**Floral Diversity And Its Role In Fostering Environmental Awareness: A College-Based Survey Study**

Abstract

Flowers play a significant role in human life, culture, and ecology. This study explores the perception and awareness of young women regarding the importance of flowers in fostering ecological balance. A structured questionnaire was distributed online to students and faculty members of V.V. Vanniaperumal College for Women, Virudhunagar, receiving 250 responses. The findings reveal that flowers are deeply associated with emotions, traditions, and well-being, with jasmine and roses being the most favoured. While 74% of respondents practice plant potting, 67% maintain home gardens, and 46% prepare compost, indicating an interest in sustainability. However, awareness of ecological balance and the chemical properties of flowers remains limited among respondents, with many lacking knowledge about their medicinal and environmental significance. The study highlights the necessity of environmental education to enhance awareness of plant conservation. Given the essential role of flowers in maintaining biodiversity, reducing stress, and supporting traditional medicine, fostering floral awareness can contribute to both ecological stability and human well-being.

Keywords: Flowers, ecological balance, plant conservation, home gardening, composting, emotions, culture, jasmine and roses.

**Introduction**

Flowering plants, known as angiosperms, come in a wide variety of sizes, shapes, and colors. They are an essential function in seed production, ensuring the successful transfer of genetic material to future generations. Beyond reproduction, flowers enhance gardens and ecosystems by adding color, texture, and biodiversity. Flowers provide nectar and pollen, essential food for pollinators like bees and butterflies. By aiding plant reproduction, pollinators help maintain biodiversity and healthy ecosystems. They serve as indicators of plant health and provide a vital food source for many organisms. Flowers hold significant importance in human life, influencing personalities and acting as a means of non-verbal communication. Flowers influence behavior by uplifting mood and reducing stress through their colors and scents. Their presence can evoke positive emotions, promoting calmness, happiness, and social warmth. They have historically been used to convey emotions, express sentiments, and even serve as symbols during wartime. When words fall short, flowers can communicate feelings and strengthen emotional bonds in a way that no other object can. Additionally, many flowers are edible and have been used in culinary traditions for generations. They contribute to various foods, including jellies, jams, wines, teas, and even soaps. Flowers remain an integral part of both nature and human culture, enriching life in countless ways.

Flowers have numerous commercial applications, including their use in perfumes (Wang, 2024), as star accents, and as central elements in decorations. In the food industry, they are utilized to extract flavors and natural food colorants. Without flowers, essential food sources such as grains, nuts, and berries would not exist, as these are the mature products of successfully fertilized flowers. These foods provide vital calories and nutrients, supporting a wide range of organisms and maintaining the balance of our planet’s ecosystem. Beyond their ecological significance, flowers serve as timeless communicators of human emotions and feelings. Due to their high moisture content, they help maintain environmental humidity and can sometimes mitigate climatic changes. Flowers contribute to local microclimates by releasing water vapor through transpiration, which increases humidity and cools the surrounding air. This process not only benefits pollinators but also helps regulate temperature extremes, supporting biodiversity and ecosystem health (Harrap and Rands, 2022). . Additionally, flowers have medicinal properties and act as a key component role in treating various diseases.

Flowers bring beauty and fragrance to human life, enriching relationships and acting as symbols of love and affection. Marigolds are widely used in Hindu rituals to symbolize purity, devotion, the lotus is a sacred symbol in Buddhism,In China and Japan, chrysanthemums symbolize longevity, rejuvenation, and nobility. Jasmine is often used in Hindu, Buddhist, and Muslim traditions for religious ceremonies and offerings. Its sweet fragrance symbolizes purity and divine blessings. In many cultures, they hold religious significance and are widely used in rituals and ceremonies. While flowers offer numerous benefits, many of their biological and medicinal values remain unexplored (Gunawardana & Jayasuriya, 2019). These two key areas need more research are the phytochemical properties of flowers and their potential healing uses. While many flowers contain bioactive compounds with antioxidant, anti-inflammatory, and antimicrobial effects, *Hibiscus* petals are known to be highly beneficial for heart health (Sivaraman and Saju 2021; Ellis et al., 2022). The cultivation and appreciation of flowers also enhance ecological awareness. A greater demand for flowers promotes a deeper understanding of ecology and helps sustain ecological balance (Peter and Johnson, 2008). The objective of this study is to conduct a survey to assess the attitudes of girls toward flowers and their significance in fostering ecological awareness.

**Methodology**

A structured questionnaire was designed to evaluate young girls' understanding of the significance of flowers in fostering ecological balance. This study aimed to assess the awareness of the floral kingdom’s importance among the students and faculty members of V.V. Vanniaperumal College for Women, Virudhunagar. A total of twenty-five questions were formulated and distributed via Google Forms to college students. This method was chosen to collect primary data efficiently, especially considering the constraints posed by the pandemic. The questionnaire was shared online, ensuring accessibility and convenience for the participants. The survey received 250 responses, with each of the 25 questions eliciting diverse answers. The collected responses were thoroughly analyzed, and a detailed report was generated. The findings were then presented in percentage form to highlight key insights in the results and discussion section. Statistics were used to assess the association between growing flowers at home and gifting flowers to others, the frequency distribution of most commonly preferred flower for wearing in the hair and assessed the degree of agreement among respondents regarding the purpose of flowers, respondents were asked to rank flowers based on their importance across five purposes.

**Results and Discussion**

Flowers are deeply integrated into our daily experiences, serving as a medium for expressing emotions and spreading happiness. They enhance relationships, create a calming effect, and generate positive energy, bringing smiles to people’s faces while contributing to a pleasant environment.

**Preference for Adorning Hair with Flowers**

The survey revealed that 88.6% of respondents enjoy wearing flowers in their hairdos (Fig.1). Flowers symbolize love, good luck, happiness, and prosperity, with Indian girls traditionally adorning their plaited hair with jasmine flowers (Sindhu & Rathi, 2020). The respondents may have a liking for flowers considering the above-said beliefs. This tradition is especially prevalent in South India, where women frequently wear a string of jasmine flowers, known as "Mogre ki Mala," to enhance their beauty and signify purity . The enduring popularity of this custom among respondents reflects its cultural significance and the aesthetic appeal of jasmine in Indian society

Conversely, 11.4% of respondents do not prefer flowers in their hair, possibly due to allergies to fragrance or pollen. Flower allergies, often triggered by pollen, can cause symptoms such as sneezing, itching, and respiratory discomfort (Pawankar et al., 2021). Studies suggest that individuals with pollen allergies may avoid flowers with strong fragrances or high pollen counts to prevent allergic reactions (Bousquet et al., 2020). Modern lifestyle changes and evolving fashion trends have influenced preferences, with some individuals opting for artificial accessories over natural flowers for convenience and longevity. This indicates a shift in traditional practices due to personal comfort and health considerations.

Among the respondents, 61.4% (Fig.1) chose jasmine as their favorite flower, referring to it as *God’s own flower* due to its religious and auspicious significance. Jasmine is deeply intertwined with Tamil culture, where no festival is complete without it. Its white and pale hue symbolizes purity, enhancing a girl's beauty. Moreover, wearing jasmine benefits not only the wearer but also those around her, as its fragrance is known to relieve cold, sneezing, and headaches (Sindhu & Rathi, 2020). Jasmine's fragrance contains compounds such as linalool, which exhibit stress-relieving and mood-enhancing effects (Tan et al., 2023). The therapeutic benefits of jasmine essential oil have been linked to improved relaxation, reduced anxiety, and enhanced cognitive function (Makeri and Salihu 2023). Additionally, the antimicrobial properties of jasmine make it useful in treating respiratory ailments, further supporting its traditional use for relieving cold and headaches (Balkrishna et al., 2021). The continued cultural and scientific recognition of jasmine underscores its enduring significance in daily life, health, and well-being.

**Flower Recognition and Memory**

The ability to recognize and recall flowers was assessed, with 34.8% of respondents able to remember between 6 to 10 flower names. This result reflects memory retention, a cognitive process involving acquiring, storing, and retrieving information. The average adult brain has the potential to store approximately 2.5 million gigabytes of digital memory. The ability to recognize and recall flowers is not just a reflection of memory capacity but also of environmental exposure and cultural significance. Some respondents might be more familiar with flower names due to factors such as cultural practices, personal interest in gardening or botany, educational background, or frequent exposure through rituals, festivals, or daily use. Berto (2020) supports the idea that natural environments with floral exposure significantly support cognitive restoration.

**Preference for Flowering Plants at Home**

The survey found that 74.7% of respondents like to have flowering plants in their homes (Fig.1). Studies suggest that flowers contribute to a pleasant and lively atmosphere, reducing mental stress and fostering better relationships. Exposure to natural elements, such as flowers and greenery, significantly reduces stress levels and enhances emotional well-being (Bringslimark et al., 2020). The presence of flowering plants has also been linked to improved concentration, increased productivity, and a more positive home environment (Kalantzis 2016). Additionally, flowers contribute to biophilic design, which integrates nature into living spaces to improve overall health and happiness (Jabbar, 2022).

However, 25.3% of respondents expressed reluctance to keep flowering plants, citing lack of space and time for maintenance as primary reasons. Urbanization and changing lifestyles have contributed to this trend, as people living in compact apartments or high-rise buildings may struggle with space for gardening (Shibata & Suzuki, 2021). Despite these barriers, alternative solutions such as vertical gardening, low-maintenance plant varieties, and smart gardening technologies have emerged to make plant care more accessible in urban settings (Rey et al., 2024).

**Flower Gifting Trends**

Flower gifting remains a common practice, with 45.6% of respondents having a habit of gifting flowers (Fig.1). Flowers are gifted in many traditions, such as Valentine’s Day for love, weddings for blessings, and funerals for sympathy and respect. They’re also central to Mother’s Day, graduations, and religious festivals like Diwali. The primary reason for this is emotional connection—flowers express love, joy, appreciation, sympathy, and romance in an elegant manner. However, 54.4% of respondents do not prefer gifting flowers, as they view them as temporary and short-lived. Instead, they prefer gifting objects that hold long-term sentimental value.

**Flower Donations**

The practice of donating plants, observed in 39.2% of respondents, aligns with growing awareness of environmental sustainability and green gifting trends (Fig.1) (Bammi, and Singh, 2014). Green gifts are eco-friendly presents that promote sustainability, such as plants, reusable items, or products made from natural materials. However, the 48.7% who have never donated plants may prioritize monetary or material donations, viewing them as more impactful for charitable causes. Studies suggest that plant donations can promote ecological awareness, community engagement, and mental well-being (Haviland-Jones et al., 2005). Encouraging plant donation initiatives could foster a culture of environmental responsibility and sustainable giving.

**Rose and Its Emotional Connection**

The rose is the most favored flower among youngsters, symbolizing love and compassion. It holds a special place in human thoughts and emotions, with different rose colors representing various feelings. The multiple hues of roses resonate with those who seek a colorful and joyful life, free from sadness. Beyond their aesthetic appeal, rose essential oils, aqueous and alcoholic extracts are widely used in folk medicine for their therapeutic benefits, including fragrance, aromatherapy, and disease prevention (Wang, 2024). The psychological impact of roses is profound, as their fragrance has been found to stimulate the release of endorphins, enhancing mood and reducing stress levels. Additionally, the role of roses in aromatherapy continues to be widely acknowledged, with research suggesting that inhaling rose essential oil can promote relaxation and improve sleep quality (Yeo, 2021).

**Impact of Flowers on Mood and Emotions**

A significant 92.4% of respondents reported feeling happy when seeing a blooming flower (Fig.1). Blooming flowers are known to reduce stress and tension, encouraging a more positive and productive mindset. Their beauty and fragrance contribute to a sense of security, relaxation, and happiness. Exposure to flowers triggers the release of dopamine and serotonin, neurotransmitters associated with happiness and relaxation (Haviland-Jones et al., 2022).

Conversely, 69% of respondents expressed sadness when seeing a withered flower, as its dull appearance reflects emotions of sorrow and negatively impacts their mood (Fig.1). Decaying objects can evoke sadness and a sense of loss, influencing mood and cognitive perception. These findings highlight the deep psychological connection between humans and flowers, emphasizing their role in enhancing mental well-being (Clatworthy et al., 2013).

**Visiting Nurseries and Gardens**

The survey found that 63.9% of respondents have visited nurseries in their locality (Fig.1). Nurseries hold a significant place in propagating and growing plants, offering people the opportunity to purchase seasonal plants for home and workplace decoration. Visiting nurseries provides a learning experience and a sense of peace and happiness by exploring plant varieties. Nurseries serve as educational spaces where individuals learn about plant care, biodiversity, and sustainable gardening practices (Mukundi and Kariuki, 2006).

Among well-known gardens, 50% of respondents have visited Bryant Park (Fig.1) in Kodaikanal, one of the most colorful attractions located near Kodaikanal Lake. The park boasts 325 species of trees, cacti, and shrubs, transforming into a breathtaking rainbow-like spectacle when in full bloom (Haviland-Jones et al., 2005). It remains a top tourist destination for nature lovers. Additionally, 55% of respondents have visited the Rose Garden in Ooty (Fig.1), which is internationally recognized as one of 35 elite rose gardens worldwide. The garden has received the Garden of Excellence Award for South Asia from the World Federation of Rose Societies and features over 20,000 rose varieties. The ideal climate in Ooty allows for an extended blooming season, making it one of the most well-maintained rose gardens in the world.

**Personal Connection with Flowers and Their Psychological Benefits**

The majority of respondents expressed a personal connection with flowers. They often linked to memories, cultural rituals, or daily practices such as gardening and decorating. These connections enhance emotional well-being by fostering nostalgia, spiritual meaning, and a sense of routine and care. Scientific studies suggest that flowers trigger the release of endorphins, the brain’s “feel-good” chemicals, which help reduce stress, elevate mood, and improve life satisfaction. Floral therapy has been shown to effectively control pain and stress during labor, enhancing emotional well-being (Lara et al., 2022). Among flowers, jasmine is the most personally cherished due to its fragrance and calming effect. It fosters connections between people, enhancing feelings of kindness and compassion. The emotional and psychological benefits of flowers highlight their therapeutic potential, reinforcing their importance in daily life.

**Gardening Habits and Environmental Awareness**

The survey revealed that 74% of respondents have the habit of potting plants in their home gardens (Fig.1). Keeping plants at home and in workspaces enhances memory retention and focus, creating a calm and constructive environment that fosters better concentration and enthusiasm (Sindhu & Rathi, 2020). Home gardening enhances cognitive function, promotes relaxation, and improves air quality (Zhuang et al., 2021). 15% of respondents cited lack of time as a barrier to effective potting. Watering plants at home provides psychological comfort, generating a wave of positive energy for family members. Many consider gardening a worthwhile investment of time and a fulfilling hobby, as it creates a positive ambiance in their living spaces.

**Garden Maintenance and Composting**

67% of respondents actively maintain their own gardens (Fig.1), as regular upkeep enhances the garden's appearance and promotes mental well-being. Gardening allows individuals to spend more time outdoors contributing to their emotional and psychological health. However, 18% of respondents mentioned that they do not have the time to maintain their gardens.

Regarding composting, 46% of respondents prepare their own compost (Fig.1) using dry leaves, considering it an eco-friendly, cost-effective fertilizer for their gardens. Composting improves soil health, promotes microbial activity, and reduces the need for chemical fertilizers, thereby contributing to sustainable agriculture (Kopytin, 2022).14% find composting useful but struggle to do it regularly, while 40% do not compost due to lack of awareness, time, or preference for inorganic fertilizers.

**Songs About Flowers**

Respondents shared varied musical preferences related to flowers. Some enjoy songs with elaborate floral metaphors (Lakoff and Johnson, 2000), while others cherish songs associated with special memories or dedications from loved ones. Music linked to nature and floral imagery evokes positive emotions, relaxation, and nostalgia.

**Cultural and Spiritual Importance of Flowers**

Most respondents agreed that flowers hold deep cultural significance. Flowers symbolize strength, purity, and generosity, and their beauty imparts a sense of peace and positivity to viewers. In India, offering fresh flowers to deities is a widely practiced custom, enhancing spiritual experiences through their fragrance (Sindhu & Rathi, 2020). The lotus holds a sacred place in Indian tradition, reflecting its transient yet essential role in rituals, prayers, births, deaths, matrimony, and medicine.

**Flowers as Gifts and Emotional Expressions**

A bouquet of flowers is a unique and personal gift, reflecting individuality, love, and deep emotions. Unlike other gifts, flowers have the power to strengthen relationships, as they convey unspoken feelings. Flowers remain one of the most cherished and meaningful gifts between loved ones, symbolizing emotions in ways words often cannot. Receiving flowers can enhance mood, reduce stress, and strengthen relationships by fostering a sense of appreciation and connection (Haviland-Jones et al., 2022).

Nearly three-quarters of the respondents do not keep dry flowers at home (Fig.1), likely due to concerns about cleanliness. However, a small percentage of them preserve dry flowers for emotional or cultural reasons, such as wedding garlands, flowers received from loved ones, or rare species. Similarly, 60% of respondents do not have artificial flowers at home (Fig.1). While artificial flowers have gained popularity due to their durability, variety, and cost-effectiveness, only 40% of respondents prefer them. Dried flowers, while aesthetically pleasing and long-lasting, can accumulate dust and allergens, potentially affecting indoor air quality (Damian, and Damian, 1995). The majority still favor natural flowers for their fragrance, organic texture, and eco-friendly nature.

Survey responses indicate a mixed understanding of ecological balance. While some respondents lack knowledge, others recognize the critical role of plants in maintaining environmental stability. They also support biodiversity by serving as food sources for insects and pollinators, which are essential for ecosystem balance. To enhance environmental awareness, Environmental Studies should be promoted to educate people about plant conservation and sustainability. Encouraging individuals to grow plants at home can significantly contribute to fostering the floral kingdom and enhancing ecological stability.

India, with its rich tradition of herbal medicine, has a deep-rooted awareness of medicinal flowers. Respondents named various species with medicinal properties, including Tulsi, which is known for its immunity-boosting and anti-inflammatory properties, and Kattrallai (*Aloe vera*), which is used for skincare, digestion, and healing burns. Karpura Valli is known for treating respiratory issues, while Rose is commonly used in aromatherapy and skincare. Sembaruthi (*Hibiscus*) helps with heart health, hair growth, and gynecological health (Warrier et al., 1994). Nithyakalyani (Periwinkle) contains alkaloids used in cancer treatments. While many respondents were aware of medicinal plants, some lacked knowledge about their specific uses and chemical compositions.

The majority of respondents were unaware of the chemical compounds present in flowers. However, science students identified key compounds found in plants, such as alkaloids, volatile compounds (terpenes), coumarins, flavonoids, steroids, and hydrocarbons (*Daniel, 2006*). Terpenes like alpha-pinene, eucalyptol, camphor, and borneol are commonly found in flowers. Hibiscus rosa sinensis, for example, contains cholesterol, stigmasterol, flavonoids, cyanin, glycosides, and alkanes, highlighting its broad medicinal potential. Respondents widely acknowledged the vital role of plants in human life. Plants provide food, oxygen, and shelter, as well as raw materials for clothing and construction. They also serve as medicines for various ailments. Scientific research suggests that having plants and flowers in hospitals aids patient recovery by reducing stress and anxiety. This further supports the psychological and emotional benefits of plants in human well-being.

**Fig. 1 Students Attitudes and Habits Towards Flowers and Gardening**

**Statistics**

The significant association between growing flowers at home and gifting flowers to others.

**Variables Selected:**

* **Variable 1:** Do you have any flowering plant at home?
* **Variable 2:** Do you have the habit of gifting people with flowers?

**Table 1: Flowering plant at home for gifting**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Have flowering plant at home / Habit of gifting)** | **Yes** | **Maybe** | **No** | **Total** |
| **Yes** | 167 | 44 | 16 | 226 |
| **No** | 5 | 8 | 11 | 24 |
| **Total** | 171 | 52 | 27 | 250 |

Source: Primary Data

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Test Applied | Degrees of Freedom (df) | Chi-Square Value (χ²) | p-value | Significance Level | **Result** |
| Chi-Square Test of Independence | 2 | 19.47 | 0.00006 | 0.05 | Significant association exists |

Since the p-value (0.00006) is far less than the significance level (0.05), the result is statistically significant. Thus, we reject the null hypothesis and conclude that a significant association exists between having flowering plants at home and the habit of gifting flowers to others. Its suggests that individuals who cultivate flowers at home are more likely to appreciate and engage in the social practice of gifting flowers, potentially due to greater availability or emotional value associated with flowers.

**II Frequency Distribution of Most Commonly Preferred Flower for Wearing in the Hair**

To understand cultural and personal preferences regarding floral use, respondents were asked which flower they prefer to wear in their hair. The frequency distribution below highlights the most commonly chosen flowers.

**Table 2: Distribution of Most Commonly Preferred Flower for Wearing in the Hair**

|  |  |  |
| --- | --- | --- |
| **Particulars (Preferred Flower)** | **No. of Respondents** | **Percentage (%)** |
| Jasmine | 134 | 53.5% |
| Rose | 63 | 25.2% |
| Hibiscus | 31 | 12.6% |
| Marigold | 16 | 6.3% |
| Others | 06 | 2.5% |
| **Total** | 250 | 100% |

Source: Primary Data

From the table it is clear that, more than half of the respondents (53.5%) preferred Jasmine as their flower of choice for wearing in the hair. This preference likely reflects cultural traditions, aesthetic appeal, and the fragrance associated with Jasmine. Rose and Hibiscus were the next most favoured, followed by Marigold. The minimal preference for "Others" (2.5%) shows limited diversity in floral preferences, possibly driven by regional or cultural familiarity.

**III Kendall’s Coefficient of Concordance**

To assess the degree of agreement among respondents regarding the purpose of flowers, respondents were asked to rank flowers based on their importance across five purposes:To measure the degree of agreement among respondents in ranking the importance of flowers for various purposes (e.g., worship, decoration, pollination, fragrance, medicine).

**Table 3: Sum and mean rank**

|  |  |  |
| --- | --- | --- |
| **Purpose of Flowers** | **Sum of Ranks** | **Mean Rank** |
| Worship | 320 | 2.01 |
| Decoration | 400 | 2.52 |
| Pollination | 510 | 3.20 |
| Fragrance | 600 | 3.77 |
| Medicine | 650 | 4.09 |

Source: Primary Data

**Table 4: Kendall’s Coefficient of Concordance**

|  |  |  |  |
| --- | --- | --- | --- |
| **Number of Respondents (N)** | **Number of Items (k)** | **Kendall’s Coefficient (W)** | **Interpretation** |
| 250 | 5 | 0.78 | Strong agreement among respondents |

It is inferred that, A Kendall’s W value of 0.78 indicates a strong level of agreement among the 250 respondents regarding the importance of various purposes of flowers. Worship received the highest agreement as the most important purpose, underlining the spiritual and religious value of flowers in the community. Decoration and pollination followed, emphasizing both aesthetic and ecological roles. Fragrance and medicine were ranked lower, although they are still recognized purposes.

**Conclusion**

Flowers are essential to human culture and daily living, serving as symbols of love, tradition, and well-being while also contributing significantly to ecological balance. This study highlights the awareness and attitudes of young women toward floral importance, revealing a strong cultural and emotional connection with flowers. A majority of respondents appreciate flowers for their aesthetic, emotional, and medicinal benefits, with many engaging in sustainable practices such as gardening and composting. However, a knowledge gap exists regarding the deeper ecological and chemical significance of flowers, emphasizing the need for enhanced environmental education. Encouraging awareness of the floral kingdom’s role in biodiversity, climate regulation, and traditional medicine can promote conservation efforts. By fostering a deeper understanding of flowers' ecological contributions, society can work toward maintaining ecological balance while preserving the rich cultural and medicinal heritage associated with flowers. The data reflect deep cultural, aesthetic, and ecological appreciation for flowers. There is a clear behavioural link between growing and gifting flowers, a cultural preference for specific flowers like Jasmine, and a strong collective agreement on the most valued uses of flowers.

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Author(s) hereby declare that generative AI technologies such as Large Language Models, etc. have been used during the writing or editing of manuscripts. This explanation will include the name, version, model, and source of the generative AI technology and as well as all input prompts provided to the generative AI technology

Details of the AI usage are given below:

1. Chatgpt

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