



Research Paper

Prevalence of dandruff (pityriasiscapitis) and hair fall (alopecia) among adults aged 18–40 years and their association with hair-care practices, lifestyle factors, and seasonal variation

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Abstract

Background:

Dandruff (Pityriasiscapitis) and hair fall (Alopecia) are prevalent dermatological concerns among young adults that significantly impact quality of life. Although multifactorial in origin, their associations with routine hair-care practices, lifestyle habits, and seasonal fluctuations remain understudied in this age group.

Objectives:

To determine the prevalence of dandruff and hair fall among adults aged 18-40 years and to evaluate their association with selected hair-care practices, lifestyle factors, and seasonal variations.

Methodology:

A questionnaire-based cross-sectional study was conducted among 100 consenting adults aged 18-40 years selected via convenience sampling. Data was collected using a pre-tested, self-administered questionnaire assessing demographic profiles, scalp/hair symptoms, hair hygiene practices, dietary habits, stress levels, and seasonal symptom variation. Statistical analysis was performed using proportions and appropriate test of associations.

Results :- Among 100 participants, the prevalence of dandruff and hair fall was 58% and 64%, respectively. Dandruff was significantly associated with oily scalp ($p=0.002$) and overnight oiling ($p=0.005$). Hair fall showed significant associations with female sex ($p=0.023$), high perceived stress ($p=0.001$), inadequate sleep ($p=0.018$), recent illness ($p=0.024$), and monsoon aggravation ($p=0.004$). Winter was the most commonly reported season for dandruff aggravation (54%).

Conclusion: Dandruff and hair fall were common among adults aged 18–40 years. Their occurrence showed associations with certain hair-care practices, lifestyle factors, and seasonal variation. Awareness regarding appropriate hair care and healthy lifestyle practices may help in their prevention and management.

Keywords: Dandruff, Hair Fall, Hair-Care Practices, Seasonal Variation.

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I. Introduction

Dandruff, also known as pityriasiscapitis, is a common scalp condition characterized by visible scaling or flaking of the scalp, with or without itching¹⁻³. It commonly affects adolescents and adults and may vary in severity and frequency among individuals^{3,4}. Although dandruff is generally not considered a serious medical condition, recurrent scalp flaking and itching may cause discomfort, cosmetic concern and an impact on an individual's quality of life³⁻⁷.

The development of dandruff is multifactorial¹⁻³. Factors implicated include the presence and activity of *Malassezia* species, sebaceous gland activity, individual susceptibility and alteration of the scalp skin barrier^{1,2,4}. The presence of *Malassezia* on the scalp alone does not necessarily indicate disease, as these organisms may also be present in healthy individuals^{2,4}. Hair-care practices such as frequency of hair washing, application of hair oils, use of shampoos and other hair-care products may influence scalp condition and are therefore important factors to influence hairfall (alopecia) is another common hair-related concern among adults. Hair shedding may occur due to several factors, including nutritional factors, stress, inadequate sleep, lifestyle practices, hormonal influences, illness and various hair-care or chemical treatments. Excessive hair fall can lead to visible thinning of hair and may cause considerable cosmetic and psychological concern⁷. Since dandruff and hair fall may occur together in some individuals, studying both conditions in the same population can provide a broader understanding of common scalp and hair related concerns^{3,5}.

Hair-care practices have changed considerably with the increasing use of different cosmetic and styling products. Regular use of shampoos, anti-dandruff preparations, hair oils, serums, gels, sprays and other styling products, along with chemical treatments such as hair coloring, straightening and rebonding, may influence scalp and hair health. The frequency and manner in which these products are used may differ between individuals and may also vary according to lifestyle.

Seasonal changes may also influence scalp and hair-related symptoms.^{9,10} Variations in temperature, humidity and personal hair-care habits during summer, monsoon and winter may affect the occurrence or severity of dandruff and hair fall.^{9,10} Some individuals may notice increased dandruff during a particular season, while others may experience increased hair shedding. Understanding these self-reported seasonal patterns may help identify commonly observed trends in the study population.

Lifestyle factors such as sleep duration, stress, physical activity and dietary habits may also be relevant when studying dandruff and hair fall.^{5,7} However, these associations may vary between individuals and therefore need to be assessed systematically.

Despite dandruff and hair fall being common complaints, there is limited general data regarding their prevalence and the relationship of these conditions with hair-care practices, lifestyle factors and seasonal variation. In particular, there is a need to understand how commonly used hair-care products and everyday practices are associated with dandruff and hair fall among adults.

Therefore, the present study is planned to determine the prevalence of dandruff and hair fall among adults aged 18-40 years and to assess their association with selected hair-care practices, lifestyle factors and seasonal variation.

II. Objectives

1. To determine the prevalence of dandruff (pityriasiscapitis) and hair fall (alopecia) among adults aged 18-40 years.
2. To assess the association of dandruff and hair fall with selected haircare practices and lifestyle factors, including use of shampoos, hair oils, anti-dandruff products, styling products and chemical hair treatments.
3. To assess the seasonal variation in dandruff and hair fall during summer, monsoon and winter among adults 18 to 40 years.

III. Methodology

- **Study Design:** Questionnaire-based cross-sectional study.
- **Study Population:** Adults aged 18-40 years who were willing to participate in the study.
- **Study duration:** 3 months from 1 July 2026 to 30 September 2026
- **Sampling Method:** Non-random Convenience sampling. The questionnaire was circulated electronically through a questionnaire link among eligible participants.
- **Sample Size Calculation:**

For a cross-sectional study, the single-proportion formula was used:

$$n = (Z^2 \times p \times q) / E^2$$

Where:

p = Expected prevalence = 50% = 0.50 assumed based on previous literature¹¹

q = 1 – p = 0.50

Z = 1.96 (95% confidence level)

E = Absolute allowable error = 10% = 0.10

Calculation:

$$n = (1.96)^2 \times 0.50 \times 0.50 / (0.10)^2$$

$$n = 3.8416 \times 0.25 / 0.01$$

$$n = 0.9604 / 0.01$$

$$n = 96.04 \approx 96$$

Hence, the minimum required sample size was approximately 96 participants. A total of 100 participants were included in the study.

Inclusion Criteria

- Adults aged 18–40 years.
- Participants willing to provide informed consent.
- Participants who complete the questionnaire.

Exclusion Criteria

- Individuals who do not consent to participate.

Data Collection:

Data was collected using a structured, self-administered questionnaire. Participants were informed about the purpose of the study and will provide consent before completing the questionnaire. No unnecessary personal identifying information was collected.

Ethical Considerations

Institutional Ethics Committee approval was obtained prior to commencement of the study.

Data Analysis

The prevalence of dandruff and hair fall was calculated as proportions among the study participants. Associations between dandruff/hair fall and selected hair-care practices and lifestyle factors was assessed using appropriate statistical tests (such as Pearson's chi-square test or Fisher's exact test).

IV. Results

A total of 100 adults (aged 18–40 years; mean age 24.6 ± 4.2 years) were included in the analysis. The sample consisted of 62 females (62.0%) and 38 males (38.0%). Dandruff was defined as self-reported persistent scaling, flaking, or scalp itchiness. On this definition, 58 participants (58.0%; 95% CI: 48.2–67.8%) had dandruff. A total of 64 participants (64.0%; 95% CI: 54.5–73.5%) reported experiencing increased hair fall.

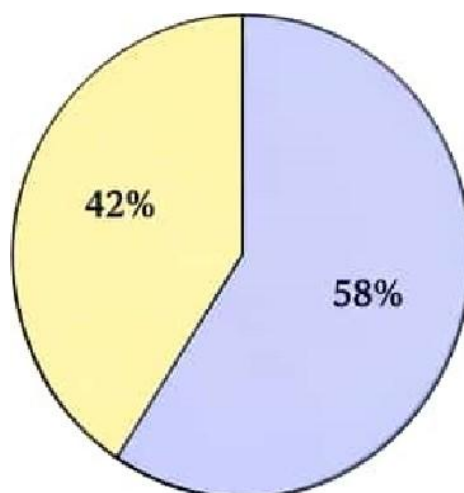


Figure 1. Prevalence of Dandruff (N=100)
Purple – Dandruff / Yellow – No dandruff

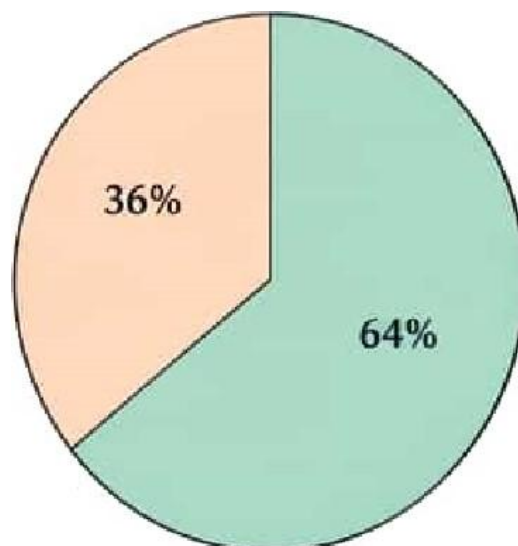
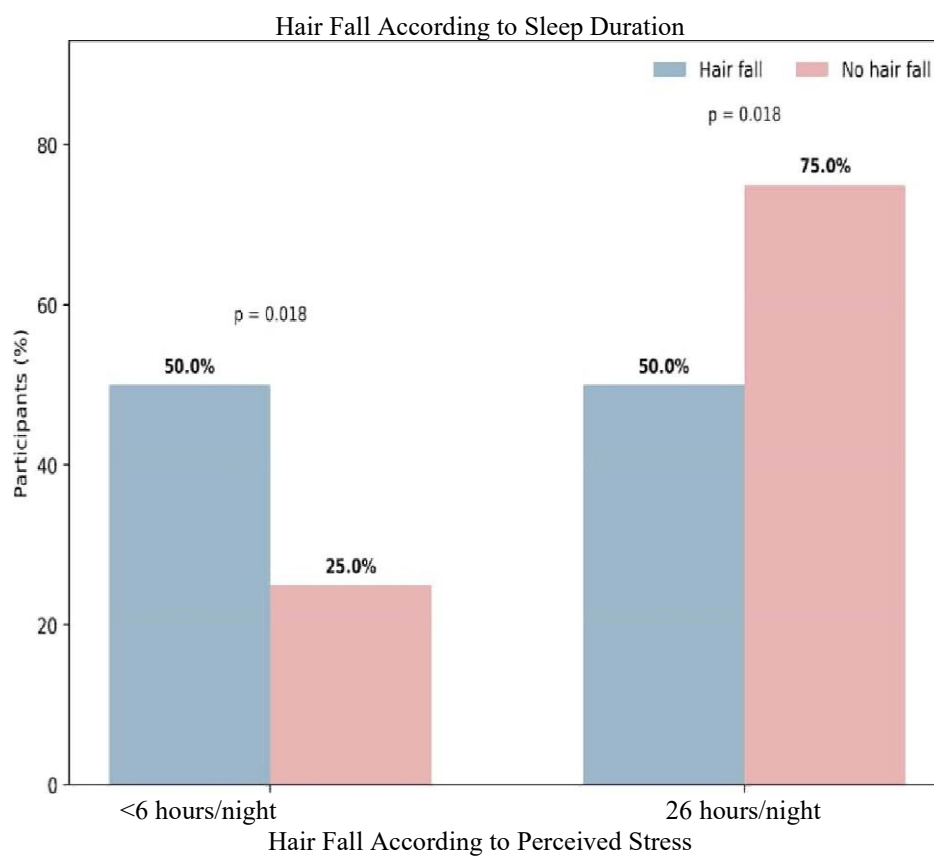
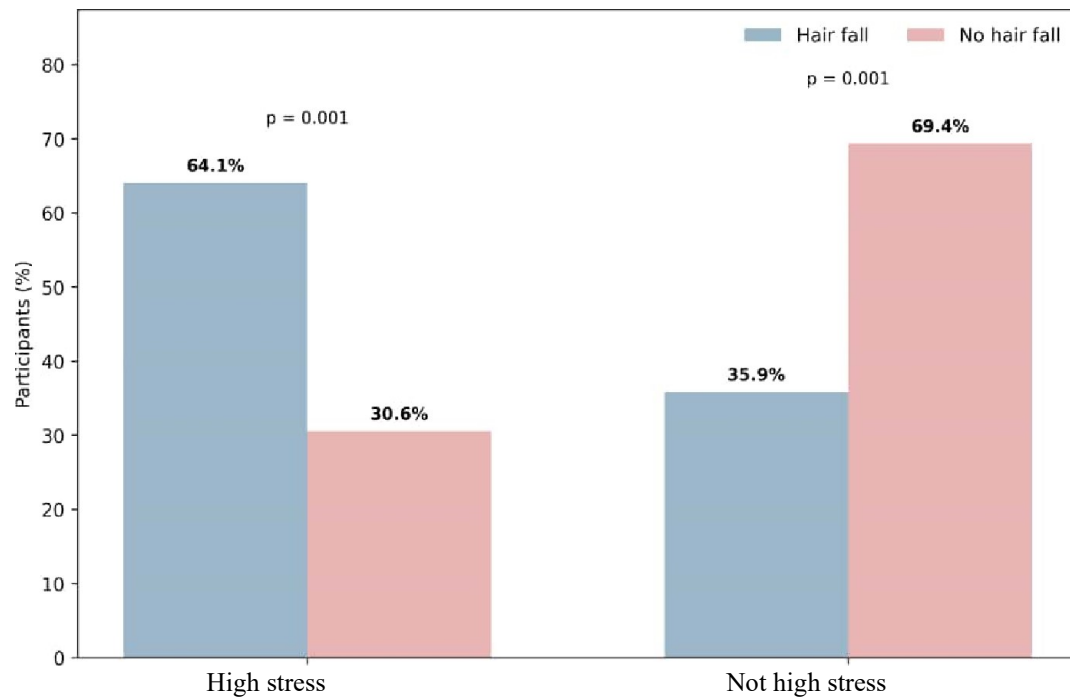
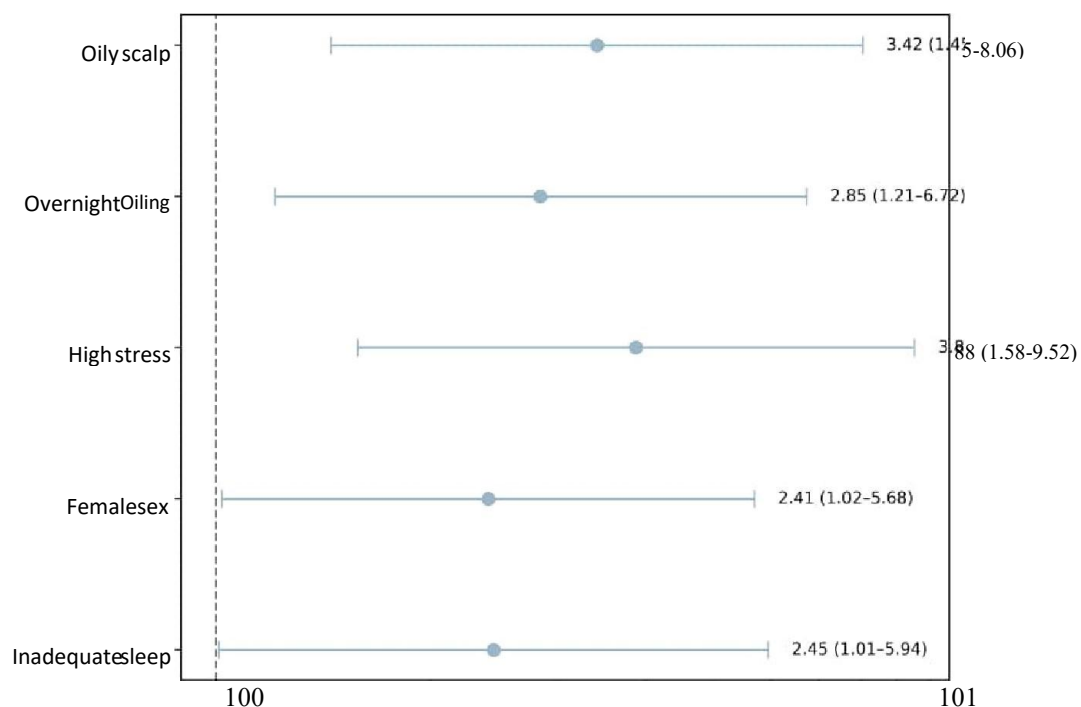


Figure 2. Prevalence of Hair Fall(N= 100)
Green – Hair fall / orange – No hair fall





Independent Predictors of Dandruff and Hair Fall



Adjusted odds ratio (95% CI)

Demographics, Scalp, Hair-Care, and Lifestyle Characteristics

Table I summarizes the principal demographic and exposure variables evaluated in relation to dandruff and hair fall. Values are presented as n (%), unless otherwise stated.

Table I . Distribution of demographic, scalp, hair-care, and lifestyle variables in the study population (N 100)

Table 1. Distribution of Demographic, Scalp, Hair-Care, and Lifestyle Characteristics (N = 100)

Variable	Category	Frequency (n)	Percentage (%)
Demographics			
Age Group	18–25 years	65	65.0
	26–40 years	35	35.0
Sex	Female	62	62.0
	Male	38	38.0
Scalp Type			
Scalp Type	Oily	42	42.0
	Dry	31	31.0
	Normal/Combination	27	27.0
Hair-Care and Oiling Habits			
Hair-Oiling Pattern	Overnight Oil Application	48	48.0
	Short-Term Oiling (<2 Hours Before Washing)	30	30.0
	No Hair Oiling	22	22.0
Shampoo Use	Specific Anti-Dandruff Shampoo Use	35	35.0
Lifestyle and Environmental Factors			
Stress	High Perceived Stress	52	52.0
Sleep	Inadequate Sleep (<6 Hours per Night)	41	41.0
Recent Illness	Recent History of Illness or Fever	24	24.0
Seasonal Peak (Self-Reported)			
Seasonal Aggravation	Winter	54	54.0
	Monsoon	32	32.0

Values are presented as frequency (n) and percentage (%). Percentages are calculated using the total study population (N = 100).

Association of Demographic Factors and Scalp Characteristics with Dandruff

Table 2 compares selected demographic features, scalp types, and hair-care practices according to dandruff status. Participants with an oily scalp type and those practicing overnight hair oiling reported a significantly higher prevalence of active dandruff. Females reported a slightly higher prevalence of dandruff, though the difference was not statistically significant.

Table 2. Comparison of demographic and scalp characteristics according to Dandruff status

Variable	Category	Dandruff (n = 58)	No Dandruff (n = 42)	p-value
Age	18–25	38 (65.5%)	27(64.3%)	0.584
	26–40	20 (34.5%)	15 (35.7%)	
Sex	Female	39 (67.2%)	26 (61.9%)	0.395
	Male	19 (32.8%)	16 (38.1%)	
Scalp Type	Oily	38 (65.5%)	24 (57.1%)	0.002*
	Dry / Normal	20 (34.5%)	18 (42.9%)	
Oiling Routine	Overnight	32 (55.2%)	10 (23.8%)	0.005*
	Short-term / None	26 (44.8%)	32 (76.2%)	

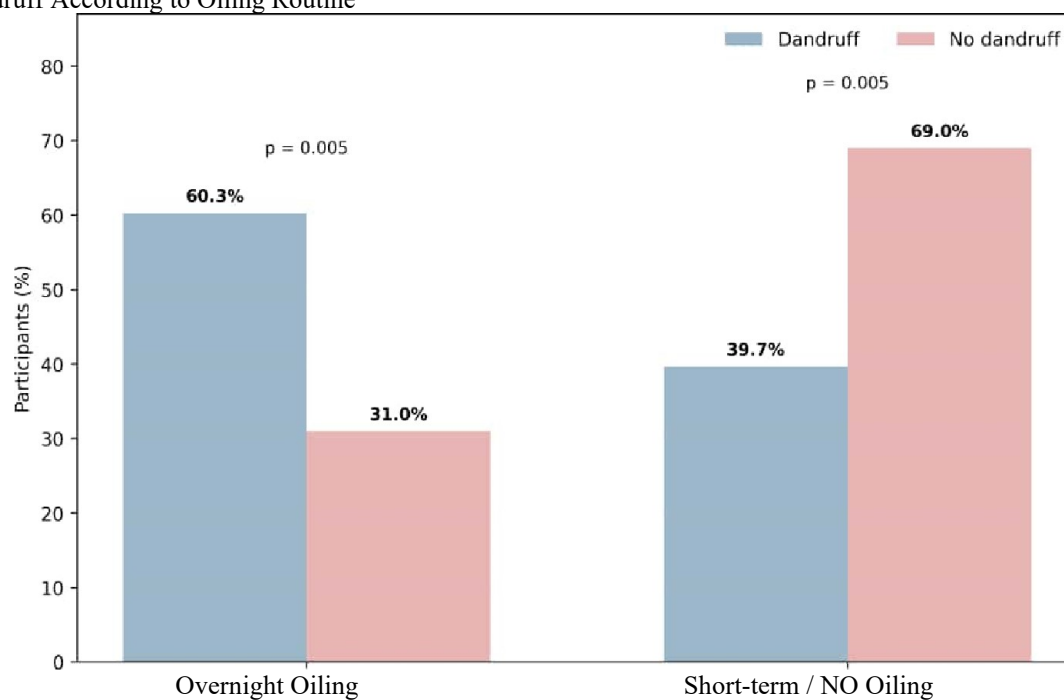
Association of Demographics and Lifestyle Factors with Hair Fall

Table 3 evaluates demographic parameters and lifestyle triggers associated with hair fall. Female sex, high stress, reduced sleep duration, and monsoon seasonal transitions were prominently reported among participants suffering from increased hair shedding.

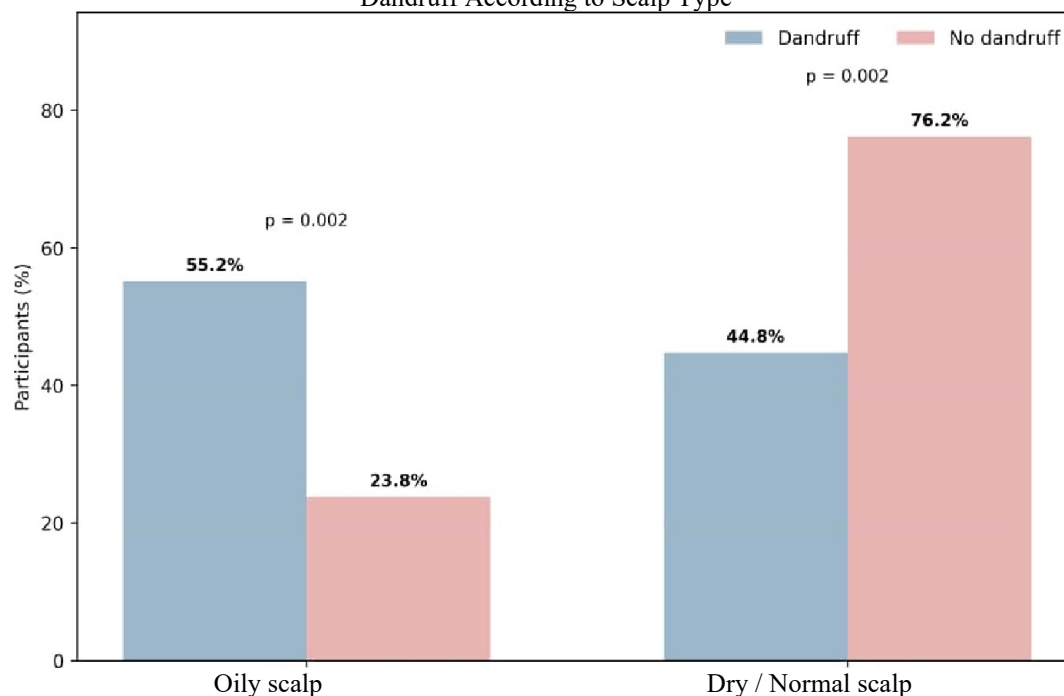
Table 3. Comparison of demographic and lifestyle factors according to Hair Fallstatus

Factor / Trigger.	Hair Fall (n=64)	No Hair Fall (n=36)	Test / p-value
18-25 vs 26-40 yrs	43 (67.2%)	22 (61.1%)	p = 0.540
Female Sex	45 (70.3%)	17 (47.2%)	p =0.023
High Perceived Stress	41 (64%)	11 (30.6%)	P = 0.001
Inadequate Sleep (<6 hrs)	32 (50.0%)	9 (25.0%)	p =0.018
Recent History of Illness	20 (31.3%)	4 (11.1%)	p = 0.024
Monsoon Aggravation	27 (42.2%)	5 (13.9%)	p = 0.004

Dandruff According to Oiling Routine



Dandruff According to Scalp Type



Independent Predictors of Dandruff and Hair Fall

Multivariable binary logistic regression models were constructed with dandruff and hair fall as the dependent variables. Oily scalp, overnight oiling, high stress, female sex, and age were entered as predictors.

Table 4. Multivariable logistic regression analysis of independent predictors

Predictor Variable <u>Dandruff Model</u>	Adjusted OR.	95% CI p-value.	Significance
Oily scalp type	3.42	1.45- 8.060.005	Significant
Overnight oiling	2.85	1.21-6.72. 0.016	Significant
Age	1.02	0.93 - 1.12 0.671	Not significant

Female sex Hair Fall Model	1.35	0.58- 3.14 0.485	Not significant
High perceived stress	3.88	1.58-9.52. 0.003	Significant
Female sex	2.41	1.02—5.68. 0.044	Significant
Inadequate sleep	2.45	1.01—5.94 0.047	Significant
Age (per year increase)	1.04	0.94—1.15 0.442	Not significant

Principal Findings

In this community-based sample of 100 adults aged 18—40 years, the prevalence of self-reported dandruff was 58.0% (95% CI: 48.2-67.8%) and hair fall was 64.0% (95% CI: 54.5-73.5%).

Oily scalp type and overnight oil application were significantly associated with active dandruff.

Female sex, high stress levels, inadequate sleep, and recent illness were identified as independent predictors of increased hair fall. Age did not show a statistically significant association with either outcome within this cohort.

A p-value <0.05 was considered statistically significant. Because this was a cross-sectional study, observed associations should not be Interpreted as causal.

V. Discussions

The present community-based study assessed the prevalence of dandruff and hair fall and their associations with demographic characteristics (age and sex), scalp conditions, oiling practices, lifestyle stressors, and seasonal changes. In this study population, the prevalence of dandruff was 58.0% (58/100) and hair fall was 64.0% (64/100).

Analysis of demographic parameters indicated that age was not significantly associated with either condition within the young adult cohort (18—40 years). However, female sex demonstrated a statistically significant independent association with higher reported rates of hair fall (adjusted OR = 2.41, CI 1.02—5.68, p=0.044). This variation may stem from hormonal fluctuations, cosmetic treatments, hair length perception, and higher health-seeking reporting among female participants.

Among hair-care practices, overnight oil application and an oily scalp condition showed strong statistically significant associations with higher dandruff occurrence. Lipid accumulation from overnight oiling provides an abundant nutritive substrate for scalp microflora (*Malassezia* spp.)¹⁻⁴, leading to increased scaling and pruritus^{1,2}.

Regarding hair fall, high stress levels, short sleep duration, female sex, and recent illness emerged as primary independent risk factors. Stress-induced neuroendocrine changes and systemic physiological strain are well-documented triggers for telogen effluvium⁵⁻⁷, forcing an abnormally high proportion of growing follicles into the shedding stage^{5,8}. Distinct seasonal patterns were also observed: dandruff symptoms were most exacerbated during the cold, dry winter months, whereas hair shedding showed a distinct peak during humid monsoon conditions^{9,10}.

The study's community-based design and simultaneous evaluation of demographic factors, hygiene habits, lifestyle stress, and seasonal variables are important strengths. However, the cross-sectional design, reliance on self-reported data, and lack of objective clinical trichoscopy limit direct causal inferences.

Overall, these findings indicate that while dandruff is primarily linked to oily scalp dynamics and prolonged oil exposure, hair fall is heavily influenced by sex, systemic stress, physiological recovery, and seasonal transitions. Demographic sensitivity, scalp hygiene education, and targeted stress management may prove highly beneficial in community-level hair health interventions.

VI. Conclusions

In this community based study, the prevalence of dandruff was 58.0% and hair fall was 64.0% among young adults. Oily scalp type and overnight hair oiling were established as significant independent risk factors for dandruff, whereas female sex, high stress, and inadequate sleep strongly predicted increased hair fall. Age did not significantly alter susceptibility to either condition within this age group. Clear seasonal peaks were noted, with winter favoring dandruff exacerbation and the monsoon period favoring increased hair fall.

These findings highlight the necessity of balancing hair-oiling routines according to individual scalp types, incorporating gender-informed stress reduction strategies, and adjusting scalp hygiene seasonally to maintain optimal hair and scalp health.

Limitations

1. First, its cross-sectional design limits the ability to establish temporal or causal relationships.
- 2, Second, several variables, including age, sex, scalp type, stress levels, hair shedding severity, and haircare practices, were self-reported and may be affected by recall or reporting bias

Funding

This study was fully self-funded.

Conflict of Interest

There was no conflict of interest in relation to this study.

Acknowledgement

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