International Journal of Advanced Research in Commerce, Management & Social Science (IJARCMSS)
ISSN :2581-7930 (Online), Impact Factor : 7.270, Volume 08, No. 04(II), October-December, 2025, pp 214-221

The Role of Dietary Patterns, Genetic Factors, and Psychological Stress in Hair Loss in Rural Areas of Bhagalpur District, Bihar

Dr. Shephali[1*] | Bijaya Lakshmi[2]

[1]Associate Professor, HOD, University Department of Home Science – Food & Nutrition, T.M. Bhagalpur University, Bhagalpur, Bihar, India.
[2]Research Scholar, University Department of Home Science – Food & Nutrition, T.M. Bhagalpur University, Bhagalpur, Bihar, India.

[*]Corresponding Author: shephalibgp1963@gmail.com

Citation: *Shephali, S. & Lakshmi, B. (2025). The Role of Dietary Patterns, Genetic Factors, and Psychological Stress in Hair Loss in Rural Areas of Bhagalpur District, Bihar. International Journal of Advanced Research in Commerce, Management & Social Science, 08(04(II)), 214–221. https://doi.org/10.62823/IJARCMSS/8.4(II).8463*

ABSTRACT

Hair loss is an emerging public-health concern in the rural areas of Bhagalpur district, Bihar, where nutritional challenges, genetic susceptibility, and psychological stress frequently coexist. This study examined the role of dietary patterns, genetic factors, and psychological stress in influencing hair-loss severity among adults in rural areas of Bhagalpur district. A descriptive cross-sectional design was adopted with a sample of 180 participants aged 18–60 years selected through simple random sampling. Data were collected using structured questionnaires on dietary habits, family history of hair loss, and perceived stress levels, along with basic clinical observation. Percentage analysis and chi-square tests were applied. Findings showed that 72% of individuals with low dietary diversity and 64% with irregular protein intake reported high hair loss. Moderate to severe hair loss was observed in 69% of participants with a positive family history. High stress was associated with greater hair shedding, reported by 74% of high-stress participants. The combined presence of poor diet, genetic risk, and high stress resulted in the highest hair-loss severity. All associations were statistically significant ($p < 0.05$). The study concludes that hair loss in the rural population of Bhagalpur district is multifactorial, with modifiable factors such as nutrition and stress management playing a crucial role. Community-based nutritional awareness and stress-reduction strategies may help reduce hair-loss burden in rural settings.

Keywords: *Hair Loss, Dietary Patterns, Genetic Predisposition, Psychological Stress, Bhagalpur District.*

Introduction

Hair loss is increasingly recognized as a public-health concern that extends beyond cosmetic appearance to affect psychological well-being, confidence, and social participation. Although often considered a minor issue, persistent hair loss can lead to emotional distress, reduced self-esteem, and anxiety, particularly among adults. In rural regions of India, including Bhagalpur district of Bihar, awareness about hair health and access to dermatological care remain limited. As a result, many individuals experience untreated or poorly managed hair loss, making it an emerging community health concern.

Hair growth depends on a continuous cycle of follicular development that requires adequate nutrition, hormonal balance, and a healthy physiological environment. When this cycle is disrupted, excessive hair shedding or thinning may occur. Non-scarring forms of hair loss, such as telogen effluvium and pattern hair loss, are commonly associated with nutritional deficiencies, hereditary factors, and psychological stress. These factors are particularly relevant in rural settings where dietary limitations, socio-economic pressures, and inherited vulnerabilities often coexist.

Dietary quality plays a crucial role in maintaining hair health because hair follicles are metabolically active and require sufficient nutrients for keratin synthesis and growth. In many rural households, diets are largely cereal-based and may lack adequate protein, iron, zinc, and essential vitamins. The present study reflects this concern, as a substantial proportion of participants reported limited dietary diversity. Survey findings showed that individuals with low dietary diversity experienced notably higher hair loss (72%) compared to those with high dietary diversity (22%). Similarly, irregular protein intake was associated with greater hair fall (64%) compared to regular intake (28%). These observations highlight how nutritional inadequacy may directly influence hair-loss severity in rural populations.

Genetic predisposition is another important determinant of hair loss. Family history often shapes susceptibility, age of onset, and progression patterns. In the current study, more than half of the respondents reported a positive family history of hair loss. Among them, 69% experienced moderate to severe hair loss, compared to 34% among those without a known family history. This pattern indicates that heredity establishes a baseline vulnerability, although its impact may be modified by lifestyle and environmental factors.

Psychological stress has also been increasingly linked to hair loss through biological and behavioural pathways. Chronic stress activates hormonal responses that can push hair follicles prematurely into the shedding phase. In rural communities, stress commonly arises from financial instability, employment uncertainty, and family responsibilities. The findings of this study showed a clear gradient: 74% of participants with high perceived stress reported high hair loss, compared to 29% among those with low stress. This suggests that stress may significantly aggravate hair-loss conditions.

Importantly, hair loss rarely results from a single factor. The present study demonstrated a cumulative effect, where individuals exposed to multiple risks showed the greatest severity. Participants with both genetic risk and poor diet reported higher moderate–severe hair loss (63%), and those with genetic risk and high stress showed similarly elevated levels (59%). These patterns indicate a synergistic interaction among diet, genetics, and stress.

In view of the limited rural-focused research on this issue, particularly in Bhagalpur district, there is a clear need for context-specific evidence to inform preventive planning. Understanding how modifiable factors such as dietary habits and psychological stress interact with genetic susceptibility can support the development of community-based awareness and intervention programs. Accordingly, the present study aims to examine the role of dietary patterns, genetic factors, and psychological stress in influencing hair-loss severity among adults in the rural areas of Bhagalpur district.

Objectives

- To examine the relationship between dietary patterns and hair loss among individuals in rural areas of Bhagalpur district.
- To assess the influence of genetic factors and family history on the occurrence of hair loss.
- To evaluate the role of psychological stress in contributing to hair loss.
- To identify the combined effect of diet, genetics, and stress on hair loss in the rural population of Bhagalpur district.

Hypotheses

H_1: There is a significant association between dietary patterns and hair loss among individuals in rural areas of Bhagalpur district.

H_2: Individuals with a positive family history of hair loss are more likely to experience moderate to severe hair loss than those without a family history.

H_3: Higher psychological stress is significantly associated with greater hair-loss severity.

H_4: The combined presence of poor diet, genetic predisposition, and high psychological stress significantly increases the severity of hair loss compared to any single factor alone.

Methodology

The study adopted a descriptive cross-sectional research design to examine the role of dietary patterns, genetic factors, and psychological stress in hair loss in the rural areas of Bhagalpur district, Bihar. The study was conducted in selected rural communities of Bhagalpur district, Bihar with a sample of 180 participants aged 18-60 years selected through simple random sampling. Data were collected

using a structured questionnaire covering socio-demographic details, dietary habits, family history of hair loss, and perceived stress levels. A standardized stress scale (such as the Perceived Stress Scale) was used to assess psychological stress. Basic clinical observation of hair-loss patterns was also recorded. Data were analysed using statistical methods such as percentage analysis, correlation, and regression to identify associations among variables. Ethical consent and confidentiality were maintained throughout the study.

Dietary Diversity and Nutritional Intake

Dietary diversity plays a critical role in maintaining healthy hair growth, as hair follicles require a continuous supply of nutrients for normal functioning. In the present study, dietary diversity among respondents in rural areas was found to be limited, with many participants relying heavily on cereal-based diets and consuming insufficient amounts of fruits, green leafy vegetables, pulses, and protein-rich foods. Such monotonous diets often lack essential micronutrients like iron, zinc, biotin, protein, and vitamins A, D, and B12, all of which are vital for the hair growth cycle. Findings from the survey revealed that participants who consumed a more diverse diet including dairy products, seasonal fruits, and pulses at least 4-5 times per week reported comparatively lower levels of hair fall. In contrast, those with low dietary diversity showed higher complaints of hair thinning and excessive shedding. This suggests that inadequate nutrient intake may weaken hair follicles, making them more prone to breakage and hair fall.

Frequency of Nutrient-Rich Food Consumption

The frequency with which nutrient-rich foods were consumed showed a direct association with hair health. Many respondents reported irregular consumption of iron- and protein-rich foods due to financial constraints or lack of awareness. Women participants, in particular, demonstrated lower intake of iron-rich foods, which may also relate to anaemia a known contributor to hair loss. Participants who consumed protein sources (such as pulses, eggs, or milk) daily or at least 4 times per week reported healthier hair texture and less hair fall. On the other hand, those consuming these foods rarely (1-2 times per week) experienced higher rates of hair shedding. The results indicate that not only the type of food but also the regularity of nutrient intake influences hair health.

Impact of Unhealthy Dietary Habits

Unhealthy dietary habits were also observed to affect hair loss. A portion of respondents frequently consumed fried foods, packaged snacks, and sugary beverages while skipping balanced meals. Such habits can reduce nutrient absorption and negatively affect overall health, including hair quality. Meal skipping, especially breakfast, was common among younger participants and was associated with increased hair fall complaints. Additionally, low water intake was reported by several participants, which may indirectly impact scalp health and hair strength. These findings highlight that poor dietary habits combined with nutrient deficiencies can accelerate hair loss in rural populations. The relationship between dietary patterns and the prevalence of hair loss among participants is summarized in Table 1.

Table 1: Association Between Dietary Patterns and Hair Loss

Dietary Pattern	% Participants Following Pattern	% Reporting High Hair Loss
Low dietary diversity	46%	72%
Moderate dietary diversity	34%	45%
High dietary diversity	20%	22%
Regular protein intake	38%	28%
Irregular protein intake	62%	64%
Frequent junk food consumption	41%	67%

Source: Field survey data

As shown in table 1, participants with low dietary diversity and irregular protein intake reported noticeably higher levels of hair loss, indicating a strong link between nutritional quality and hair health.

Role of Hereditary Predisposition

Genetic predisposition is one of the most significant determinants of hair loss, particularly in conditions such as pattern hair loss and premature thinning. In the present study, a considerable proportion of participants reported that one or more family members experienced similar hair-loss patterns. This indicates that heredity plays a major role in determining susceptibility to hair fall. Hair

follicles are genetically programmed for growth duration, thickness, and sensitivity to hormonal changes. Individuals with a genetic tendency toward hair loss may experience earlier onset and faster progression compared to those without such a background. The findings showed that participants with a positive family history often began noticing hair thinning at a younger age. This supports the view that genetics sets a baseline risk for hair loss, which may later be influenced by lifestyle and environmental factors.

Family History and Pattern Similarity

The study also explored whether participants shared similar hair-loss patterns with their parents or close relatives. Many respondents with a family history reported hair loss in a pattern resembling that of their father, mother, or grandparents. For example, male participants frequently showed receding hairlines similar to paternal relatives, while female participants reported diffuse thinning like their mothers. This pattern similarity strengthens the argument that hair loss is not merely incidental but often inherited. Participants without any known family history generally reported later onset and milder forms of hair fall. However, it was also observed that awareness about family medical history was limited among some rural respondents, which could slightly affect reporting accuracy. Despite this, the overall trend strongly indicated a hereditary link.

Interaction of Genetics with Other Factors

Although genetics plays a key role, it does not act alone. The study found that genetic susceptibility often interacts with nutrition, health status, and stress. Participants with a family history who also had poor diets or high stress levels reported more severe hair loss. This suggests that genetic risk can be triggered or intensified by unfavourable conditions. Conversely, some participants with hereditary risk but healthier lifestyles showed slower progression. This indicates that while genes cannot be changed, their impact can be moderated through proper care, nutrition, and stress management. Therefore, understanding genetic background can help in early identification and preventive strategies. The association between hereditary background and hair-loss severity among respondents is presented in Table 2.

Table 2: Family History and Hair Loss Association

Family History of Hair Loss	% Participants	% Reporting Moderate to Severe Hair Loss
Positive family history	58%	69%
No known family history	30%	34%
Uncertain family history	12%	48%

Source: Field survey data

The above table 2 demonstrates that individuals with a positive family history showed a significantly higher prevalence of moderate to severe hair loss, supporting the role of genetic predisposition.

Role of Psychological Stress in Hair Loss

Psychological stress is a significant factor affecting hair health in rural populations. In the rural population of Bhagalpur district, stress commonly arises from socio-economic challenges such as agrarian uncertainty, debt, unemployment, migration, and family responsibilities. Limited access to mental-health services and social stigma often prevent timely support. In this study, many participants reported moderate to high stress, particularly women and young adults facing financial and social pressures. This shows that stress is a common rural experience and may influence hair health.

Biological Mechanisms Linking Stress and Hair Loss

Stress affects hair growth through biological pathways. Chronic stress activates the hypothalamic–pituitary–adrenal (HPA) axis, increasing cortisol levels that push hair follicles from the growth phase into the shedding phase, leading to telogen effluvium. Stress can also disturb immune balance and contribute to conditions like alopecia areata. Additionally, stress may disrupt sleep and appetite, indirectly worsening nutritional status. The study observed that highly stressed participants often had poor diets and irregular sleep, suggesting a combined effect.

Observed Association Between Stress Levels and Hair Loss Severity

A clear relationship was found between stress levels and hair-loss severity. Participants with higher stress reported more hair shedding and thinning, while those with lower stress had relatively stable hair conditions. Some respondents linked hair fall to specific stressful events. Individuals practicing stress-relief activities such as yoga, prayer, or exercise reported fewer complaints, indicating that coping

strategies can reduce impact. The findings reinforce the idea that stress management should be considered a component of hair-loss prevention strategies in rural communities. The distribution of hair-loss severity across different stress levels is illustrated in Table 3.

Table 3: Association Between Psychological Stress and Hair Loss

Stress Level	% Participants	% Reporting High Hair Loss
Low Stress	26%	29%
Moderate Stress	44%	52%
High Stress	30%	74%

Source: Field survey data

As indicated in table 3, higher perceived stress levels were associated with greater reports of hair shedding, suggesting a clear stress hair loss connection.

Combined Effect of Diet, Genetics, and Psychological Stress on Hair Loss

Hair loss in rural populations results from the interaction of genetic susceptibility, diet, and psychological stress rather than a single cause. Genetics provides baseline vulnerability, but the severity of hair loss depends largely on modifiable factors such as nutrition and stress. Individuals with a family history but good diet and low stress often showed milder thinning, whereas those with poor diets and high stress reported faster progression. Nutritional deficiencies weaken hair follicles, and chronic stress disrupts the hair-growth cycle, indicating that these factors amplify genetic risk rather than act independently.

Interaction Patterns Observed in the Study

The study identified clear interaction patterns among risk factors. Participants exposed to two or more risks consistently showed greater hair-loss severity than those with only one. Those with both genetic predisposition and poor dietary diversity frequently reported moderate to severe hair thinning, and severity was highest when high stress was added. Conversely, individuals without family history but with poor diet and stress still experienced hair fall, though often less severe. These findings support a cumulative risk model and show that improving even one factor can reduce perceived hair loss.

Practical Implications of the Combined Effect

The combined effect highlights the need for a holistic prevention approach in rural areas. Hair-loss prevention should include nutritional education, affordable access to protein- and micronutrient-rich foods, and stress-management practices such as yoga and social support. Awareness of family history can encourage early preventive care. Community health workers can promote the message that while genetics cannot be changed, lifestyle can influence outcomes. Overall, improving diet and psychological well-being can help reduce hair-loss severity even among genetically susceptible individuals. The cumulative influence of diet, genetics, and psychological stress on hair-loss severity is summarized in Table 4.

Table 4: Combined Risk Factors and Hair Loss Severity

Risk Combination	% Participants	% Reporting Moderate–Severe Hair Loss
Genetic risk only	18%	41%
Poor diet only	16%	38%
High stress only	12%	36%
Genetic + Poor diet	22%	63%
Genetic + Stress	14%	59%

Source: Field survey data

The above table 4 highlights that participants exposed to multiple risk factors experienced the highest levels of hair loss, confirming the synergistic effect of these variables.

Hypothesis Testing

To examine the study objectives more rigorously, statistical hypothesis testing was conducted using percentage comparison and chi-square tests of association. Chi-square analysis was applied to assess the relationships between dietary patterns, family history, psychological stress, and hair-loss severity, as these variables were categorical in nature. The level of significance was set at $p < 0.05$. The hypotheses tested accordingly to determine whether significant associations existed among the study variables:

Hypothesis 1 (H_1)

H_1: There is a significant association between dietary patterns and hair loss among individuals in rural areas of Bhagalpur district.

H_0: There is no significant association between dietary patterns and hair loss among individuals in rural areas of Bhagalpur district.

As presented in Table 1, participants with low dietary diversity (72%) and irregular protein intake (64%) reported substantially higher hair loss compared to those with high dietary diversity (22%) and regular protein intake (28%). The observed differences indicate a strong association between dietary quality and hair-loss prevalence. A chi-square test of association showed a statistically significant relationship between dietary patterns and hair-loss severity, $\chi^2(4, N=180) = 16.84$, $p = 0.002$.

Decision: H_1 is accepted. Dietary patterns show a significant relationship with hair loss.

Hypothesis 2 (H_2)

H_2: Individuals with a positive family history of hair loss are more likely to experience moderate to severe hair loss than those without a family history.

H_0: Individuals with a positive family history of hair loss are not more likely to experience moderate to severe hair loss than those without a family history.

Table 2 shows that 69% of respondents with a positive family history reported moderate to severe hair loss compared to 34% among those without family history. This marked difference supports a hereditary influence. Chi-square analysis confirmed a significant association between family history and hair-loss severity, $\chi^2(2, N=180) = 14.27$, $p = 0.001$.

Decision: H_2 is accepted. Family history significantly influences hair-loss severity.

Hypothesis 3 (H_3)

H_3: Higher psychological stress is significantly associated with greater hair-loss severity.

H_0: Higher psychological stress is not significantly associated with greater hair-loss severity.

Table 3 indicates that 74% of individuals with high stress reported severe hair loss compared to 29% among those with low stress. A clear gradient is observed across stress levels.

The chi-square test revealed a statistically significant association between stress levels and hair-loss severity, $\chi^2(4, N=180) = 19.63$, $p < 0.001$.

Decision: H_3 is accepted. Psychological stress has a significant association with hair loss.

Hypothesis 4 (H4)

H_4: The combined presence of poor diet, genetic predisposition, and high psychological stress significantly increases the severity of hair loss compared to any single factor alone.

H_0: The combined presence of poor diet, genetic predisposition, and high psychological stress does not significantly increase the severity of hair loss compared to any single factor alone.

Table 4 demonstrates that combined risk factors (genetics + poor diet or genetics + stress) show higher prevalence of moderate–severe hair loss (63% and 59%) compared to single risk factors alone (36–41%). This supports a cumulative or synergistic effect. Chi-square testing indicated a significant cumulative association, $\chi^2(6, N=180) = 22.91$, $p < 0.001$.

Decision: H_4 is accepted. Multiple risk factors jointly increase hair-loss severity.

Table 5: Summary of Hypothesis Testing

Hypothesis	Variables Tested	χ^2 value	p-value	Decision
H_1	Dietary patterns × Hair loss	16.84	0.002	Accepted
H_2	Family history × Hair loss	14.27	0.001	Accepted
H_3	Stress level × Hair loss	19.63	<0.001	Accepted
H_4	Combined factors × Hair loss	22.91	<0.001	Accepted

Source: Field survey data

The results in table 5 show that all calculated p-values were below 0.05, indicating statistically significant associations. Therefore, all four research hypotheses were accepted, and the corresponding null hypotheses were rejected. This confirms that dietary patterns, genetic factors, and psychological stress individually and jointly influence hair-loss severity.

Results and Discussion

The study confirms that dietary patterns, genetic predisposition, and psychological stress are significantly associated with hair-loss severity among rural adults.

For dietary patterns (H_1), 72% of participants with low dietary diversity and 64% with irregular protein intake reported high hair loss, compared to 22% among those with high dietary diversity. The association was significant ($\chi^2 = 16.84$, $p = 0.002$), indicating that poor nutrition contributes to hair fall.

Regarding genetic factors (H_2), 69% of individuals with a positive family history experienced moderate to severe hair loss versus 34% without such history. This relationship was significant ($\chi^2 = 14.27$, $p = 0.001$), confirming heredity as a major risk factor.

For psychological stress (H_3), high hair loss was reported by 74% of high-stress participants compared to 29% of low-stress participants. The association was significant ($\chi^2 = 19.63$, $p < 0.001$), showing that stress increases hair shedding.

The combined effect (H_4) showed that 63% of participants with genetic risk and poor diet and 59% with genetic risk and high stress reported greater severity, compared to 36–41% for single factors. This cumulative effect was significant ($\chi^2 = 22.91$, $p < 0.001$).

Overall, hair loss in the rural population of Bhagalpur district is multifactorial, with diet and stress acting as modifiable factors that influence genetically predisposed individuals.

Conclusion

The present study concludes that hair loss in the rural population of Bhagalpur district is a multifactorial condition influenced by dietary patterns, genetic predisposition, and psychological stress. The findings demonstrate that individuals with low dietary diversity and irregular protein intake experience higher levels of hair loss, highlighting the importance of balanced nutrition for hair health. Genetic predisposition emerged as a strong non-modifiable factor, with participants having a positive family history showing greater severity and earlier onset of hair thinning. Psychological stress was also significantly associated with increased hair shedding, indicating the role of emotional and socio-economic pressures in rural settings. Importantly, the study revealed a cumulative effect, where the coexistence of poor diet, genetic risk, and high stress led to the greatest hair-loss severity. These results emphasize that while genetic susceptibility cannot be altered, improving dietary habits and managing stress can substantially reduce the burden of hair loss. Therefore, community-based awareness, nutritional education, and stress-management interventions are essential for promoting hair and overall health in the rural population of Bhagalpur district.

References

1. Chakrabarty, S., Krishnappa, P. G., Gowda, D. G., & Hiremath, J. (2016). Factors associated with premature hair graying in a young Indian population. *International journal of trichology*, *8*(1), 11-14.
2. Devi, S. D., & Bagga, A. (2006). *Ageing in women: A study in North-East India*. Mittal Publications.
3. Dhar, S., Mondal, K. K., & Bhattacharjee, P. (2023). Influence of lifestyle factors with the outcome of menstrual disorders among adolescents and young women in West Bengal, India. *Scientific reports*, *13*(1), 12476.
4. Gowda, D., Premalatha, V., & Imtiyaz, D. B. (2017). Prevalence of nutritional deficiencies in hair loss among Indian participants: results of a cross-sectional study. *International journal of trichology*, *9*(3), 101-104.
5. Katsarou-Katsari, A., Singh, L. K., & Theoharides, T. C. (2001). Alopecia areata and affected skin CRH receptor upregulation induced by acute emotional stress. *Dermatology*, *203*(2), 157-161.
6. Khan, M. A., Bahadur, A. K., Agarwal, P. N., Sehgal, A., & Das, B. C. (2010). Psychosocial disorders in women undergoing postoperative radiation and chemotherapy for breast cancer in India. *Indian journal of cancer*, *47*(3), 296-303.
7. Khath, B., & San, M. (2024). The impact of hair loss in Cambodia: causes, prevention methods, and treatment solutions. *Srawung: Journal Of Social Sciences And Humanities*, 66-82.

8. Kumar, A., Kumar, K., Ali, M., Raj, V., Srivastava, A., Kumar, M., ... & Ghosh, A. K. (2024). Severe disease burden and the mitigation strategy in the arsenic-exposed population of Kaliprasad Village in Bhagalpur District of Bihar, India. *Biological trace element research*, *202*(5), 1948-1964.

9. Mahajan, B. S., & Chunawala, S. (1999). Indian secondary students' understanding of different aspects of health. *International Journal of Science Education*, *21*(11), 1155-1168.

10. Mohamed, N. E., Soltan, M. R., Galal, S. A., El Sayed, H. S., Hassan, H. M., & Khatery, B. H. (2023). Female pattern hair loss and negative psychological impact: possible role of brain-derived neurotrophic factor (BDNF). *Dermatology Practical & Conceptual*, *13*(3), e2023139.

11. Poonia, K., Thami, G. P., Bhalla, M., Jaiswal, S., & Sandhu, J. (2019). NonScarring diffuse hair loss in women: a clinico-etiological study from tertiary care center in North-West India. *Journal of Cosmetic Dermatology*, *18*(1), 401-407.

12. Sawant, N., Chikhalkar, S., Mehta, V., Ravi, M., Madke, B., & Khopkar, U. (2010). Androgenetic alopecia: quality-of-life and associated lifestyle patterns. *International journal of trichology*, *2*(2), 81-85.

13. Yadav, M. S., Kushwaha, N., & Maurya, N. K. (2025). The Influence of Diet, Lifestyle, and Environmental Factors on Premature Hair Greying: An Evidence-Based Approach. *Archives of Clinical and Experimental Pathology*, *4*(1).

14. Youssef, S. M., Atallah, R. B., Zaky, M. S., Eldeek, B. S., & Elsaie, M. L. (2022). Urban-rural differences in the prevalence of female pattern hair loss among secondary school girls: A cross-sectional study. *Journal of cosmetic dermatology*, *21*(5), 2229-2235.

❑❑❑