Journal of Pakistan Association of Dermatologists. 2024;**34(2)**:506-510.

Original Article

Prevalence and risk factor of hair fall and its relation with stress in healthy female subjects: A survey based study

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Abstract

Background Hair is the beauty and affection of a female personality. Hair fall is infuriating for young females and losing their hair is like losing their beauty. Many females are losing their hair without knowing the reason and their risk factors.

Objective The purpose of this study was to determine the prevalence of hair loss and its risk factors and their relation with stress in the young female population of Karachi, Pakistan.

Methods To accomplish this task a survey-based study was conducted. 1015 female participants were selected with the age range of 15-25 years all participants were asked different questions in the questionnaire to assess the level of stress and degree of hair loss by using the Depression, Anxiety, Stress Scale (DASS scale) and Ludwig scale respectively. All statistical analyses were performed by SPSS 16.

Results In this study we observed that the prevalence of hair fall was quite low, only 37 (3.7%) females have significant hair loss.

Conclusion Hair fall has low prevalence in young females. With no significant relationship between hair fall and duration of hair fall. Improper diet and lack of protein intake and tight hairstyle are common risk factors for hair fall.

Key words
Prevalence; Hair fall; Stress; Risk factors.

Introduction

Hair is an important part of an individual's appearance and plays an important role in shaping their personality.[1] Human hair is a natural fiber that is primarily made up of keratin and keratin-associated proteins[2] and sprout from dermal follicles.[3] Hair growth occurs in a cyclic manner comprised of three phases Anagen, Catagen, and Telogen. The anagen phase is the active phase of hair growth. The catagen phase is the phase of follicular regression. The telogen phase is the dormant stage of a hair follicle.[4] Approximately 90% of typical scalp hair should be in the anagen or growth phase of the hair cycle, while 10% should be in the telogen or resting phase. Excessive loss of hair occurs when the percentage of scalp follicles in the telogen phase rises.[5] Daily shedding of 100 hairs is considered normal while exceeded to 100 hair strands is declared as a state of hair fall or alopecia.[6]

Hair fall, also known as Alopecia, is among all sufferers' most frequent complaints.[7,8] Common

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types of hair fall include female pattern hair loss alopecia, male pattern hair loss, alopecia areata, and a thinning of hair known as telogen effluvium. The cause of female pattern hair loss is unclear. Male-pattern hair loss is caused by a mix of heredity and male hormones, alopecia areata is caused by an autoimmune reaction, and telogen effluvium is often caused by a physically or mentally stressful incident. Telogen effluvium is fairly prevalent after pregnancy.[9] Many causative components can play a role in the contribution of hair fall i.e. genetic predisposition, severe illness, hormone imbalance, medication, stress,[10] excessive pulling of hair, nutritional deficiency, thyroid problem, hyperpyrexia, and severe infection. Hair loss can also occur as a result of mechanical damage to the hair caused by chemical treatments like shampoo or hair color containing powerful chemicals such as selenium bleach.[11]

Our purpose of the current study is to find out the prevalence of hair fall in the young female population of Karachi and then find out the common risk factor and examine the relationship between the level of stress and hair fall.

Methods

A survey-based study was conducted in Karachi, Pakistan. About 1015 females participants with the age range of 15 to 25 years were recruited from different schools, colleges, and universities from 15 February to 15 March 2016 and had signed written consent forms. To evaluate the level of stress, the Depression, Anxiety, Stress Scale (DASS) was used. Scores ranging from 0-14 as normal, 15- 18 as mild, 19-25 as moderate, 26-33 as severe and >34 considered as extremely severe type of stress.[12] To determine the severity of hair loss in female patterns, the Ludwig scale was used. According to the Ludwig scale type I show thinner hair along the center of the scalp, type II show diffuse thinning, type III indicate extreme thinning while the last two images indicate advanced hair loss and frontal baldness, respectively.[13] All participants were asked different questions given in the questionnaire related to demographic profile including age, ethnicity, lifestyle, Basal metabolic index (B.M.I), and dietary profile. We also took information regarding hair texture, thickening, hair styling, and use of chemically processed treatments, family history of hair baldness, and medical history. All females who were married, with any dermatological problem of the scalp, autoimmune disorders, any infectious disease, psychological disorder, neurological problem, and less than 15 years of age were excluded.

All statistical analysis was performed by SPSS 16 and all values were considered significant at a P value less than 0.05. All parameters were analyzed by frequencies and percentages.

Results

A total of 1015 females participated in this study. The mean±SD age was 20.39±2.30 years with B.M.I 19.67±3.78 kg/m^2. 353(34.8%) reported that they have poor hair health. 549 (54.1%) participants reported that their hair broke off from the middle or split end while 425 (41.9%) had fallen with the bulb end or within the root. By cross-tabulation of the duration of hair fall and hair fall per day, we estimated only 37 (3.7%) participants have true hair fall.

In dietary habits, almost 36% of the subjects take eggs 2-3 days/ week which shows a normal intake of egg in their diet. Approximately 12% of the subjects take eggs rarely and 2% never take it. So the person who never takes egg or takes it rarely may have a reason for the hair fall. 36% and 23% of the subjects take milk regularly and 2-3 days/week respectively and 7% of

subjects never take it. 26% and 25% take yogurt in their diet weekly and 2-3 days/week respectively. 5% of subjects never take yogurt in their diet. 28% of subjects take cereals rarely and 10% of the subject's diet is lacks cereals. Around 37% and 31% of the subjects take seafood in their diet rarely and monthly respectively and 7% never takes it. 45% of the subject takes chicken in their diet 2-3 days/week. 2% of the subject's diet lacks chicken. Almost 38% of subjects rarely take almonds in their diet, 7% never take almonds. Almost 29% of the subjects take beef in their diet weekly. 7% of subjects never take beef in their diet. While almonds, nuts, beans cheese, and liver were rarely taken by any of the participants.

57.5% or 584 out of 1000 females use shampoo in 3 days/week and 5% population do not use shampoo. The hair-dying trend is not common, about 60.1% of females do not dye their hair, 29.5% of females dye their hair rarely and 4 females use hair-dying daily. 53.6% use hair spray in a month. 61.4% of people do not do excessive brushing but 13.0% do excessive brushing and about 11.8% do it daily as a routine to make it straight. 63.3% of people do not make weaves as a hairstyle but 17.8% of people said that they used to make it rarely and 2.7% use it daily in their routine life. 49.5% of people did not make tight hairstyles while 23.1% of people used to make them. 35.5% of people make ponytails & about 11.9% make them daily. 38.3% of people do not make tight bun style while 27.1% make it and 18.0% of them said that they use to make it daily.

The results of DASS showed that 163 (16%) had mild stress, 218 (21.6%) had moderate stress, 102 (10.2%) had severe stress while 32 (3.2%) had extreme stress **(Table 1)**.

The results of comparing stress levels with hair loss revealed that the majority of those who had

Table 1 DASS Score.

	Frequency	*Percentage*
Normal	498	49.2
Mild	163	16
Moderate	218	21.6
Severe	102	10.2
Extremely severe	32	3.2

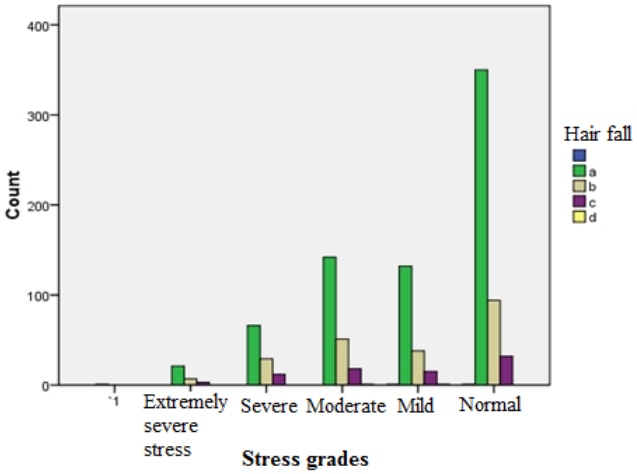

Figure 1 Frequency of hair fall on level of stress.

'a' consider more than 50 strands of hair fall. 'b' indicates 100 strands of hair shading. 'c' shows more than 100 strands of hair loss. 'd' indicates no response.

hair loss had no history of stress (**Figure 1)**. Using the $\chi 2$ test, no significant difference was seen in frequencies of hair fall on the level of stress (p=0.875).

Stress grades were also compared to the duration of hair fall. Results are detailed in **Figure 2**. There was no significant difference in the prevalence of stress grade as assessed by the $\chi 2$ test (p=0.572)

According to the Ludwig scale, 75% of participants have no hair loss i.e. type 1-I and 13.1% have mild type,2.5% have progressed to wide parting from center and 8.5% have thinning of hair line from frontal **(Table 2)**.

Discussion

Hair loss is a very infuriating affair for young females and losing hair like losing their beauty and attraction. It becomes a great torture to their

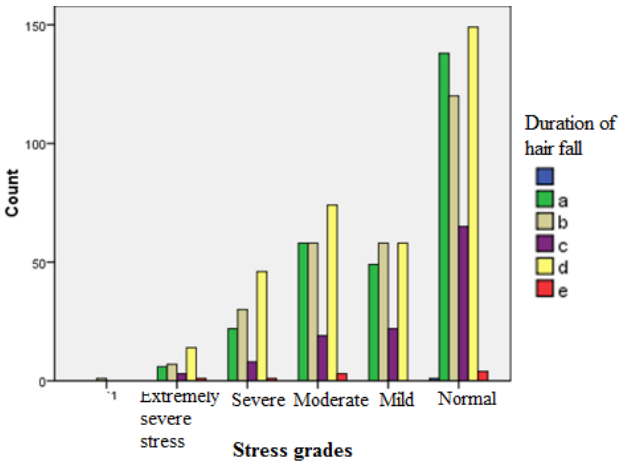

Figure 2 Comparison of stress grades to duration of hair fall.

'a' considers the duration of hair fall from a few days. 'b' indicates the duration of hair fall from 2-3month. 'c' shows the duration of hair fall from <4 months. 'd' duration of hair fall from 6 months. 'e' indicates no hair fall.

Table 2 LUDWIG Scale.

	Frequency	*Percentage*
Type 1-1	762	75.1
Type 1-2	132	13.1
Type 1-3	25	2.5
Type 1-4	3	0.3
Frontal	86	8.5
Advanced	1	0.1
Type 2-1	3	0.3
Type 3	1	0.1

personality and these females become more conscious and seek attention for hair care. This study was conducted in the general population and in this study we found that the prevalence of hair loss in females was very low, only 37 (3.7%) females have significant hair loss. In the present study, we observed that out of 1015 participants, only 30-40% of subjects take egg, milk, chicken, and beef properly in their diet while other sources of protein, vitamins, and minerals like cereals, seafood, almonds, cheese, nuts, liver, and beans are mostly taken rarely. A low protein diet, Vitamin B-12 deficiency, and folic acid deficiency also weaken the hair and are responsible for poor health.[14]

In the studied population, chemical processed treatments were not as common, frequency of using hair dying, hair sprays, and conditioner was very low. Hair styling is more prevalent, 36% of participants make ponytails 11.8% make it daily, 17.8% made weaves, 23.1% have tight hairstyles, and 18.1% made bun style daily. A hairstyle that constantly pulls hair and produces tension and traction on hair roots will lead to hair loss, this condition is termed traction alopecia.[15] In ponytail style, the attachment of weaves or hair extensions, tight buns, and tight braids, the hairs along with hair line of the scalp receive great tension and constant hair pulling responsible for hair shedding.[16] The DASS score showed that almost 352 (35.2%) participants had moderate to extreme levels of stress. However, we did not find any significant association between hair fall and stress grade in young females and also did not find any significant association between stress and duration of hair fall.

A study conducted in Pakistan reported a lack of knowledge and understanding among participants about hair fall causing risk factors.[17] Only one study was conducted in Pakistan to find out the prevalence of hair fall in female medical students, in this study, there is a lack of association between hair fall and stress, and also found a low prevalence of significant hair fall in females.[18] Another study conducted in an institution in Curitiba reported a significant relationship between the perception of hair loss and symptoms of depression.[19]

Conclusion

This study presents the prevalence and risk factors of hair fall and its relation with stress in healthy female subjects. Hair fall has low prevalence in young females. With no significant relationship between hair fall and duration of hair fall. Improper diet and lack of protein intake and tight hairstyle are common

risk factors for hair fall. This study was unable to find any relationship between the level of stress and hair fall that may be due to the very low prevalence of excessive hair loss. Although, this study occurs on a large sample size i.e. n=1015 of the general population, a specific study design is needed to establish a relationship.

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