Original Article

Prevalence of Premature Hair Greying, its Associated Factors and Impact on Quality of Life in Medical Students from Rajasthan, India

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Abstract

Background: Considering the paramount significance of hair in life, greying hair at a young age can be extremely distressing. In addition, an incompletely understood aetiology and scarcity of treatment options make premature hair greying (PHG) noteworthy. **Aims:** We aimed to estimate the prevalence of PHG in medical college students from Rajasthan, India, and any sociodemographic and lifestyle correlates of PHG and to determine its effect on the quality of life (QOL). **Patients and Methods:** A cross-sectional study was conducted amongst 295 students of a medical college in western Rajasthan, India, under the age of 25 years. A scalp examination was done to count grey hair. All factors were investigated using structured, pre-validated questionnaires. **Results:** The prevalence of premature greying of hair was 41.4%. Sociodemographic factors such as older age, rural residence and positive family history were significantly associated with PHG. The number of meals, fruit consumption and irregularity of meals were the lifestyle factors associated with PHG. The QoL of 54.1% of students with grey hair was poor; males and rural residents were more affected. **Conclusions:** Premature greying of hair is a fairly prevalent condition in medical college students affecting their QoL. Factors such as family history, age, residence and eating habits may predispose students to PHG.

Keywords: India, lifestyle, premature hair greying, pre-valence, quality of life, Rajasthan

Introduction

The role of hair in life is exquisite, be it on appearance, confidence or self-esteem. From length and lustre to number and colour, every aspect of hair bears the utmost importance. It was found that 6%–23% of people have 50% grey hair by the age of 50 years.[1] Furthermore, studies on the physiology of hair pigmentation indicate that one of the inexorable effects of ageing is the greying of hair.[2,3]

However, greying hair at a young age is an enigma in itself, lacking a convincing aetiology and a deficit of social acceptance. Interpreted as a sign of being old, lacking vigour and increasing infirmity, premature hair greying (PHG) can be a troubling and sensitive issue, especially in the age group of teenagers and young adults.

PHG is defined as greying beginning before the 'usual' age of onset, i.e. before 20 years in Caucasians, 25 years in Asians and 30 years in Africans.[2] In the Indian population, the exact age is not well defined; previous studies have used 25 as the cut-off age before which greying is considered premature.[4,5]

The pathogenesis seems to involve a genetic predisposition augmented by environmental factors. Aside from being associated with autoimmune diseases, HIV infection and premature ageing syndromes,[3] PHG involves increased oxidative stress mainly exasperated by emotional stress, ultraviolet (UV) exposure, smoking and inflammatory stress.[3,4,6,7] The treatment options for PHG remain inadequate with most of the population finding solace in hair colour products such as organic dyes.[6]

The prevalence of PHG in India remains underinvestigated with only a few reports to our knowledge and none from the

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state of Rajasthan.[5,8,9] Medical college students represent a young population from different cities/regions of the state. Therefore, we aimed to determine the prevalence of PHG in medical college students from Rajasthan as well as to study the sociodemographic factors (age, sex and residence) associated with it.

There have been numerous reports of an association between nutritional deficiencies and biochemical parameters with PHG[4,7,10] and while the molecular mechanisms behind hair greying are known to a certain clarity,[2,3] correlations with lifestyle remain uncertain and deduced from smaller populations.[4,7,11,12] Hence, we also aimed to investigate the associations of PHG with lifestyle factors. Finally, we also determined the effect of PHG on the quality of life (QoL) as the impact of PHG on QoL remains understudied.[13,14]

Subjects and Methods

Selection and description of participants

A cross-sectional study was conducted amongst the students of a Medical College in Western Rajasthan, India. A total of 295 students, <25 years of age from all semesters were selected using simple random sampling from 1200 registered medical students.

Inclusion criteria

- Medical students of all semesters selected randomly
- Students aged < 25 years.

Exclusion criteria

- Students with hypopigmentation disorders and alopecia areata
- Students who refused to participate in the study.

Approval from the institutional ethical committee (IEC/2019/51) and written informed consent were obtained from all students before the initiation of the study. The students who were non-residents of Rajasthan were excluded from the study. A scalp examination was done for each individual to count the number of grey hairs. The diagnosis of PHG was made based on the appearance of a significant number of grey hairs (>5) on examination.[4,5,7,9,11] The severity was judged based on the number of grey hairs on the entire scalp as mild (5–20), moderate (20–50) and severe (>50).[9]

Data were collected using pre-designed semi-structured questionnaires. The questionnaires were pre-validated by conducting a pilot study amongst the college students, and changes were made accordingly to increase understandability and validity. Information was obtained about sociodemographic factors (age, gender and residence), body mass index (BMI), height and weight, age of onset and family history of greying (maternal, paternal and sibling). The distribution of hair on the scalp was studied as the site of origin (frontal, temporal, occipital and parietal distribution) and the site of maximum distribution at presentation (frontal, parietal, temporal, occipital and diffuse). Lifestyle factors investigated included questions about the frequency of the use of hair products (oil, shampoo, conditioner and hair gel/wax), physical activity/sedentary behaviour and eating habits. Sedentary behaviour has been defined as any waking behaviour characterised by an energy expenditure ≤ 1.5 metabolic equivalents while in a sitting, reclining or lying posture.[15] These include sedentary states such as the use of electronic devices (e.g. television, computer, tablet and phone) while sitting, reclining or lying; reading/writing/talking while sitting; homework while sitting; sitting at school/college classes and sitting during transit (in a bus, car or train). We investigated about the duration of all these sedentary states as well as the number of days per week and the duration of exercise and sports. The questions were divided into regular/college days and holidays/Sundays. Eating habits studied included the type of diet, frequency of consumption of green leafy vegetables and fruits, number of meals, the habit of skipping meals and irregularity in meal timings.

Body image questionnaire (BIQ)[16] with the key feature of stress taken as grey hair was used to assess the QoL in students with PHG (score ranging from 19 to 95), but it was not possible to compare with a control group due to the format of the questionnaire. The English version of the 19-item BIQ was self-administered. The questionnaire contained questions concerning the student's perception of their stress feature (grey hair) and measured the distress caused, preoccupation with thoughts of stress feature, effect on social activities, interpersonal relationships, ability to study and work, etc., The questions were scored from 1 to 5 (1: very much, often; 2: fairly, fairly often; 3: in between, neither one; 4: fairly, fairly often and 5: very much, often) and were summed to calculate a total score. The QoL was defined as poor for total scores more than 24 and good for total scores < 24[14] with higher scores representing more effect on the QoL. The association of scores of all the students was determined by different variables such as age, gender, residence, severity and duration of PHG.

Statistics

The sample size (295) was calculated at a 95% confidence interval to verify an expected prevalence of 26%[9] at the absolute allowable error of 5%. Categorical data were summarised as proportion and percentage and a comparison of proportions was done using the Chi-square test. Quantitative variables were summarised as a mean and standard deviation and compared using the Student's *t*-test. P <0.05 was considered statistically significant. All statistical analyses were done using Epi info version 7.2.1.0 CDC, Atlanta, GA, USA, 2018 Statistical software.

Results

The mean age of all students was 20.19 ± 1.54 years (17–25 years). The mean age of students with PHG was significantly higher than students without PHG (P = 0.004). Out of the 295 participants, PHG was found in 41.4% of the students (n = 122). There were 180 (61%) males and 115 (39%) females in the study.

Clinical profile of students with premature hair greying (n = 122)

The mean age of onset for greying was 17.2 ± 2.5 years (range: 10–23 years). Maximum students (n = 89; 73%) had onset of greying between 15 and 19 years of age, followed by 20 (16%) in the age group of 20–25 years and 13 (11%) between 10 and 14 years. The mean duration of greying was 3.29 ± 2.25 years (39.48 ± 27 months). The severity was mild and moderate in 41 (33.6%) students each and severe in 40 (32.8%) students. The most common site of the origin of grey hair on the scalp was reported as frontal (50%, n = 61), followed by parietal (30.33%, n = 37), occipital (13.93%, n = 17) and temporal (5.74%, n = 7). The most common area of maximum distribution on the scalp was found to be parietal (32.79%, n = 40), followed by frontal (27.87%, n = 34), diffuse (22.13%, n = 27), occipital (10.66%, n = 13) and temporal (6.56%, n = 8). Only three participants reported taking treatment for PHG. Forty-four (36.07%) students reported plucking out grey hair and 22 (18%) students reported dyeing hair.

Amongst sociodemographic factors, higher age and rural residence were significantly associated with the presence of PHG [Table 1]. Positive family history was significantly higher amongst students with PHG [Table 2]. Hair products were used either regularly (hair oil and shampoo) or rarely (hair conditioners and gel/wax) but neither was significantly associated with PHG (two-tail $P > 0.05$). Eating behaviour investigations showed that consumption of fewer than three meals per day, irregular meal periodicity and less frequent consumption of fruits were significantly associated with PHG [Table 3]. Sedentary behaviour and physical activity investigations showed time spent on studies, and leisure activity was significantly higher in participants without PHG [Table 4]. A BIQ score > 24 (poor) was present in 66 (54.1%) students [Table 5]. Male gender (two tail, $P = 0.029$), as well as a rural residence (two tail, $P = 0.021$) were associated with a poor score.

Discussion

PHG is a reasonably common problem, albeit a mostly

Table 1: General characteristics

Category (n)	PHG present (n=122), n (%)	95% CI	PHG absent (n=173), n (%)	95% CI	P (two-tail)
Age (years)	20.49±1.70	20.26-20.72	19.97±1.39	19.84-20.10	0.004*
Age group (years)					
17-19 (97)	37 (38.1)	28.9-48.1	60 (61.9)	51.9-71.1	0.018*
20-22 (182)	73 (40.1)	33.1-47.4	109 (59.9)	52.6-66.8	
23-25 (16)	12 (75)	50.1-91.5	4 (25)	8.5-49.9	
Gender					
Male (180)	81 (45)	37.8-52.3	99 (55)	47.7-62.2	0.142
Female (115)	41 (35.7)	27.3-44.7	74 (64.3)	55.3-72.7	
Residence					
Urban (163)	57 (35)	27.9-42.5	106 (65)	57.5-72.0	0.018*
Rural (132)	65 (49.2)	40.8-57.7	67 (50.8)	42.3-59.2	
BMI (kg/m^2)					
<18.5 (43)	18 (41.9)	27.9-56.9	25 (58.1)	43.1-71.1	0.705
18.5-22.9 (165)	65 (39.4)	32.1-47	100 (60.6)	53-67.9	
>23 (87)	39 (44.8)	34.6-55.4	48 (55.2)	44.6-65.4	

*Statistically significant (P<0.05). CI for the means and proportions. PHG: Premature hair greying, BMI: Body mass index, CI: Confidence interval

Table 2: Association of family history with premature greying of hair

Category (n)	PHG present (n=122), n (%)	95% CI	PHG absent (n=173), n (%)	95% CI	P (two-tail)
Paternal family history					
Positive (49)	35 (71.4)	57.7-82.7	14 (28.6)	17.3-42.3	0.000006*
Negative (246)	87 (35.4)	29.6-41.5	159 (64.6)	58.5-70.4	
Maternal family history					
Positive (28)	19 (67.9)	49.1-83.0	9 (32.1)	17.0-50.9	0.005*
Negative (267)	103 (38.6)	32.9-44.5	164 (61.4)	55.5-67.1	
Sibling family history					
Positive (71)	47 (66.2)	54.6-76.5	24 (33.8)	23.5-45.4	0.000002*
Negative (224)	75 (33.5)	27.5-39.9	149 (66.5)	60.1-72.5	
Any family history					
Positive (105)	67 (63.8)	54.3-72.6	38 (36.2)	27.4-45.7	<0.0000001*
Negative (190)	55 (29.0)	22.8-35.7	135 (71.0)	64.3-77.2	

*Statistically significant (P<0.05). CI for the means and proportions. PHG: Premature hair greying, CI: Confidence interval

overlooked one. One viewpoint is that it has a genetic predisposition and is exacerbated by environmental factors such as emotional stress, UV radiation and inflammatory stress.[3] Some studies have suggested an increase in oxidative stress and the failure of antioxidant mechanisms as possible causes.[17,18] Numerous studies report various biochemical factors being associated with the pathogenesis of PHG including serum ferritin, high-density lipoprotein-cholesterol, vitamins (B12 and D3) and minerals such as calcium, iron and copper,[4,5,7] whereas others suggest emotional or psychosocial stress and smoking as contributors.[3,4,7,9,11] As treatment options remain uncertain, plucking of grey hair and artificial colour application are what most people rely on.

Owing to the lack of studies on PHG from Rajasthan, we aimed to study the epidemiology and sociodemographics of PHG in medical college students. The prevalence of PHG in medical students was a notable 41%. Previous studies from India have reported a prevalence of 27.4%,[8] 26%[9] and 1.2%[5] from regions such as Uttarakhand and Karnataka. The higher prevalence in our study could be due to regional health differences or due to higher stress exposure in students being admitted to medical colleges. Other studies have found

Table 3: Association of eating habits/behaviour with premature greying of hair

Category (*n*)	PHG present (*n*=122), *n* (%)	95% CI	PHG absent (*n*=173), *n* (%)	95% CI	*P* (two-tail)
Number of meals					
<3 (115)	57 (49.6)	40.5-58.7	58 (50.4)	41.3-59.5	0.03*
≥3 (180)	65 (36.1)	29.3-43.3	115 (63.9)	56.7-70.7	
Diet type					
Vegetarian (215)	90 (41.9)	35.4-48.5	125 (58.1)	51.5-64.6	0.876
Non-vegetarian (80)	32 (40)	29.7-51	48 (60)	49-70.3	
Meal periodicity					
Regular (129)	44 (34.1)	26.3-42.6	85 (65.9)	57.4-73.7	0.017*
Occasionally irregular (56)	21 (37.5)	25.6-50.7	35 (62.5)	49.3-74.4	
Frequently irregular (110)	57 (51.8)	42.5-61.0	53 (48.2)	39.0-57.5	
Green leafy vegetable consumption					
Frequently (42)	12 (28.6)	16.5-43.5	30 (71.4)	56.5-83.5	0.136
Occasionally (168)	70 (41.7)	34.4-49.2	98 (58.3)	50.8-65.6	
Rarely (85)	40 (47.1)	36.6-57.7	45 (52.9)	42.3-63.4	
Fruit consumption					
Frequently (91)	32 (35.2)	25.9-45.4	59 (64.8)	54.6-74.1	0.021*
Occasionally (140)	54 (38.6)	30.8-46.8	86 (61.4)	53.2-69.2	
Rarely (64)	36 (56.2)	44.0-68.0	28 (43.8)	32.0-56.0	
Fast food consumption					
Frequently (25)	11 (44)	25.7-63.6	14 (56)	36.4-74.3	0.937
Occasionally (117)	49 (41.9)	33.2-51.0	68 (58.1)	49.0-66.8	
Rarely (153)	62 (40.5)	33.0-48.4	91 (59.5)	51.5-67.0	

*Statistically significant (P<0.05). CI for the means and proportions. PHG: Premature hair greying, CI: Confidence interval

Table 4: Association of physical activity and sedentary states (mean duration and standard deviation) with premature greying of hair

Category	PHG present (*n*=122)	95% CI	PHG absent (*n*=173)	95% CI	*P* (two-tail)
Sleep (h)					
Regular days	7.61±1.22	7.39-7.83	7.51±1.15	7.33-7.68	0.474
Holidays	8.04±1.44	7.78-8.30	8.12±1.65	7.87-8.37	0.11
Studies (h)					
Regular days	7.00±2.96	6.47-7.53	7.62±4.69	6.92-8.32	0.0000001*
Holidays	6.21±3.03	5.67-6.75	6.00±3.50	5.47-6.52	0.0912
Leisure activities (h)					
Regular days	3.70±1.97	3.35-4.05	3.79±3.61	3.25-4.33	<0.0000001*
Holidays	3.96±2.17	3.57-4.35	4.05±2.41	3.69-4.41	0.219
Exercise + sports (min)					
Regular days	52.75±37.49	46.03-59.47	56.90±38.16	51.17-62.63	0.342
Holidays	55.33±43.73	47.49-63.17	59.18±45.69	52.32-66.04	0.471
Days of (exercise + sports) per week	3.43±2.26	3.02-3.83	3.55±2.30	3.20-3.90	0.842

*Statistically significant (P<0.05). CI for the means and proportions. PHG: Premature hair greying, CI: Confidence interval

Table 5: Association of body image questionnaire score and age, gender, residence, severity and duration of premature hair greying

Category (*n*)	Good QoL: Score <24 (*n*=56), *n* (%)	95% CI	Poor QoL: Score >24 (*n*=66), *n* (%)	95% CI	*P* (two tail)
Age (years)					
17-19 (37)	14 (37.8)	23.4-54.1	23 (62.2)	45.9-76.6	0.421
20-22 (73)	37 (50.7)	39.3-62.0	36 (49.3)	37.9-60.7	
23-25 (12)	5 (41.7)	17.2-69.8	7 (58.3)	30.2-82.8	
Gender					
Male (81)	31 (38.3)	28.2-49.2	50 (61.7)	50.8-71.8	0.029*
Female (41)	25 (61.0)	45.5-74.9	16 (39)	25.1-54.5	
Severity					
Mild (41)	22 (53.7)	38.4-68.4	19 (46.3)	31.6-61.6	0.113
Moderate (41)	21 (51.2)	36.1-66.2	20 (47.8)	33.8-63.9	
Severe (40)	13 (32.5)	19.4-48.0	27 (67.5)	52.0-80.6	
Residence					
Urban (57)	33 (57.9)	44.8-70.2	24 (42.1)	29.8-55.2	0.021*
Rural (65)	23 (35.4)	24.5-47.5	42 (64.6)	52.5-75.5	
Duration of PHG (years)					
<1 (8)	5 (62.5)	27.8-89.4	3 (37.5)	10.6-72.2	0.549
1-5 (80)	37 (46.25)	35.5-57.2	43 (53.75)	42.8-64.4	
5-10 (34)	14 (41.2)	25.7-58.1	20 (58.8)	41.9-74.3	

*Statistically significant (P<0.05). CI for the means and proportions. QoL: Quality of life, PHG: Premature hair greying, CI: Confidence interval

a prevalence of 28.1% in a Turkish population,[11] 25.3% in a Korean male population[19] and 42.5% in a Saudi Arabian population.[20] Some studies used the age of 20 years[5,11] and 30 years[8,19,20] as the cut-off age for PHG, whereas we used the cut-off age as 25 years similar to Bhramaramba *et al*.,[9] who also did their study on college students. This result puts forth the notion that PHG is a significantly common problem amongst the age group of college students in the state of Rajasthan and that geographical location may account for differences in the prevalence of PHG. The mean age of students with PHG was significantly higher than those without PHG (P = 0.004) which was also confirmed in the studies of Akin Belli *et al*. and Agarwal *et al*.[11,21] This association of PHG with higher age may be explained by longer exposures of older students to inciting factors such as stress and nutritional deficiencies. The mean age of onset in the current study was 17.2 ± 2.5 years, which is higher than some previous studies[5,7,22] that had a lower mean age of participants. Bhramaramba *et al*.[9] had a similar mean age of participants but reported a higher age of onset (20.79 years), whereas studies with a higher age of participants reported a higher age of onset of 20.6[21] and 23.7[8] years. Each grade of severity (mild, moderate and severe) was distributed equally (~33%) amongst the students. Some studies[7,9] found most participants to have mild greying of hair, whereas Bhat *et al*.[5] reported most students to have moderate greying of hair. This may be due to a different measurement scale, which in the current study was similar to the study by Bhramaramba *et al*.[9] and they reported the majority (55%) of participants to have mild greying of hair. We found the frontal scalp to be the most common site for grey hair origin, as also seen by Saxena *et al*.[18] and Daulatabad *et al*.,[22] whereas others reported the vertex to be the most common site of origin.[7,9] We found the parietal scalp as the most common area of distribution of grey hair, whereas others found frontal,[22] vertex[9] and diffuse[7] distribution to be present in the majority of students.

As supported by a majority of previous findings,[5,10-12,21] our study could not find any association between BMI and PHG, while a few others reported low BMI[8] and obesity[19] to be correlated with PHG. The male-to-female ratio for PHG was approximately 2:1, but there was no gender predilection for PHG as confirmed previously,[5,7,9-12,22] but two reports from the North Indian population have reported a male predisposition for PHG.[8,21] We found an association between PHG and rural residence (P = 0.018), which is a novel finding as it has not been investigated in previous studies. This result calls for further investigations as it points to the discrepancy between the health of the urban and rural Indian populations. Family history significantly varied between PHG and non-PHG groups, being present in more than half (64%, n = 67) of the participants with PHG (P < 0.0000001). All categories of family history (paternal, maternal and sibling) were significantly higher in the PHG group. Similar findings were reported by other studies.[7-10] This indicates a strong genetic predisposition for premature greying, thus reinforcing the notion that PHG has a hereditary component. Recently, a whole-transcriptome analysis revealed that genes involved in the melanin biosynthesis pathway were associated with PHG.[23] However, genes that may predispose to PHG are still subject to investigation.

The use of hair oil was reported by most of the participants, but the frequency of hair oil use was found to have no association with PHG. This was different from the studies by Sharma and Dogra.[7] and Nath *et al*.,[8] which found hair oil

to be protective and used more amongst those without PHG. More studies are needed to ascertain the relation between hair oil and PHG due to the contradicting results. There was no correlation between the use of shampoo, conditioner and hair gel/wax and PHG as also reported by Nath *et al*.[8] In our study, the mean duration of exercise and days of exercise per week was higher in the non-PHG group, but this difference was not statistically significant. The mean duration of time spent on studies and leisure activities (sedentary behaviour) was higher in the non-PHG group ($P = 0.0000001$). This may be because students with PHG have more stressful lifestyles and are not able to spend a balanced time on studies and leisure activities. Varying results were reported by Sharma and Dogra.[7] and Chakrabarty *et al*.[4] who found sedentary behaviour to be associated with PHG, whereas Akin Belli *et al*.[11] did not find any association between physical activity and PHG similar to the current study.

Amongst all the investigated eating habits, the number of meals, regularity of meals and fruit consumption were significantly associated with PHG. Premature greying was higher amongst those who ate meals irregularly, ate < 3 meals per day and had less frequent consumption of fruits. Regularity of eating habits was only previously studied by Chakrabarty *et al*.[4] and they found irregular eating habits to be significantly associated with PHG. Recently, another study suggested a correlation between diet preference and PHG, i.e. vegetarian diet was associated with PHG;[12] however, in the current study, no significant difference was found between diet types similar to two other reports.[11,19] We hypothesise that irregularity in meals and eating fewer meals may increase oxidative stress of the body and the chances of nutrient deficiencies, while infrequent consumption of fruits may contribute to the pathogenesis of PHG due to the antioxidant properties of fruits,[24] since PHG has been linked with increased oxidative stress.[17,18]

QoL as measured by the BIQ was poor in 54% of the students with PHG, suggesting that the greying of hair can be a particularly troubling issue. Previous reports from the Indian population[13,25] have used the Dermatology Life Quality Index score and have also suggested an adverse effect on the QoL of a large proportion of students (85%). We used the BIQ as also used by Ashraf *et al*.[14] who reported 58% of the PHG cases in an Indonesian population to have a poor QoL. The QoL was more affected in males as compared to females, which may be explained by the concealment of grey hair due to longer hair length in females. In addition, the QoL was more affected in residents of rural areas compared to city residents. The severity and duration of PHG did not have an effect on QoL, which was also observed by Ashraf *et al*.[14] Thirty-six per cent of students in our study reported plucking out grey hair and 18% reported artificial colour application. This study was limited by a questionnaire format which may have given rise to recall bias. QoL could not be compared with a control group due to the format of the selected questionnaire, more specific questionnaires related to hair problems are required, which can also be applied to a control group. Our study is done on the Indian population, and the results may not be generalisable globally. Future studies with larger sample sizes should explore the association of the area of residence with PHG, the influence of irregularity of meals on hair greying and specific nutrients in fruits that possibly protect against PHG. Our study highlights the high prevalence of PHG in North-western India and suggests lifestyle changes as a remedy to the vast uncertainty for the treatment of PHG while confirming a strong effect of PHG on the QoL.

Conclusion

Premature graying of hair is prevalent in a high proportion of medical college students. It was associated with socio-demographic factors like age, residence and family history, and lifestyle factors including the number of meals consumed per day, regularity of meals, and frequency of fruit consumption. Our study highlights the high prevalence of PHG in North-western India and suggests lifestyle changes as a remedy to the vast uncertainty for the treatment of PHG while confirming a strong effect of PHG on the quality of life.

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Conflicts of interest

There are no conflicts of interest.

References

1. Panhard S, Lozano I, Loussouarn G. Greying of the human hair: A worldwide survey, revisiting the '50' rule of thumb. Br J Dermatol 2012;167:865-73.
2. Tobin DJ, Paus R. Graying: Gerontobiology of the hair follicle pigmentary unit. Exp Gerontol 2001;36:29-54.
3. Pandhi D, Khanna D. Premature greying of hair. Indian J Dermatol Venereol Leprol 2013;79:641-53.
4. Chakrabarty S, Krishnappa PG, Gowda DG, Hiremath J. Factors associated with premature hair greying in a young Indian population. Int J Trichology 2016;8:11-4.
5. Bhat RM, Sharma R, Pinto AC, Dandekeri S, Martis J. Epidemiological and investigative study of premature greying of hair in higher secondary and pre-university school children. Int J Trichology 2013;5:17-21.
6. Kaur K, Kaur R, Bala I. Therapeutics of premature hair greying: A long journey ahead. J Cosmet Dermatol 2019;18:1206-14.
7. Sharma N, Dogra D. Association of epidemiological and biochemical factors with premature greying of hair: A case-control study. Int J Trichology 2018;10:211-7.
8. Nath B, Gupta V, Kumari R. A community based study to estimate prevalence and determine correlates of premature greying of hair among young adults in Srinagar, Uttarakhand, India. Int J Trichology 2020;12:206-12.
9. Bhramaramba TS, Sathyanarayana BD, Swaroop MR, Devaraj Y, Raghavendra JC, Dukkipati M, *et al*. A clinicoepidemiological study of premature canities of degree college students in the rural area. Int J Adv 2016;3:489-93.
10. El-Sheikh AM, Elfar NN, Mourad HA, Hewedy ES. Relationship between trace elements and premature hair greying. Int J Trichology 2018;10:278-83.
11. Akin Belli A, Etgu F, Ozbas Gok S, Kara B, Dogan G. Risk factors for premature hair greying in young Turkish adults. Pediatr Dermatol 2016;33:438-42.
12. Acer E, Kaya Erdoğan H, İğrek A, Parlak H, Saraçoğlu ZN, Bilgin M. Relationship between diet, atopy, family history, and premature hair

greying. J Cosmet Dermatol 2019;18:665-70.
13. Daulatabad D, Grover C, Singal A. Quality of life and psychological impact of premature canities: A study from North India. Pigment Int 2016;3:24-8.
14. Ashraf P, Jusuf NK, Simanungkalit R. Association between premature canities and quality of life at Medan, Indonesia 2017. Bali Med J 2018;7:339-45.
15. Tremblay MS, Aubert S, Barnes JD, Saunders TJ, Carson V, Latimer-Cheung AE, *et al.* Sedentary behavior research network (SBRN) – Terminology consensus project process and outcome. Int J Behav Nutr Phys Act 2017;14:75.
16. Koleck M, Bruchon-Schweitzer M, Cousson-Gélie F, Gilliard J, Quintard B. The body-image questionnaire: An extension. Percept Mot Skills 2002;94:189-96.
17. Shi Y, Luo LF, Liu XM, Zhou Q, Xu SZ, Lei TC. Premature greying as a consequence of compromised antioxidant activity in hair bulb melanocytes and their precursors. PLoS One 2014;9:e93589.
18. Saxena S, Gautam RK, Gupta A, Chitkara A. Evaluation of systemic oxidative stress in patients with premature canities and correlation of severity of hair greying with the degree of redox imbalance. Int J Trichology 2020;12:16-23.
19. Shin H, Ryu HH, Yoon J, Jo S, Jang S, Choi M, *et al.* Association of premature hair greying with family history, smoking, and obesity: A cross-sectional study. J Am Acad Dermatol 2015;72:321-7.
20. Almutairi R, Dhafiri M. Premature greying of hair among the population of King Faisal University in Al-Ahasa, Saudi Arabia: An epidemiological study. Int J Med Dev Ctries 2019;3:542-8.
21. Agarwal S, Choudhary A, Kumar A, Zaidi A, Mohanty S, Yadav S. A study of association of premature greying of hair and osteopenia in North Indian population. Int J Trichology 2020;12:75-8.
22. Daulatabad D, Singal A, Grover C, Chhillar N. Profile of Indian patients with premature canities. Indian J Dermatol Venereol Leprol 2016;82:169-72.
23. Bian Y, Wei G, Song X, Yuan L, Chen H, Ni T, *et al.* Global down regulation of pigmentation-associated genes in human premature hair greying. Exp Ther Med 2019;18:1155-63.
24. García-Alonso M, De Pascual-Teresa S, Santos-Buelga C, Rivas-Gonzalo JC. Evaluation of the antioxidant properties of fruits. Food Chem 2004;84:13-8.
25. Mathias D, Patvekar MA, Deora MS, Dalave KT, Raheja A. Study of quality of life in patients with premature greying of hair in Western Indian population. Int J Res Dermatol 2021;7:218-22.