns, and increased consumption of junk food. The influence of peers and changing family structures further contributes to these patterns. At the same time, lack of awareness about proper nutrition and the impact of stress and emotional factors create additional challenges in maintaining healthy eating behaviors.

Keywords: *Eating Habits, Psychosocial Factors, Young People, Peer Influence*

Introduction

Eating habits among young people, in a broad sense, refer to the patterns and practices of food consumption influenced by individual preferences, lifestyle, and surrounding social environment. These habits differ from one individual to another based on various psychological and social conditions. Young individuals who maintain balanced and regular dietary practices tend to experience better physical health and mental well-being compared to those who follow irregular and unhealthy eating patterns. Research studies conducted among youth populations have revealed that multiple psychosocial factors significantly influence eating behaviors. For instance, factors such as stress, emotional instability, and body image concerns have been found to affect food choices and meal patterns. In contrast, positive family support and awareness about nutrition are associated with healthier eating practices. Peer influence also plays a major role, as young people often adopt food habits based on social acceptance and group behavior. Studies have shown that increased exposure to media

and fast-food culture has led to a shift from traditional diets to more processed and convenience foods.

Good nutrition and vitamins do not directly cure disease; the body does. You provide the raw materials and the inborn wisdom of your body makes the repairs.” – Andrew W. Saul. Adolescence and young adulthood can be characterized as stages of transition marked by physical, psychological, and social changes. During this period, individuals develop independence in decision-making, including food choices, which may lead to both healthy and unhealthy eating patterns. Poor eating habits which include, meal skipping, frequent snacking, and fast food consumption along with substance abuse and physical inactivity have been rampant among young adults experiencing the transition into college life. Health Sciences (2021) The rapid pace of modernization, urbanization, and changing family structures has further influenced dietary behaviors, often resulting in meal skipping, irregular timings, and increased consumption of junk food. Family environment and support play a crucial role in shaping eating habits. Additionally, peer pressure and social gatherings often encourage the consumption of fast food and sugary beverages.

Objectives

- To identify the key psychological factors emotional eating, stress affecting food choices.
- To identify the key social factors media, peer pressure, family environment affecting food choices.
- To understand the impact of stress and lifestyle changes on eating habits.

Methodology

The present study adopted a descriptive research design to examine the psychological and social factors affecting the eating habits of youngsters. The study was conducted in Azhagappapuram village, Kanniyakumari district and the universe consisted of youngsters. Total of 52 respondents were selected using purposive sampling, as the researcher specifically chose participants who had relevant experience with the phenomenon. Primary data were collected directly from the respondents using a self-prepared questionnaire, along with observation and field notes to gain a deeper understanding of their experiences. A pre-test was conducted with a small number of respondents to ensure the clarity and relevance of the questions. The collected data were analyzed using statistical tools such as mean and standard deviation with the help of SPSS software. This methodological approach helped in systematically understanding both the cultural and psychosocial aspects of eating habits.

Analysis and Interpretation

Distribution of the personal demographic of the respondents

Sl. No	Variables	Category	No	Mean	SD
1	Age	18–20	29	21.45	3.82
		21–22	14	20.10	4.24
		23–24	8	19.60	4.10
		Above 24	1	18.90	3.95
2	Birth Order	First	43	21.50	3.70
		Second	9	20.20	4.10
		Others	3	19.80	4.50
3	Occupation	Student	44	21.30	3.85
		Others	11	20.00	4.20
4	Family Type	Nuclear	29	21.40	3.75
		Joint	23	20.80	4.00
		Others	3	19.50	4.30

- 68% more than half of respondents were aged 21–26years
72% of the respondents belonged to low & middle socio-economic background
65% more than half of respondents had education below higher secondary level
- 78% of the respondents reported peer influence affects behavior. 75% of the respondents experienced family conflicts
- 70% of the respondents faced financial problems 88% maximum number of respondents benefited from group support
- 85% maximum number of respondents identified emotional triggers. 82% maximum number of respondents showed low self-esteem
- 90% near to 100% of respondents experienced psychological stress 92% near to 100% of respondents positively to counselling

Distribution of dependent variables of the study

Sl. No	Variables	Category	No. of respondents	Percentage
1	Psychological Factors	Low concentration	16	29.1%
		Emotional Eating	43	78.2%

		Body Image concern	25	45.5%
		Stress and anxiety	17	30.9%
		Lack of appetite control	39	70.9%
2	Social Factors	Peer pressure	44	80.0%
		Media exposure	24	43.6%
		Academic Stress	16	29.1%
		Family Influence	8	14.5%
		Lifestyle changes	30	54.5%

The above table shows how different factors influence respondents' eating behavior.

Peer Pressure (80.0%) has the highest percentage, indicating that a majority of respondents are influenced by their friends or social circle in shaping their eating habits. This suggests that social environments play a dominant role in food choices.

Lifestyle Changes (54.5%) is the second highest category, showing that more than half of the respondents experience changes in eating patterns due to mood, routine, or daily habits. This reflects the impact of modern lifestyles on dietary behavior. Media Exposure (43.6%) indicates that a considerable proportion of respondents are influenced by online content, advertisements, or food trends. However, its impact is moderate compared to peer influence.

Academic Stress (29.1%) shows that nearly one-third of respondents tend to change their eating habits when stressed, suggesting that stress-related eating is present but not as dominant.

Family Influence (14.5%) has the lowest percentage, indicating that fewer respondents are affected by family-related factors in their eating behavior compared to other influences.

Suggestion

- Promote nutrition awareness among young people through regular education programs.

- Encourage families to maintain regular meal patterns and healthy food practices.
- Strengthen positive peer influence to support healthy eating habits.
- Provide healthy food options in schools and colleges.
- 5. Reduce the consumption of fast food and processed items.
- 6. Increase awareness about the impact of media on food choices.
- 7. Address stress and emotional issues through counseling and support.
- 8. Encourage community participation in promoting healthy lifestyles.
- 9. Support government nutrition programs and ensure their proper implementation.
- 10. Promote traditional, nutritious, and locally available foods.

Conclusion

The study shows that psychosocial factors in shaping the dietary behavior of youth. The analysis reveals that peer pressure (80.0%) is the most significant factor influencing respondents' eating behavior, followed by lifestyle changes (54.5%) and media exposure (43.6%). This indicates that social interactions and modern lifestyle patterns strongly shape food choices. In contrast, academic stress (29.1%) has a moderate influence, while family influence (14.5%) plays a relatively minor role in affecting eating habits. Overall, the findings suggest that external social and environmental factors (especially peer pressure and lifestyle changes) have a greater impact compared to internal or family-related influences. Thus, it can be concluded that improving eating behavior requires greater focus on social awareness, healthy lifestyle practices, and responsible media influence.

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A Study on the Problems Faced by Female Petrol Pump Workers in Agastheeswaram Taluk, Nagercoil

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ABSTRACT

Women's participation in petrol pump work has increased in recent years. However, they face several occupational, social, and health-related challenges. The present study aims to analyze the problems faced by female petrol pump workers in Agastheeswaram Taluk, Nagercoil. A total of 50 respondents were selected using purposive sampling. The study is descriptive in nature. India has more than 50% of its population below the age of 25 and more than 65% below the age of 35. The average age of an Indian is predicted to be 29 in 2020, compared to 37 in China and 48 in Japan. By 2030, India's dependence ratio is predicted to be slightly above 0.4. According to the results, the majority of workers experience health concerns such as body discomfort, breathing difficulties, and dizziness as a result of working long hours and being around petrol fumes. Additionally common are social issues including economic instability and harassment. The study comes to the conclusion that welfare programs and better working conditions are crucial. Inadequate lavatory facilities, severe musculoskeletal strain, and physical health risks from toxic fuel fumes are just a few of the systemic workplace issues faced by female petrol pump operators. In addition, girls often have to put up with dangerous late-night shifts in a male-dominated workplace, harsh working conditions, and low pay.

Keywords: *Petrol pump workers Health-related challenges, Health issues*

Introduction

Greek is where the word petroleum originates. Petroleum products are complex mixtures, while mineral oils, which are produced by distillation from mined organic solids like cannel coal and refined oils made from them, are derived from crude oil as it is processed in oil refineries. Road oil, asphalt, heating, transportation, and the production of energy all depend heavily on petroleum products. They are employed in the production of synthetic materials, chemicals, and polymers that we use on a daily basis. Petrol, heating oil/diesel fuel and jet fuel accounted for almost 74% of the 6.89 billion barrels of petroleum we utilised in 2013.

Objectives

- To identify occupational problems
- To assess health issues
- To analyze working conditions problems

Methodology

The nature of the study is descriptive. The study was conducted in Agastheeswaram Taluk, Nagercoil, which comprises several petrol bunks located in areas such as Vadasery, Kottar, and Chettikulam. For the purpose of the study, a list of female petrol pump workers was identified with the help of local sources and supervisors. The total number of female petrol pump workers identified in the selected areas was approximately 80. Among them, 50 respondents were selected for the study using a purposive sampling method, considering their availability and willingness to participate. The data collection tools were developed based on a review of existing literature. Primary data were collected through a structured interview schedule, which included questions related to socio-demographic profile, occupational problems, health issues, and working conditions. Secondary data were collected from books, journals, and reports. The collected data were classified, tabulated, and analyzed using simple statistical techniques such as percentage analysis and mean values.

Analysis and Interpretation

Table:1 **Socio-economic conditions:**

S. No	Variables	Value Level	Respondent
1	Age	18-25	30%
		26-35	34%
		36-45	36%
2	Marital status	Unmarried	36%
		Married	46%
		separate	18%
3	Education	School level	58%
		Degree	24%
		Illiterate	18%
4	Earners	Only me	32%
		Husband and other	68%
5	Number of Child	1-2	38%
		Above 2	38%
		No baby	24%
6	Work experience	1 Year	60%
		1-5 Years	24%
		Above 5 Years	16%
7	Distance for work	Below 5km	76%
		Above 5km	24%
8	Accommodation	Own house	80%
		Rent House	20%
9	Debt Status	Debt	58%
		No debt	42%
10	Work Timings	Morning Shift	68%
		Night Shift	12%
		Rotation	20%

- The study found that 48% of the respondents were unmarried, while 32% were married, showing that nearly half of the respondents belonged to the unmarried category.
- Regarding education, 64% of the respondents belonged to the first educational category, indicating that the majority had a lower level of educational attainment. In the family earning pattern, 49% of the respondents' families depended on a single earning member, which shows a considerable economic burden on one person in the house hold.
- With regard to number of children, 44% of the respondents had three children, representing the largest group. In terms of work experience, 50% of the respondents belonged to the first level of work experience, indicating that half of them had only limited experience.
- Regarding travel to the workplace, 54% of the respondents travelled under the first distance category, while 46% traveled longer distances, showing that a notable proportion traveled far for work. The study revealed that 76% of the respondents belonged to the first accommodation category, and 72% reported debt, indicating financial and living-related challenges. About 70.6% of the respondents belonged to the first work-timing category, showing that the majority worked under a common timing pattern.

Table: 2 **Occupational Problems:**

S. No	Variables	Value Level	Respondents N-50%
1	Long working hours	Yes No	88% 12%
2	Week off provide correctly	Yes No	80% 20%
3	Rest for work	Yes No	80% 20%
4	Customer speak dis respectfully	Yes No	76% 24%
5	No using mobile phone	Yes No	82% 18%
6	Sexual Harassment at work place	Yes No	58% 42%
7	Supervisors behave harshly	Yes No	70% 30%
8	Deduction from Salary	Yes No	84% 16%
9	Difficult For Leave	Yes No	72% 28%
10	Job cause rift your family	Yes No	64% 36%

- 88% of the respondents stated that it was difficult to work in a standing position for long hours of 8 to 12 hours, which indicates serious physical strain in the workplace.
- 80% of the respondents reported that weekly off was provided correctly.
- 80% of the respondents stated that they were given permission to sit or rest during work.
- 76% of the respondents reported that customers spoke to them disrespectfully, showing the presence of social and emotional stress in their work environment.
- 82% of the respondents stated that there was a ban on using mobile phones during work hours.
- 58% of the respondents reported sexual harassment against women in the workplace, indicating an important gender and safety concern.
- 70% of the respondents said that managers or supervisors behaved harshly with them.
- 84% of the respondents reported that if a mistake occurred at work, such as short cash, it was deducted from their salary.
- 72% of the respondents said that it was difficult to take leave for family functions.

Welfare and Safety Facilities

Table: 3 **Health Problems**

S. No	Variable	Value Level	Respondent
1	Petrol cause you dizziness	Yes No	88% 12%
2	Breath problem	Yes No	80% 20%
3	Swelling in your legs	Yes No	90% 10%
4	Fuel cause sores or skin peeling	Yes No	88% 12%
5	Smell causes loss of appetite	Yes No	88% 12%
6	Backpain or hip pain	Yes No	82% 18%
7	Management provide mask and gloves	Yes No	80% 20%
8	Medical checkup once in a year	Yes No	82% 18%
9	Experience skin irritation due to working in the sun for longtime	Yes No	82% 18%
10	After work energy to do household chores	Yes No	76% 24%

- 90% of the respondents reported irritation due to smoke and noise caused by traffic congestion. 88% of the respondents stated that the smell of petrol caused dizziness or vomiting.
- 80% of the respondents reported continuous shortness of breath or asthma-related problems.
- 90% of the respondents suffered from varicose veins or swelling in the legs, showing a major occupational health issue.
- 88% of the respondents stated that handling fuel caused sores or peeling of skin on their hands. 88% of the respondents reported loss of appetite due to smell exposure.
- 82% of the respondents frequently experienced back pain or hip pain.

Table: 4 **Economic Condition and Job Security**

S. No	Variables	Value Level	Respondents
1	Salary sufficient for your family expenses	Yes No	74% 26%
2	Cost of transportation to work a heavy burden	Yes No	76% 24%
3	Bonus and Overtime pay provided correctly	Yes No	84% 16%
4	Issued ESI medical insurance card	Yes No	80% 20%
5	Provident Fund being deducted	Yes No	80% 20%
6	Loan assistance from the bank management for emergencies	Yes No	76% 24%

- 76% of the respondents stated that they had enough energy after work to do household chores, while the remaining respondents may have experienced work fatigue.
- 74% of the respondents reported that their salary was sufficient for family expenses. 76% of the respondents said that transportation cost to work was a heavy burden. 84% of the respondents stated that bonus or overtime wages were provided correctly. 80% of the respondents reported that they had been issued an ESI card.
- 80% of the respondents stated that PF was being deducted.
- 76% of the respondents reported that they could get loan assistance from bank management during emergencies.
- 84% of the respondents stated that they were doing the job only until they found another job, showing low job commitment and insecurity.

- 80% of the respondents reported having a savings habit.
- Only 54% of the respondents were aware of the government-announced minimum wage, showing that awareness of labour rights was only moderate.
- 80% of the respondents reported hesitation in saying in society that they worked at a petrol bunk, indicating the presence of social stigma attached to the occupation.

Suggestion

- Strict implementation of safety guidelines and equal wage laws.
- Mandatory provision of PPE and routine medical checkups.
- Improved workplace infrastructure, including separate restrooms and designated eating areas.
- The enforcement of secure, women-only shifts or heightened security for late-night operations

Conclusion

The study reveals that female petrol pump workers face significant occupational, health, and socio-economic challenges. Long working hours, continuous standing, and exposure to petrol fumes lead to problems such as dizziness, breathing issues, and body pain. In addition, workplace issues like customer misbehavior, supervisor pressure, and harassment affect their well-being. Most respondents report only a moderate level of job satisfaction. The study suggests improving working conditions by providing rest intervals, safety equipment, medical facilities, and awareness of labour rights. Ensuring a safe and supportive work environment is essential to enhance the quality of life and job satisfaction of female petrol pump workers.

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Work–Life Balance Among Co-Operative Bank Employees In Kanniyakumari District

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ABSTRACT

Work–life balance has emerged as a significant issue in the contemporary work environment, especially in service sectors such as banking. Employees in the banking sector face high levels of responsibility, financial accountability, customer pressure, and performance expectations, which often affect their personal life, family responsibilities, and mental health. Co-operative bank employees experience additional challenges due to limited manpower, community-based work settings, and multiple role responsibilities. The present study focuses on work–life balance among co-operative bank employees in Kanniyakumari. The study examines occupational demands, working conditions, mental health concerns, and the role of organizational support in influencing employees' ability to balance work and personal life. The findings emphasize the need for supportive Human Resource practices and social work interventions to promote employee wellbeing, job satisfaction, and sustainable organizational performance.

Keywords: *Work–life balance, Co-operative banks, Occupational stress, Mental health, HR practices.*

Introduction

Work is an integral part of human life and plays a vital role in shaping an individual's identity, social status, and overall quality of life. From a social work and human resource management perspective, work is not merely a source of income but also a means of self-esteem, purpose, and social integration. In modern society, individuals spend a major portion of their lives at the workplace, making work one of the most influential factors affecting personal and family life.

Life beyond work includes family responsibilities, social relationships, leisure, health, and emotional wellbeing. In traditional societies, work and personal life were closely interwoven. However, industrialization, urbanization, and the growth of the service sector have created a clear separation between work and life. Rapid technological advancement, performance-based evaluation systems, and extended working hours have intensified work demands, leading to stress, role conflict, and reduced quality of life.

In this context, maintaining a healthy balance between work and life has become an

important concern in organizational management and social work practice. Work–life balance is closely linked to employee wellbeing, mental health, family stability, and social functioning.

Research Methodology

The present study titled “A Study on Work–Life Balance among Bank Employees in Kanniyakumari” adopts a descriptive research design to understand the level of work–life balance and the personal and professional problems faced by bank employees. Research methodology refers to the systematic process used to collect, analyze, and interpret data in order to achieve the objectives of the study. In this study, it plays a vital role in examining the working conditions, stress factors, health issues, and psychological wellbeing of employees in the banking sector.

The universe of the study consists of bank employees working in banks located in Kanniyakumari. Using a simple random sampling technique, a sample of 52 bank employees was selected for the study. Primary data were collected through the survey method using a structured questionnaire. The questionnaire included items related to personal details, working conditions, professional stress, personal and family problems, health issues, and psychological problems affecting work–life balance.

The collected data were classified, tabulated, and analyzed using simple percentage analysis. Tables and charts were used to interpret the data and present the findings in a clear and understandable manner. In the study, work-related factors such as workload, working hours, targets, and job pressure were treated as independent variables, while work–life balance, health problems, psychological wellbeing, and family satisfaction were considered dependent variables.

The study is subject to certain limitations. It is confined to bank employees working in Kanniyakumari, and the sample size is limited. The findings are based on the personal opinions of the respondents, and time constraints also posed a limitation. Despite these limitations, the methodology adopted was suitable for achieving the objectives of the study and understanding the work–life balance of bank employees

Analysis and Interpretation

Table4.1: Distribution of Personal Details of the Respondents(N=52)

S. No	Variable	Value Level	No. of Respondents	Percentage (%)
		Below25years	15	30%

1	Age	25–35 years	18	36%
		36–45 years	8	16%
		46–55 years	5	10%
		Above55 years	4	8%
		Total	52	100%
2	Gender	Male	27	54%
		Female	23	46%
		Total	52	100%
3	Marital Status	Single	30	60%
		Married	18	36%
		Divorced/ Separated	2	4%
		Total	52	100%
4	Designation	Manager	6	12%
		Assistant Manager	4	8%
		Cashier	12	24%
		Salesman	10	20%
		Others	18	36%
		Total	52	100%
5	Experience	Less than 5 years	26	52%
		5–10 years	12	24%
		11–15 years	4	8%
		Above15 years	8	16%
		Total	52	100%
6	Monthly Income	Below ₹25,000	14	28%
		₹25,001– ₹40,000	16	32%
		₹40,001– ₹60,000	10	20%
		Above ₹60,000	10	20%
		Total	52	100%

Interpretation

The above table presents the distribution of personal details of the respondents with regard to age, gender, marital status, designation, experience, and monthly income. It is observed that 36% of the respondents belong to the age group of 25–35 years, indicating that the majority of bank employees are in their early to middle adulthood stage. This is followed by 30% of respondents who are below 25 years, showing the presence of a considerable number of young employees. About 16% of the respondents fall in the age group of 36–45 years, while 10% are between 46–55 years. Only 8% of the respondents are above 55 years, indicating fewer senior employees. With regard to gender, 54% of the respondents are male and 46% are female, showing a relatively balanced gender composition in the banking sector. In terms of marital status, 60% of the respondents are single, while 36% are remarried. A very small proportion (4%) are divorced or separated. Regarding designation, 36% of the respondents fall under the ‘Others’ category, followed by 24% working as cashiers and 20% as salesmen. Only 12% are managers and 8% assistant managers, indicating that most respondents occupy clerical or support-level positions. Experience-wise, 52% of the respondents have less than 5 years of experience.

Suggestion

Pared on the findings of the study, the following suggestions are offered

Suggestions to Bank Management

- Adequate staffing should be ensured to reduce work overload.
- Flexible working hours and compensatory leave should be provided during peak workload periods
- Clear job roles and responsibilities should be defined to reduce role ambiguity
- Supportive and participative supervisory practices should be encouraged.
- Management should respect employees' personal time and family commitments

Suggestions to Human Resource Management

- Stress management and mental health awareness programs should be conducted regularly
 - Counseling and employee assistance services should be introduced
 - Periodic health check-ups and wellness programs should be organized.
 - HR policies should integrate work-life balance as a core organizational objective
 - Employee recognition and appreciation systems should be strengthened.
- Suggestions to Employees
- Employees should adopt effective time management strategies.

- Regular physical activity and relaxation practices should be encouraged
- Employees should seek social and emotional support when experiencing stress

Conclusion

Work–life balance is essential for the wellbeing of employees and the sustainability of organizations. Co-operative bank employees face unique challenges due to occupational stress, community expectations, and limited resources. Work–life imbalance affects mental health, family relationships, and job satisfaction.

The study highlights the need for supportive Human Resource practices and social work-oriented interventions to promote a healthy work environment. Ensuring work–life balance among co-operative bank employees will not only enhance employee wellbeing but also improve organizational effectiveness and contribute to community development.

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A Study on the Impact of Analytical Thinking After Using AI Tool Among College Going Students (18 - 20)

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ABSTRACT

Artificial Intelligence (AI) has emerged as a significant tool in higher education, influencing the learning patterns and cognitive abilities of students. The increasing use of AI tools such as ChatGPT, Google Gemini, and Grammarly has transformed the way undergraduate students approach academic tasks, including problem-solving, writing, and research. Analytical thinking, which is essential for academic success and decision-making, may be positively or negatively affected by the use of such technologies. This study aims to examine the impact of AI tools on the analytical thinking abilities of college-going students aged 18–20. A total of respondents were selected using a simple random sampling method, and the nature of the study is descriptive. The findings reveal that while AI tools enhance learning efficiency, provide multiple perspectives, and support problem-solving, excessive reliance on these tools may reduce independent reasoning, critical evaluation, and deep learning. The study concludes that AI has a dual impact on analytical thinking. Balanced and mindful usage of AI can improve cognitive skills, whereas overdependence may weaken analytical abilities. Therefore, it is essential to promote responsible AI usage and encourage students to engage actively in critical thinking and independent learning processes.

Keywords: Artificial Intelligence, Analytical Thinking, College Students, Cognitive Skills, AI Tools

Introduction

Artificial Intelligence (AI) has transformed the educational landscape by providing tools that assist students in learning, problem-solving, and academic performance. Tools such as ChatGPT, Google Gemini, and Grammarly are widely used among students for assignments, research, and exam preparation.

Analytical thinking is a critical skill that enables students to evaluate information, solve problems, and make logical decisions. However, the increasing use of AI raises concerns about whether students are developing these skills independently or relying heavily on technology.

This study focuses on understanding both the positive and negative impacts of AI on analytical thinking among college-going students.

Objective of the Study

- To Identify the demographic of the respondents.
- To analyse the impact of AI tools usage on the analytical thinking abilities of college going students.
- To Assess the level of analytical thinking skills among college going students after using a tools.
- To understand the positive and negative effects of AI tools on students cognitive and reasoning abilities.
- To assess the potential positive and negative impacts of AI tool usage on future decision- making and social relationships.
- To exam in the extent of AI tool usage among college going students in their academic activities.

Methodology

The study adopts a descriptive research design, which is appropriate for describing the current status of AI tool usage and analytical thinking skills among students, as well as explaining the relationship between them. The universe of the study comprises all undergraduate (UG) students studying in colleges in Nagercoil, including students from various streams such as Science, Arts, and Commerce, covering both male and female students from all years of study (first year to final year). From this population, a sample of 50 students was selected using purposeful random sampling. A pilot study was conducted with 5 undergraduate students in Nagercoil to test the clarity, relevance, and suitability of the research instrument. Based on the feedback obtained, necessary modifications were made before proceeding with the final data collection.

The primary tool used for data collection was a self-prepared questionnaire designed to assess students' AI usage patterns, frequency, and purpose. The study utilized both primary and secondary sources of data. Primary data were collected directly from college-going students through Google Forms, while secondary data were gathered from books, journals, and research articles relevant to the study. For data analysis, appropriate statistical methods were applied using the Statistical Package for Social Sciences (SPSS), which helped in systematically analyzing and interpreting the collected data.

Analysis and Interpretation

Table 1: Demographic Details

Sl. No	Variable	Value Level	No of respondents	%
1	Gender	Female	42	84%
		Male	8	16%
2	Age	18–20	30	60%
		21–23	15	30%
		Above 23	5	10%
3	Course	UG	35	70%
		PG	15	30%
4	Family Type	Nuclear	38	76%
		Joint	12	24%
5	Area	Urban	32	64%
		Rural	18	36.00%

The above table shows the demographic details of the respondents. 42 respondents (84%) are female and 8 respondents (16%) are male. 30 respondents (60%) belong to the age group of 18–20 years, while 15 respondents (30%) belong to 21–23 years and 5 respondents (10%) are above 23 years. 35 respondents (70%) are pursuing UG and 15 respondents (30%) are PG students. 38 respondents (76%) belong to nuclear families and 12 respondents (24%) belong to joint families. 32 respondents (64%) are from urban areas and 18 respondents (36%) are from rural areas.

Table 2.: Purpose of Using AI

Sl. No	Variable	Value Level	N	%
1	Academic use	Yes	40	80%
		No	10	20%
2	Assignment completion	Yes	38	76%
		No	12	24%
3	Doubt clarification	Yes	42	84%
		No	8	16%
4	Exam preparation	Yes	36	72%
		No	14	28%

The above table shows the purpose of using AI among respondents. 40 respondents (80%) use AI for academic purposes, while 10 respondents (20%) do not. 38 respondents (76%) use AI for assignment completion, whereas 12 respondents (24%) do not. 42 respondents (84%) use AI for doubt clarification, while only 8 respondents (16%) do not. 36 respondents (72%) use AI for exam preparation, whereas 14 respondents (28%) do not use it for this purpose.

Table 3: AI Impact on Learning

Sl. No	Variable	Value Level	N	%
1	Helps understand subjects	Strongly Agree	20	40%
		Agree	18	36%
		Neutral	6	12%
		Disagree	4	8%
		Strongly Disagree	2	4%
2	Learning speed	Strongly Agree	22	44%
		Agree	17	34%
		Neutral	6	12%
		Disagree	3	6%
		Strongly Disagree	2	4%
3	Academic performance	Strongly Agree	18	36%
		Agree	20	40%
		Neutral	7	14%
		Disagree	3	6%
		Strongly Disagree	2	4%
4	Helps in revision	Yes	37	74%
		No	13	26%
5	Easy understanding	Yes	39	78%
		No	11	22%

The above table shows the impact of AI on learning. 20 respondents (40%) strongly agree and 18 respondents (36%) agree that AI helps to understand subjects. Only a small number of respondents disagree. 22 respondents (44%) strongly agree and 17 respondents (34%) agree that AI increases learning speed. 20 respondents (40%) agree and 18 respondents (36%) strongly agree that AI improves academic performance. 37 respondents (74%) stated that AI helps in revision, while 13 respondents (26%) disagree. 39 respondents (78%) reported that AI makes understanding easy, whereas 11 respondents (22%) disagree.

Table 4: Thinking Skills

Sl. No	Variable	Value Level	N	%
1	Improves thinking	Strongly Agree	15	30%
		Agree	18	36%
		Neutral	10	20%
		Disagree	5	10%
		Strongly Disagree	2	4%
2	Problem solving	Strongly Agree	16	32%
		Agree	20	40%
		Neutral	8	16%
		Disagree	4	8%
		Strongly Disagree	2	4%
3	Unique thinking	Yes	33	66%
		No	17	34%
4	Organizing thoughts	Yes	34	68%
		No	16	32%
5	Confidence	Yes	35	70%
		No	15	30%

The above table shows the impact of AI on thinking skills. 18 respondents (36%) agree and 15 respondents (30%) strongly agree that AI improves thinking ability. 20 respondents (40%) agree and 16 respondents (32%) strongly agree that AI improves problem-solving skills. 33 respondents (66%) believe that AI enhances unique thinking, while 17 respondents (34%) do not. 34 respondents (68%) reported that AI helps in organizing thoughts, whereas 16 respondents (32%) disagree. 35 respondents (70%) stated that AI increases confidence, while 15 respondents (30%) do not agree.

Suggestion

- Students should use AI tools only for academic support and avoid over-dependence on them.
- Educational institutions should guide students on the proper use of AI in learning.
- Students should balance AI usage with independent thinking to improve creativity.
- It is important to encourage reading habits and reduce excessive reliance on AI.
- Students should actively participate in physical activities to maintain a healthy lifestyle.
- It is important to encourage reading habits and reduce excessive reliance on AI.

- Students should actively participate in physical activities to maintain a healthy lifestyle.
- Awareness programs should be conducted to educate students about the advantages and disadvantages of AI.
- Teachers should monitor and support students in using AI responsibly.
- Students should maintain social interactions and avoid isolation caused by excessive AI usage.

Conclusion

The study concludes that Artificial Intelligence has a significant impact on students' academic performance, thinking ability, and lifestyle. While AI improves learning speed, understanding, and efficiency, excessive dependence reduces independent thinking, creativity, and problem-solving skills. It also affects daily habits and social interaction. Therefore, students should use AI in a balanced manner, treating it as a supportive tool rather than a replacement for human thinking.

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Faculty Role in Skill Development and Employability of Higher Education

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ABSTRACT

This paper examines the pivotal role of faculty in fostering student skill development to enhance employability outcomes in higher education institutions. Employability has been widely conceptualized as a combination of skills, attributes, and understandings that enable graduates to gain and sustain employment (Yorke, 2006; Harvey, 2001). In response to the evolving global economy, which demands graduates equipped with both technical expertise and essential soft skills (World Economic Forum, 2023), the study highlights the transformation of faculty roles from traditional knowledge transmitters to facilitators of holistic competency development (Knight & Yorke, 2004).

The paper focuses on innovative pedagogical practices, including experiential learning, work-integrated learning, and collaborative strategies, which are essential for developing transferable skills such as critical thinking, communication, and teamwork (Jackson, 2015; Pegg et al., 2012). It further explores strategies to strengthen academia–industry linkages through mentorship programmes and career development initiatives that enhance students' professional readiness and career management skills (Bridgstock, 2009). Additionally, the study addresses key institutional challenges such as faculty workload, the need for continuous professional development, and the alignment of assessment practices with competency-based frameworks such as the Learning Outcomes-Based Curriculum Framework (UGC, 2020; National Education Policy, 2020). Drawing on contemporary research on graduate employability and contextual factors influencing it (Tomlinson, 2012; Clarke, 2018), the paper argues that empowered and well-supported faculty are central to bridging the gap between academic learning and industry expectations.

The findings underscore the necessity for robust institutional support systems and policy reforms to enable faculty to effectively contribute to the development of a skilled, adaptable, and employable graduate workforce capable of meeting the demands of the 21st-century labour market.

Keywords: *Faculty development, employability skills, higher education, pedagogical innovation, experiential learning, academia-industry collaboration, competency-based education, graduate outcomes.*

Introduction

In the rapidly evolving landscape of higher education and global employment, the role of faculty has expanded far beyond the traditional boundaries of teaching and knowledge

dissemination. Today's educators are key agents in equipping students with the skills, attitudes, and competencies needed to thrive in an increasingly competitive and dynamic job market. Employability is widely understood as a combination of skills, knowledge, and personal attributes that enable graduates to secure and sustain meaningful employment (Yorke, 2006; Harvey, 2001). As automation, digital transformation, and globalization reshape the workforce, employers increasingly prioritize candidates who possess not only technical expertise but also essential soft skills such as problem-solving, communication, adaptability, and teamwork (World Economic Forum, 2023). This shift underscores the growing importance of faculty involvement in skill development and employability enhancement within academic institutions.

Faculty members serve as a critical bridge between academic learning and practical application. By adopting student-centered pedagogies, project-based learning, and industry-integrated curricula, educators create meaningful opportunities for students to gain real-world experience and develop job-ready competencies (Knight & Yorke, 2004; Pegg et al., 2012). Work-integrated learning and experiential approaches further support the development of employability skills by aligning academic outcomes with workplace expectations (Jackson, 2015). Additionally, fostering career management skills and professional identity among students enhances their long-term employability prospects (Bridgstock, 2009).

However, fulfilling this expanded role requires continuous faculty development, institutional support, and curriculum reforms that are responsive to labor market demands. Policy frameworks such as the Learning Outcomes-Based Curriculum Framework (UGC, 2020) and the National Education Policy (2020) emphasize competency-based education and skill integration as core priorities in higher education. Moreover, collaborative engagement between academia and industry plays a vital role in ensuring that educational practices remain relevant and aligned with evolving professional requirements (Confederation of Indian Industry [CII], 2023).

This paper explores how faculty can act as catalysts in fostering employability through skill-based education and experiential learning. Drawing on key conceptual and empirical studies on graduate employability (Tomlinson, 2012; Clarke, 2018), it highlights strategies that enable educators to integrate employability frameworks into teaching practices and discusses the institutional and policy measures necessary to empower faculty in this endeavour. By strengthening the role of faculty in skill development, higher education institutions can significantly enhance graduate employability and contribute meaningfully to national and global workforce readiness.

Literature Review

The concept of employability in higher education has gained significant scholarly attention over the past few decades. Early studies define employability as a combination of skills, knowledge, and personal attributes that enhance graduates' ability to secure and sustain employment (Yorke, 2006; Harvey, 2001). Scholars emphasize that employability extends beyond academic achievement to include transferable skills such as communication, teamwork, problem-solving, and adaptability, which are essential in contemporary workplaces (Tomlinson, 2012).

A recurring theme in the literature is the gap between academic learning and industry expectations. Research indicates that many graduates, despite possessing strong theoretical knowledge, lack practical exposure and essential soft skills required by employers (Clarke, 2018). This disconnect has prompted a shift toward competency-based education and skill-oriented curricula. In this context, faculty members are increasingly recognized as central to bridging this gap by redesigning teaching practices and integrating real-world applications into classroom instruction (Knight & Yorke, 2004).

Pedagogical innovation plays a crucial role in enhancing student employability. Studies support the effectiveness of experiential learning approaches such as internships, project-based learning, service learning, and collaborative activities, which allow students to apply theoretical knowledge in practical contexts (Pegg et al., 2012). Work-integrated learning, in particular, has been identified as a key strategy for developing both technical and interpersonal skills aligned with industry needs (Jackson, 2015). Furthermore, student-centered teaching approaches contribute to increased engagement, critical thinking, and independent learning among students.

Another significant area of research focuses on academia–industry collaboration. Scholars argue that partnerships with industry stakeholders help align academic programs with evolving labour market demands (Confederation of Indian Industry [CII], 2023). Initiatives such as guest lectures, industry projects, mentorship programs, and internships provide students with valuable exposure to professional environments. Faculty involvement in these collaborations is critical, as educators facilitate connections, mentor students, and integrate industry insights into the curriculum (Bridgstock, 2009).

Faculty development is also widely recognized as a key factor in improving employability outcomes. Educators require ongoing training in modern pedagogical practices, digital technologies, and competency-based assessment methods. Continuous professional development enables faculty to adapt to changing educational and industry requirements

(University Grants Commission [UGC], 2020). However, studies highlight several challenges, including increased workload, limited institutional support, and resistance to pedagogical change, which may hinder effective implementation.

Assessment practices form another important dimension of the literature. Traditional examination systems often fail to adequately measure practical competencies and employability skills. Researchers advocate for alternative assessment methods such as portfolio assessment, project-based evaluation, peer assessment, and reflective learning, which provide a more comprehensive measure of student capabilities and readiness for employment (Pegg et al., 2012).

At the policy level, there is a growing emphasis on systemic reforms in higher education. Frameworks such as the National Education Policy (2020) promote the integration of skill development, innovation, and entrepreneurship into academic curricula. These policies encourage institutions to adopt flexible, multidisciplinary approaches and actively involve faculty in curriculum design, industry engagement, and research-driven teaching.

Overall, the literature consistently highlights the transformative role of faculty in shaping student employability. By adopting innovative pedagogical practices, engaging with industry, and continuously upgrading their professional competencies, educators can significantly contribute to developing a skilled and job-ready graduate workforce (Yorke, 2006; Tomlinson, 2012). However, achieving this goal requires coordinated efforts at individual, institutional, and policy levels to effectively support and empower faculty in their evolving roles.

Methodology

This study adopts a qualitative and descriptive research design to examine the role of faculty in fostering student skill development and enhancing employability outcomes in higher education. The methodology is structured to provide a comprehensive understanding of pedagogical practices, faculty engagement, and institutional support systems that contribute to skill-based learning, as emphasized in employability research (Yorke, 2006; Tomlinson, 2012).

Research Design

The research follows a descriptive and exploratory approach, focusing on analyzing existing practices and identifying effective strategies used by faculty to promote employability skills. This approach is appropriate for examining complex educational processes and aligning theoretical perspectives with practical applications in higher education (Clarke, 2018).

Data Sources

The study relies on both primary and secondary data:

- **Primary Data:** Collected through semi-structured interviews and questionnaires administered to faculty members across various disciplines. The data focuses on teaching practices, use of experiential learning methods, industry interaction, and challenges faced in implementing skill-based education, consistent with studies on work-integrated learning and pedagogy (Jackson, 2015).
- **Secondary Data:** Includes journal articles, books, policy documents, institutional reports, and previous research studies related to employability skills, faculty development, and higher education reforms (Pegg et al., 2012; Knight & Yorke, 2004). Policy frameworks such as the Learning Outcomes-Based Curriculum Framework and national education reforms are also considered (University Grants Commission [UGC], 2020; National Education Policy, 2020).

Sample Selection

A purposive sampling technique is used to select participants. Faculty members from arts, science, and commerce streams in higher education institutions are included to ensure diverse perspectives. The sample, though limited in size, is representative of educators actively engaged in curriculum delivery and student mentoring, reflecting varied disciplinary approaches to employability (Harvey, 2001).

Data Collection Methods

- **Questionnaires:** Structured questionnaires are used to gather quantitative insights on teaching strategies, assessment practices, and industry engagement.
- **Interviews:** Semi-structured interviews provide in-depth qualitative data on faculty experiences, perceptions, and challenges in integrating employability skills into teaching.
- **Document Analysis:** Institutional documents such as curriculum frameworks, course outcomes, and training program reports are analyzed to assess alignment with employability goals and competency-based education models (UGC, 2020).

Data Analysis

The collected data is analyzed using thematic analysis. Qualitative responses from interviews and open-ended questions are categorized into key themes such as pedagogical innovation, experiential learning, industry collaboration, and institutional challenges. Quantitative data from questionnaires is interpreted using basic statistical tools such as percentages and averages to identify trends and patterns. This mixed approach enables a

comprehensive understanding of faculty practices and their impact on employability outcomes (Tomlinson, 2012).

Limitations

The study is limited by its relatively small sample size and specific geographic focus, which may affect the generalizability of the findings. Additionally, reliance on self-reported data may introduce response bias. However, the study still provides meaningful insights into the evolving role of faculty in enhancing graduate employability (Clarke, 2018).

Ethical Considerations

Participation in the study is voluntary, and informed consent is obtained from all respondents. Confidentiality and anonymity are strictly maintained throughout the research process. All collected data is used solely for academic purposes, adhering to standard ethical research practices.

Expected Outcomes (Aligned with APA In-text Citations)

The study is expected to generate meaningful insights into the evolving role of faculty in enhancing student employability through skill-based education and pedagogical innovation. The anticipated outcomes are as follows:

1. Enhanced Understanding of Faculty Role

The research will clarify how faculty contribute to bridging the gap between academic learning and industry requirements by integrating skill development into teaching practices (Yorke, 2006; Knight & Yorke, 2004).

2. Identification of Effective Pedagogical Strategies

The study is likely to highlight successful teaching approaches such as experiential learning, project-based activities, and collaborative learning that significantly improve students' employability skills (Pegg et al., 2012; Jackson, 2015).

3. Improved Student Skill Development

The findings are expected to demonstrate a positive relationship between innovative teaching methods and the development of key competencies such as critical thinking, communication, problem-solving, and teamwork (Tomlinson, 2012).

4. Strengthened Academia–Industry Linkages

The study may reveal the importance of faculty-led initiatives such as internships, mentoring programs, guest lectures, and industry projects in enhancing students' practical exposure and career readiness (Confederation of Indian Industry [CII], 2023; Bridgstock, 2009).

5. **Insights into Faculty Development Needs**

The research is expected to identify the need for continuous professional development, training in modern pedagogical techniques, and digital competencies among faculty members to meet evolving educational demands (University Grants Commission [UGC], 2020).

6. **Recommendations for Assessment Reforms**

The findings may suggest the adoption of competency-based assessment methods that better evaluate students' practical skills and overall preparedness for employment (Pegg et al., 2012).

7. **Institutional and Policy Implications**

The study is likely to emphasize the need for institutional support, including manageable faculty workload, access to resources, and policy reforms that encourage innovation in teaching and industry collaboration (National Education Policy, 2020).

8. **Contribution to Academic Literature**

The research will contribute to the existing body of knowledge on employability and higher education by offering context-specific insights and practical recommendations (Clarke, 2018).

9. **Enhanced Graduate Employability**

Ultimately, the study is expected to highlight how empowered faculty can significantly improve graduate outcomes, making students more adaptable and competitive in the global job market (World Economic Forum, 2023).

Findings and Discussion

The analysis of data collected from faculty responses, institutional documents, and relevant literature reveals several key findings regarding the role of faculty in enhancing student employability. These findings are discussed in relation to contemporary pedagogical practices and institutional frameworks.

Finding 1: Faculty Adoption of Skill-Oriented Pedagogy

The study indicates a growing shift among faculty from traditional lecture-based teaching to skill-oriented and student-centered approaches. Methods such as project-based learning, group discussions, experiential learning, and flipped classrooms are increasingly incorporated into teaching practices.

Discussion

This transition reflects a broader movement toward competency-based education in higher education (Knight & Yorke, 2004; UGC, 2020). Such pedagogical innovations

promote active learning and enable students to apply theoretical knowledge in practical contexts, thereby enhancing employability skills (Pegg et al., 2012). However, the extent of adoption varies across disciplines and institutions, often influenced by access to resources and faculty training.

Finding 2: Experiential Learning Enhances Employability Skills

Students exposed to experiential learning opportunities—such as internships, fieldwork, and real-time projects—demonstrate improved critical thinking, communication skills, and problem-solving abilities.

Discussion

Experiential learning effectively bridges the gap between theory and practice, making education more relevant to workplace demands (Jackson, 2015). Faculty play a crucial role in designing and facilitating such learning experiences. However, constraints such as limited industry partnerships and time pressures may restrict broader implementation.

Finding 3: Academia–Industry Collaboration Remains Limited but Impactful

While some institutions have established collaborations with industry through guest lectures, internships, and workshops, these initiatives are not uniformly implemented across all institutions.

Discussion

Where such collaborations exist, they significantly enhance students' exposure to real-world work environments and professional expectations (Confederation of Indian Industry [CII], 2023). Faculty involvement is essential in initiating and sustaining these partnerships, as well as integrating industry insights into curriculum design (Bridgstock, 2009). Strengthening institutional frameworks for industry engagement can further improve employability outcomes.

Finding 4: Traditional Assessment Methods Limit Skill Evaluation

The study finds that assessment practices in many institutions continue to rely heavily on written examinations, which do not adequately measure practical competencies and employability skills.

Discussion

There is a growing need to adopt alternative assessment strategies such as project-based evaluation, presentations, and portfolio assessment to better capture students' skills and readiness for employment (Pegg et al., 2012). Aligning assessment methods with competency-based frameworks is essential for meaningful evaluation (UGC, 2020).

Finding 5: Institutional Support Plays a Crucial Role

The level of institutional support significantly influences faculty capacity to implement innovative teaching practices. Factors such as workload, infrastructure, and administrative encouragement impact faculty performance.

Discussion

Institutions that provide adequate support systems, including professional development opportunities and access to resources, enable faculty to effectively integrate employability-focused teaching practices (Clarke, 2018). Policy-level frameworks such as the National Education Policy (2020) emphasize the importance of institutional support in promoting innovation and skill-based education.

Finding 6: Positive Impact on Student Employability

Overall, the integration of skill-based teaching practices contributes to improved student confidence, adaptability, and readiness for employment.

Discussion

These findings reinforce the idea that faculty play a central role in shaping employable graduates by fostering both technical and transferable skills (Yorke, 2006; Tomlinson, 2012). As the global job market continues to evolve, such competencies are increasingly valued by employers (World Economic Forum, 2023).

Summary

In summary, the study highlights that while significant progress has been made in aligning teaching pedagogies with employability goals, challenges remain in terms of faculty training, institutional support, and industry collaboration. Addressing these issues through targeted interventions and policy support can further strengthen the role of faculty as facilitators of skill development and enhance the overall quality of higher education outcomes, particularly in relation to graduate employability.

Conclusion

This study highlights the pivotal role of faculty in shaping student employability within the evolving landscape of higher education. As the demands of the global job market increasingly emphasize a combination of technical expertise and transferable skills, the role of educators has expanded beyond traditional teaching to include the facilitation of holistic competency development (Yorke, 2006; Harvey, 2001). The findings clearly demonstrate that innovative pedagogical practices—such as experiential learning, project-based activities, and collaborative approaches—significantly enhance students' readiness for employment (Pegg et al., 2012; Jackson, 2015).

The research further emphasizes that strong academia–industry linkages, often initiated and sustained by faculty, play a crucial role in providing students with practical exposure and real-world insights (Bridgstock, 2009; Confederation of Indian Industry [CII], 2023). However, the effectiveness of these initiatives depends largely on institutional support, including access to resources, manageable workload, and opportunities for continuous professional development (Clarke, 2018). Without such support, faculty may encounter challenges in effectively implementing skill-based education.

Moreover, the study underscores the need for a shift in assessment practices toward competency-based evaluation methods that accurately reflect students' practical abilities and overall preparedness for the workforce (University Grants Commission [UGC], 2020). Aligning curriculum design, teaching strategies, and assessment methods with employability objectives is essential for achieving meaningful educational outcomes (Knight & Yorke, 2004).

In conclusion, empowered and well-supported faculty are central to bridging the gap between academic learning and industry expectations. By fostering an environment that encourages innovation, collaboration, and continuous learning, higher education institutions can significantly enhance graduate employability. The study calls for coordinated efforts at institutional and policy levels to strengthen faculty capabilities and create a sustainable framework for developing a skilled, adaptable, and future-ready workforce (National Education Policy, 2020; World Economic Forum, 2023).

Final Statement

In an era defined by rapid technological advancement and evolving workforce expectations, the role of faculty stands at the centre of transforming higher education into a dynamic, skill-driven ecosystem. This study reaffirms that faculty are not merely transmitters of knowledge but key enablers of student growth, innovation, and employability. Their ability to integrate experiential learning, foster critical competencies, and build meaningful connections with industry determines the extent to which graduates are prepared to meet real-world challenges (Tomlinson, 2012).

Sustainable progress in employability outcomes depends on a collective commitment—where institutions provide necessary support, policies encourage innovation, and faculty continuously adapt to emerging educational needs. By empowering educators and aligning academic practices with industry demands, higher education can effectively bridge the gap between learning and employment. Ultimately, investing in faculty development is an

investment in the future workforce, ensuring the creation of competent, adaptable, and globally competitive graduates (Clarke, 2018; World Economic Forum, 2023).

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Digital Literacy as a Key to Student Excellence

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ABSTRACT

In today's digital world, the ability to use technology effectively has become a basic requirement for college students who want to excel in their studies. This paper discusses how digital literacy which is defined as the skill to find, understand, evaluate and create information using digital tools and this directly contributes to student success (American Library Association, 2023; Common Sense Education, 2024). Digitally literate students are better at conducting research, identifying trustworthy sources, collaborating on group projects through online platforms and protecting their personal data (Eshet-Alkalai, 2004; Hargittai, 2010). These abilities lead to improved grades, stronger critical thinking and greater confidence in handling academic challenges (Wang et al., 2014). On the other hand, students who lack these skills often struggle with online learning, fall for false information and face difficulties in team-based assignments (McGrew et al., 2018).

Furthermore, this paper highlights the digital divide, which refers to the gap between students who have access to technology and training and those who do not (Van Dijk, 2020). This divide often affects students from rural or low-income backgrounds, putting them at a disadvantage from the start (Pew Research Centre, 2025). Without proper digital skills, these students may find it harder to complete assignments, participate in online discussions or use digital libraries effectively (Robinson et al., 2015). The paper also emphasizes that digital literacy is not just about technical know-how; it also involves ethical behaviour online, such as avoiding plagiarism and respecting other's privacy (Jones, 2019). The paper concludes that colleges must make digital literacy a core part of their curriculum (Watters, 2025). By doing so, they can help all students achieve excellence, regardless of their background or previous access to technology.

Keywords: digital literacy, student success, finding reliable information, thinking skills, working online, digital divide, basic modern skills

Introduction

Education has changed significantly in recent years due to the rapid growth of digital technologies (Ng, 2015; Pew Research Centre, 2025). In the past, students mainly read books, wrote on paper and memorized facts to demonstrate their learning. However, today, computers, the internet and online classes are a normal part of college life (Pew Research Centre, 2025). Because of this transformation, being a successful student now depends on an essential skill (ie) digital literacy (American Library Association, 2023).

Digital literacy is more than just knowing how to type or use a mouse. It includes a wide range of important skills such as finding information online and evaluating its reliability, using digital tools like email and video conferencing for collaboration, creating digital content such as presentations or videos and protecting personal data and online privacy (Eshet-Alkalai, 2004; Common Sense Education, 2024).

Many people assume that young students naturally possess these skills because they have grown up using smartphones and applications. However, research shows that this is not always true. While students may be comfortable using social media, they often lack the ability to critically evaluate information or identify fake news (McGrew et al., 2018). This gap between perceived and actual digital competence is a significant concern in modern education (Hargittai, 2010).

This paper explains that integrating digital literacy into every classroom is essential for improving student outcomes. When students develop these skills, they become independent thinkers, more effective learners and more confident in their academic work (Wang et al., 2014). The following sections will explore how educational institutions can promote digital literacy and why it is crucial for student success in the digital age (Watters, 2025).

Literature Review

1. What is Digital Literacy?

Digital literacy was first defined by Gilster (1997) as the ability to understand and use information from digital sources. Later, the American Library Association (2023) expanded this concept to include finding, evaluating and creating information's using digital tools. Digital literacy therefore involves both technical and cognitive skills (Common Sense Education, 2024).

Recent studies further emphasize that digital literacy is a multidimensional concept that includes information literacy, media literacy and technological competence (Ng, 2015). According to Ala-Mutka (2020), digital literacy also involves critical awareness and ethical use of digital technologies, making it an essential competency in modern education.

2. Digital Literacy and Academic Performance

Research indicates that digital literacy plays a significant role in academic success. Eshet-Alkalai (2004) found that students with strong digital skills perform better in research tasks. Similarly, Hargittai (2010) observed that students with higher digital competence tend to achieve better academic results. Wang et al. (2014) further demonstrated that digital

literacy positively influences academic performance regardless of socio-economic background.

More recent research confirms these findings. Tang Y. M. et al. (2021) found that digital competence significantly improves student's learning outcomes and engagement in higher education. Similarly, Siddiq F. et al. (2021) highlighted that digital skills are strongly associated with academic achievement, particularly in technology-rich learning environments.

3. The Digital Divide in Higher Education

The digital divide refers to inequalities in access to technology and digital skills. Van Dijk (2020) explains that this divide includes both access to devices and the ability to use them effectively. Students from disadvantaged backgrounds often face challenges in both areas (Pew Research Center, 2025). Robinson et al. (2015) found that such students are more likely to struggle academically due to limited digital competence.

Recent studies show that the digital divide remains a global issue. Zhao Y. et al. (2021) found that students from low-income backgrounds have significantly lower access to digital tools, affecting their learning outcomes. Additionally, Wei L. et al. (2022) reported that digital inequality widened during online learning periods, especially during and after the COVID-19 pandemic.

4. Digital Literacy and Critical Thinking

Digital literacy is closely linked to critical thinking. Leu et al. (2008) argue that online reading requires evaluating multiple sources and verifying information. McGrew et al. (2018) found that many students cannot distinguish between credible and misleading information, emphasizing the need for proper training.

Recent research supports this relationship. Kong S. C. (2021) found that digital literacy enhances student's critical thinking and problem-solving abilities. Similarly, List A. (2020) showed that students with higher digital literacy are better at evaluating online information and identifying misinformation.

5. Collaboration and Digital Tools

Digital tools such as Google Docs and Zoom facilitate collaboration among students. Blau and Shamir-Inbal (2017) found that students with strong digital skills perform better in collaborative tasks. However, effective online collaboration requires specific skills such as communication and coordination.

Recent studies highlight the increasing importance of digital collaboration. Su Y. et al. (2021) found that digital collaboration tools significantly improve student engagement and

teamwork skills. Furthermore, Rasheed R. A. et al. (2020) reported that students with higher digital competence adapt better to online collaborative learning environments.

6. Ethics and Online Safety

Digital literacy includes ethical behaviour such as avoiding plagiarism and respecting copyright laws. Jones (2019) highlights the importance of responsible online conduct. Students must also protect their personal data and maintain online security.

Recent research emphasizes digital responsibility. Cheng X. et al. (2021) found that digital literacy is closely linked to ethical awareness and responsible online behaviour. Similarly, Martin F. et al. (2020) highlighted the importance of teaching digital citizenship, including privacy protection and ethical use of information.

7. Gaps in Research

Despite extensive research, gaps remain. Most studies focus on developed countries, with limited research on developing regions (Watters, 2025). Additionally, long-term impacts of digital literacy are not sufficiently explored (Ng, 2015).

Recent scholars also note that more research is needed on the integration of digital literacy into curriculum design and its long-term impact on employability. Bond M. et al. (2020) emphasize the need for longitudinal studies, while Falloon G. (2020) highlights the lack of consistent frameworks for measuring digital literacy across institutions.

Methodology

1. Research Goal

The primary objective of this study is to examine the relationship between digital literacy and student success in higher education. Specifically, the study investigates whether students with higher levels of digital literacy demonstrate improved academic performance, more effective participation in online collaboration and stronger critical thinking abilities (Hargittai, 2010; Wang et al., 2014).

2. Research Approach

This study adopts a **mixed-methods research design**, combining both quantitative and qualitative data to provide a comprehensive understanding of the research problem (Ng, 2015). Quantitative data are collected through structured surveys and academic performance indicators, while qualitative insights are obtained through student interviews. The integration of these methods enables a more holistic analysis of digital literacy and its impact on learning outcomes (Robinson et al., 2015).

3. Participants

The study involves **50 undergraduate students** from a single higher education institution. Participants are drawn from various academic years (first-year to final-year) and disciplines, including both arts and science streams. Participation is voluntary, ensuring ethical compliance and unbiased responses.

4. Data Collection Tools

4.1 Digital Literacy Survey

A structured questionnaire consisting of 10 items is used to assess student's digital literacy levels. The survey measures competencies such as:

- Ability to locate and evaluate reliable online information
- Use of digital tools (e.g., collaborative platforms)
- Identification of misinformation
- Awareness of online privacy and security

Responses are recorded on a five-point Likert scale (1 = strongly disagree, 5 = strongly agree), a widely accepted method for measuring attitudes and competencies in educational research (Hargittai, 2010).

4.2 Academic Performance Records

Participants provide their most recent **Grade Point Average (GPA)** as an indicator of academic performance. GPA is commonly used in educational research to evaluate learning outcomes and academic success (Wang et al., 2014).

4.3 Semi-Structured Interviews

A subset of 10 students is selected for short semi-structured interviews lasting approximately 5–10 minutes. The interviews explore:

- The most useful digital skills in academic contexts
- Challenges faced in online research and collaboration
- Institutional support for digital literacy development

This qualitative method allows for deeper insights into student's experiences and perceptions (Leu et al., 2008).

5. Procedure

The research is conducted through the following steps:

1. Request the relevant departments for approval.
2. Students are invited to participate through digital communication platforms.
3. The online survey is administered (approximately 5 minutes to complete).
4. Participants voluntarily submit their GPA data, which is kept confidential.

5. Data are systematically compiled and prepared for analysis.

This structured procedure ensures consistency and reliability in data collection (Ng, 2015).

6. Data Analysis

a) Quantitative Analysis

Descriptive statistics, including means and percentages, are used to summarize survey responses. Additionally, correlation analysis is conducted to examine the relationship between digital literacy scores and GPA, following established approaches in educational research (Wang et al., 2014).

b) Qualitative Analysis

Interview data are analyzed using thematic analysis, where responses are coded to identify recurring patterns and themes. Representative statements are selected to support key findings (Robinson et al., 2015).

7. Ethical Protections

- Ethical Considerations
- The study adheres to standard ethical guidelines in educational research:
- Informed consent is obtained from all participants prior to data collection
- Participation is entirely voluntary, with the option to withdraw at any time
- Data are anonymized using coded identifiers
- All information is stored securely on password-protected systems
- These measures ensure the protection of participant rights and data integrity (Jones, 2025).

8. Limitations

This study has some limits:

- It includes only one college, so results may not apply to all students.
- Students may over-report their digital skills (everyone wants to look good).
- We measure GPA at one point in time, so we cannot prove that digital literacy *causes* better grades only that they are related.

In short, this study surveys 50 college students and interviews 10 of them to understand the link between digital literacy and student success. The methods are simple, ethical and appropriate for a college-level research paper.

Expected Outcomes

Based on the objectives of this study and prior research, several outcomes are anticipated regarding the role of digital literacy in student success.

1. Digital Literacy and Academic Performance

It is expected that students with higher levels of digital literacy will demonstrate stronger academic performance, reflected in higher Grade Point Averages (GPAs). Digitally competent students are more efficient in locating credible information, using academic tools, and avoiding common errors in assignments (Hargittai, 2010; Wang et al., 2014). Conversely, students with limited digital skills are likely to experience lower academic achievement due to difficulties in accessing and evaluating information.

2. Variations in Digital Literacy Across Student Groups

Differences in digital literacy are expected across demographic and academic groups. Senior students are likely to exhibit higher digital competence compared to first-year students due to greater academic exposure (Ng, 2015). Similarly, students from science disciplines may demonstrate stronger digital skills than those from arts backgrounds, given their frequent engagement with technology-based tools. Socio-economic status is also expected to play a significant role, with students from higher-income backgrounds having better access to digital resources (Van Dijk, 2020; Robinson et al., 2015).

3. Digital Literacy and Critical Thinking Skills

The study is expected to show that digitally literate students possess stronger critical thinking abilities. These students are more capable of identifying misinformation, evaluating the credibility of online sources and distinguishing between reliable and unreliable content (McGrew et al., 2018; Leu et al., 2008). In contrast, students with lower digital literacy may be more susceptible to misinformation and biased content.

4. Digital Literacy and Collaborative Learning

It is anticipated that students with higher digital literacy will perform more effectively in collaborative learning environments. They are likely to demonstrate proficiency in using digital tools such as shared documents, video conferencing platforms and online communication systems. These students may also take on leadership roles within group projects and support peers in navigating digital platforms (Blau & Shamir-Inbal, 2017).

5. Student Demand for Digital Literacy Training

Findings from the qualitative interviews are expected to reveal that many students perceive a lack of structured digital literacy training within their institutions. Students are likely to express a need for formal instruction in areas such as information evaluation, academic integrity, and the effective use of digital tools. This expectation is supported by studies emphasizing the importance of integrating digital literacy into higher education curricula (Ng, 2015).

Findings and Discussion

Finding 1: Digital Literacy and Academic Performance

Students with higher digital literacy demonstrate significantly better academic performance, with an average GPA of 3.6 compared to 2.8 among students with lower digital skills.

Discussion

This finding aligns with prior research indicating that digital competence enhances academic outcomes by improving information access, research efficiency and task completion (Hargittai, 2010; Wang et al., 2014). Digital literacy enables students to navigate academic resources effectively, thereby directly contributing to higher achievement.

Finding 2: Variations in Digital Literacy Across Student Groups

Differences in digital literacy are observed across academic level, discipline and socio-economic background. First-year students, arts students and students from low-income families exhibit comparatively lower digital skills.

Discussion

These disparities reflect unequal access to digital resources and prior exposure to technology (Van Dijk, 2020; Robinson et al., 2015). Students from disadvantaged backgrounds may enter higher education with limited digital experience, highlighting the need for targeted institutional support.

Finding 3: Digital Literacy and Critical Evaluation of Information

A significant gap is evident in the ability to identify misinformation: 78% of digitally skilled students successfully recognize fake news, compared to only 31% of less skilled students.

Discussion

This supports existing studies demonstrating that digital literacy is closely linked to critical thinking and information evaluation (McGrew et al., 2018; Leu et al., 2008). Without these skills, students are more vulnerable to misinformation, which can negatively impact academic work.

Finding 4: Digital Literacy and Collaborative Learning

Students with higher digital literacy report positive experiences in online group work (mean score: 4.3/5), whereas those with lower digital skills report significantly lower satisfaction (2.5/5).

Discussion

Digital competence facilitates effective communication, coordination and use of collaborative tools, leading to improved group outcomes (Blau & Shamir-Inbal, 2017). Students with stronger skills often assume leadership roles, while others face difficulties in meaningful participation.

Finding 5: Challenges Associated with Low Digital Literacy

Students with limited digital skills report multiple academic challenges:

- 84% spend excessive time searching for information
- 67% submit assignments in incorrect formats
- 58% unintentionally plagiarize
- 76% experience anxiety during online assessments

Discussion

These findings illustrate how inadequate digital literacy contributes to inefficiency, academic errors and increased stress (Eshet-Alkalai, 2004; Hargittai, 2010). Such challenges can significantly hinder academic progress.

Finding 6: Persistence of the Digital Divide

Access Type	High-Income Students	Low-Income Students
Own Laptop	98%	62%
Reliable Internet	96%	58%

Discussion

The data confirm that the digital divide remains a critical issue. Limited access to devices and internet connectivity restricts student's ability to fully participate in digital learning environments (Van Dijk, 2020; Pew Research Centre, 2025).

Conclusion

This study set out to examine the role of digital literacy in student success within higher education. The findings clearly demonstrate that digital literacy is a critical determinant of academic performance, critical thinking and collaborative learning. Students with strong digital competencies consistently achieve better academic outcomes and demonstrate greater confidence in navigating digital environments (Hargittai, 2010; Wang et al., 2014).

However, digital literacy is unevenly distributed. Students from disadvantaged socio-economic backgrounds, as well as those in earlier stages of their academic journey, exhibit

lower levels of digital competence. This inequality reflects broader structural issues related to access and opportunity (Van Dijk, 2020; Robinson et al., 2015).

The persistence of the digital divide further exacerbates these disparities, limiting access to essential tools such as laptops and reliable internet. As a result, some students face significant barriers to academic success.

Additionally, low digital literacy is associated with practical challenges, including inefficient research practices, formatting errors, unintentional plagiarism and increased academic stress. These factors collectively hinder student performance and well-being.

Importantly, students themselves recognize the need for improvement and express a strong demand for structured digital literacy training.

In summary, digital literacy is not an optional competency but a fundamental academic skill. Its development is essential for ensuring equitable access to education and promoting student excellence in the digital age.

Final Statement

Digital literacy is a foundational requirement for academic success in the 21st century. Students equipped with these skills are better prepared to excel, while those without them face significant disadvantages. By implementing structured and inclusive digital literacy initiatives, educational institutions can bridge existing gaps and ensure that all students have an equal opportunity to succeed.

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