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CLINICO-EPIDEMIOLOGICAL STUDY OF PREMATURE GRAYING OF HAIR IN HADOTI REGION OF RAJASTHAN

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ABSTRACT

Background: Once considered as a mundane disorder, premature graying of hair has immerged out as interesting disorder among dermatologists and patients. **Aims:** To study the clinico-epidemiological profile of premature graying of hair in Hadoti region of Rajasthan and to lookout its systemic associations. **Material and Methods:** In an epidemiological, case control study, a detailed history of age of onset, pattern, progression and family history of graying were recorded. Age and sex matched controls were compared to lookout associations of premature graying with atopic diathesis, family history, sedentary lifestyle and lipid abnormalities. **Results:** A total of 200 cases and 200 controls (male: female= 3:2) were enrolled, with mean age of case group was 13.14±3.5 years and, of the control group was 13.67 ± 2.35 years. The mean duration of premature graying of hair presenting to hospital was 18.54±10.95 months. The most common pattern of graying was vertex with least common being parieto-temporal pattern. There was statistically significant association of premature graying of hair seen with atopic diathesis, sedentary lifestyle, irregular food habits and positive family history. In lipid profile parameters, serum levels of HDL were significantly low in case group. **Limitations:** small sample size, micronutrients profile were not assessed. **Conclusion:** Besides defining epidemiological characteristics of premature graying, current study has thrown light to its distribution according to age group, an association with atopic diathesis, sedentary lifestyle and irregular food habits which have been driven as statistically significant unlike the case of previous studies.

KEYWORDS: Premature graying of hair, case- control, epidemiological, systemic associations.

INTRODUCTION

Graying of hair, also coined as "canities," is a physiological phenomenon and considered to be a part of chronological aging.[1] Premature graying causes loss of self-esteem, particularly in today's image conscious generation and often interferes with socio-cultural adjustment. Hair is considered to gray prematurely if it occurs before the age of 20 years in Caucasians and before 30 years in Africans.[2-4] Aging of hair follicle refers to reduced melanocyte function and decreased hair production.[2]

As the premature graying assumes a special significance in Indian subcontinent due to darker hair colour, at the same time, Indian subcontinent also has a high tendency of various nutritional deficiencies due to poverty and inadequate intake. There are only a few epidemiological studies reported in literature in Indian context. This study will describe the epidemiology of premature graying and its systemic associations in Hadoti region of Rajasthan and will provide a needful insight to it.

MATERIAL AND METHODS

It was a case control, non-interventional study, conducted on patients attending the outpatient department of dermatology, venereology and leprology of Government medical college and attached group of hospital, Kota, Rajasthan. Cut off age was taken of 20 years.[5] A total of 200 cases were recruited with minimum 5 gray hair fibers on scalp (counted manually), fulfilling inclusion criteria. Age and sex matched control were selected from persons presenting in skin outdoor for other conditions except premature graying. Patients were excluded if graying was a part of/or due to other conditions such as vitiligo or cutaneous disease involving scalp, genetic disorder/syndrome associated with graying, history of topical medicine application or hair dye on in past 6 months, smokers, pregnant and lactating

mother or who did not give consent. Consent was obtained from each of the case/control and/or guardian of case/control after explaining them about the study. Ethical clearance for the proposed study was obtained from institutional ethics committee.

A detailed history of age of onset, pattern, progression and family history of graying were recorded on a predesigned proforma. Scalp examination was done for all cases by dividing the scalp surface into five imaginary zones, that is, frontal region, vertex, right and left temporal regions and the occipital region. Family history was elicited for two generations and recorded based on recall. Study population was questioned regarding the history of atopic diathesis (including allergic rhinitis, asthma and or atopic dermatitis), sedentary lifestyle and irregular food habits. Sedentary lifestyle was defined as subjects with no or irregular physical activity, as reported by patient on his own. Irregular eating habits were defined as a deviation from regular meal timing for 1 hour or more at least once per week.[6] Progression of graying was defined subjectively by history over a period of last 1 year as slow, stable or rapid progression. All participants underwent blood investigation for lipid profile.

Data was entered in Microsoft office and analyzed by Statistical Package for Social Sciences (SPSS Version 16). Unpaired t-test was applied from comparing the means and chi square test was used for comparing the proportions. A p value <0.05 was considered to be statistically significant.

RESULTS

A total of 200 cases and 200 controls were enrolled. Age of cases ranged from 5 to 20 years (Mean 13.14±3.5 years) and, of the control group of patients ranged from 8 to 20 years (mean 13.67 ± 2.35 years). (Table.1).

Table 1: Clinico-epidemiological profile of cases and controls.

Parameters	Case group	Control group
N	200	200
Age (mean in years)	13.14±3.5	13.67±2.35
Male: female	120:80	120:80
Atopic diathesis	79(39.5%)	21(10.5%)
Allergic rhinitis	38(19%)	11(5.5%)
Asthma	19(9.5%)	7(3.5%)
Atopic dermatitis	22(11%)	3(1.5%)
Sedentary lifestyle		
Yes	94(47%)	62(31%)
No	106(53%)	138(69%)
Irregular food habits		
Yes	102(51%)	71(35.5%)
No	98(49%)	129(64.5%)

One twenty were males (60%) and 80 (40%) were females with male to female ratio of 3:2 in both groups.

The mean duration of premature graying of hair presenting to hospital was 18.54±10.95 months.

Out of 200 cases, 34 cases (17%) had a rapid progression, 108 (54%) had slow progression and 58 cases (29%) had stable course of disease. (Fig. 1)

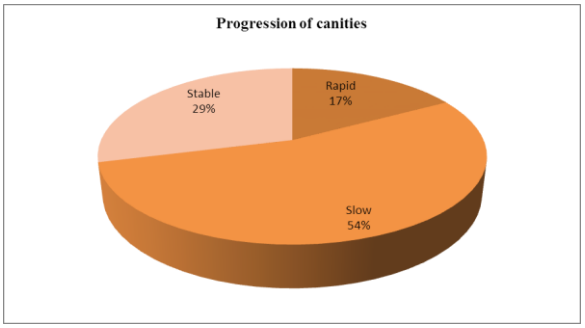

Fig. 1: Bar chart showing progression of graying in cases.

The graying of vertex part was most commonly seen as in 69 cases (34.5%) followed by frontal pattern in 64 cases (32%), diffuse in 32 cases (16%), occipital pattern in 22(11%) and least presented pattern was parieto temporal being seen in 13 cases (6.5%) (Fig. 2, 3).

Fig. 2: Diffuse pattern of premature graying of hair.

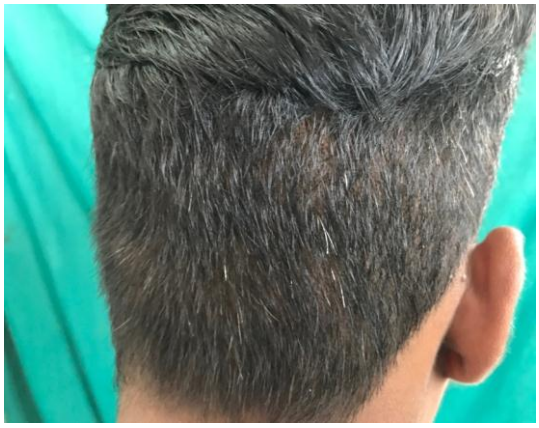

Fig. 3: Parieto temporal pattern of premature graying of hair.

Atopic diathesis was divided into three categories as allergic rhinitis, asthma and atopic dermatitis. If none of the above were positive than the person was counted as

having no atopic diathesis. Diagnosis was made on subjective complain of individual or parents history about that particular child. In the case group atopic dermatitis was present in 22 cases (11%), asthma in 19 (9.5%) and allergic rhinitis was present in 38 cases (19%). No features or history suggestive of atopic diathesis was found in 121 cases (60.5%). In contrast to these findings, the control group had 3 cases of atopic dermatitis (1.5%), 11 cases of allergic rhinitis (5.5%) and 7 cases of asthma (3.5%) among them. This indicates statistically significant association of premature graying with atopic diathesis in comparison of control group (p value = 0.0001) (Fig. 4).

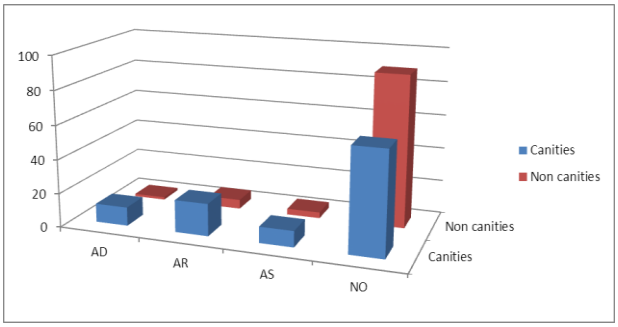

Fig. 4: Bar chart showing prevalence of Atopic diathesis. in case and control group.

A family history of up to 2 generations in case group (including first degree and second degree relative) was obtained on recall basis and recorded. On analyzing data, we had found that 67 (33.5%) first degree relative of PHG (premature hair graying) group and 49 (24.5%) second degree relatives of PHG group were affected. No positive family history was recorded in 84 (42%) of cases. It signifies a strong family association of premature graying of hair in PHG group (Table. 2).

Table 2: Epidemiological characteristic of PHG group.

Parameters	n= 200
Age wise distribution of cases (years)	
0-5	2 (1%)
6-10	42 (21%)
11-15	100 (50%)
16-20	56 (28%)
Progression (subjective)	
Rapid	34(17%)
Slow	108 (54%)
Stable	58 (29%)
Pattern of graying	
Vertex	69 (34.5%)
Frontal	64 (32%)
Diffuse	32 (16%)
Occipital	22 (11%)
Parieto-temporal	13 (6.5%)
Family history	
First degree	67 (33.5%)
Second degree	49 (24.5%)

Sedentary lifestyle was present in 94 cases (47%) while 106 (53%) cases had non sedentary lifestyle. While in control group only 62 (31%) individuals were leading a sedentary lifestyle and 138 (69%) were not. On statistical analysis of data, sedentary lifestyle was significantly associated with premature graying of hair (p value=0.001).

Irregular food habits were present in 102 (51%) cases while in control group 71 (35.5%) individuals were associated with irregular food habits thus data yielded that irregular food habits were statistically significantly associated with the PHG group (p value=0.002). In lipid profile parameters serum levels of HDL were significantly low in case group (Table.3).

Table 3: Comparison of lipid parameters in cases and controls.

Lipid Parameters	Case Group		Control Group		
	Mean	SD	Mean	SD	p value
HDL	42.87	9.97	46.55	9.55	0.00
LDL	91.68	18.53	90.58	19.73	0.56
VLDL	19.01	6.24	18.92	5.48	0.87
TC	161.44	20.34	163.49	20.87	0.31
TGs	131.19	17.24	131.06	16.12	0.93

DISCUSSION

Skin and hair phenotypes have powerful impact in human communication, evident from history of long racial inequality based on skin and hair colour. They impart much information, not least about our racial, ethnic, health, gender and age status. In the case of the latter parameter, we experience significant change in pigmentation in our journey from birth to puberty and through to young adulthood, middle age and beyond. The hair follicle pigmentary unit, by virtue of its varied colour according to age status and visibility, is perhaps one of most visible, accessible and potent aging sensors, with marked dilution of pigment intensity occurring long before even subtle changes are seen in the epidermis.[7] Skin and hair play a major role in human outlook and are of immense value to an individual's physical appearance and self-perception. Aging of hair includes two aspects of change, namely, weathering of hair shaft and aging of hair follicle. Weathering is degeneration of hair fiber occurring from the root to the tip. Aging of hair follicle refers to reduced melanocyte function (known as graying) and decreased hair production.[2] Graying of hair is considered to be a physiological age related phenomenon. A recent study was challenged the "50" rule of thumb (at least 50% of individuals have 50% gray hair by the age of 50 years) reported that the global range of individuals having 50% gray hair by the age of 50 years was between 6% and 23%.[8] Graying of hair is believed to have a multi-factorial etiology which includes environmental factors, genetic component, nutritional status and oxidative stress but the exact cause or pathogenesis has not been elicited yet.

The current study which was carried in Hadoti region of Rajasthan (northwest India) assumes special significance as sample population may be a representative of larger group due to pooling of adolescents age group to this area due to prominence of major coaching institutes.

In a study by Daulatabad D et al[5] conducted in the outpatient department of dermatology, University College of Medical Sciences and associated Guru Teg Bahadur Hospital, Delhi, on 52 each case and control, the mean age of onset of graying was 11.6 ± 3.6 years which was slightly earlier than the current study (mean age of presentation 13.14 ± 3.5 years). Positive family history of premature graying was reported in 39 (75%) cases with an equal prevalence on paternal and maternal sides. More than half of the cases, 29 (55.8%) reported having a first degree relative affected by premature graying, 13 (25%) had a second degree and 20 (38.5%) had a third degree relative affected. Atopy was found to be strongly associated with PHG group with an odds ratio of 3.8. In the current study which concluded on a larger sample size, mean duration of disease was 18.54±10.95 months. A positive family history of premature graying was present in 116 (58%) of cases which included having a first degree relative affected by premature graying in 67 (33.5) and 49 (24.5%) had a second degree affected relative. Atopic diathesis was seen in 79 (39.5%) cases but only in 21 (10.5 %) of control group in our study. The association with atopic diathesis in our study was statistically significant with a p value of less than 0.05 (p value =0.0001) which was not calculated in previous studies. Part of scalp to be first affected in our study was vertex in 69 cases (34.5%) followed by frontal in 64 (32%), diffuse in 32 (16%), occipital in 22 (11%) and least common presentation was parieto temporal in 13 cases (6.5%). These findings are similar to the study conducted by Daulatabad et al. One interesting finding which we recorded was that age group of 11 to 15 years was leading with presentation of 100 cases (50%) followed by 16 to 20 years group with 56 (28%), 6 to 10 years with 42 cases (21%) and least was 0 to 5 years with only 2 cases (1%). This may be due to the fact that children of age group 11 to 15 years may start becoming increasingly conscious about their social image, how they look and to the confrontation of peer pressure. Also, it denotes a higher risk of onset of PHG than other age groups.

Chakrabarty S et al[6] conducted study at a trichology clinic in Bengaluru between October 2013 and April 2014 with a total of 37 cases of PHG and 37 age and gender matched controls. Individuals with PHG in their study had significantly lower levels of high-density lipoprotein cholesterol (HDL-C) as compared to the control group ($p < 0.001$). Significant proportions of patients with PHG had a sedentary lifestyle and admitted to having irregular eating habits. Similar findings were reported in our study as mean HDL in cases was 42.87±9.96 while mean HDL in control group was 46.55±9.54. In our study the PHG group has statistically significant association with sedentary lifestyle and irregular food habits as compared to control group (p value < 0.05).

In a study by Erdogan T et al [9] they concluded that presence of premature hair graying may be useful in identifying individuals with an increased risk of cardiovascular disease. These findings may be relatable to our results as lower levels of protective serum HDL levels were found in our PHG group. This is a well-known entity that lower HDL levels are a risk factor for coronary artery diseases.[9]

There are several limitations to this study; the first being that although sample size of current study is quite larger than similar studies on Indian population still it was not calculated on the basis of prevalence of disease because of scarcity of prevalence data of this entity in Indian population. Also, we were unable to investigate various micronutrients parameters which were done in previous studies. Therefore, a larger sample size study including detailed blood investigation of nutritional profile are recommended to confirm the results obtained in this study and for better exploration of the disease pathogenesis.

CONCLUSION

The current results have defined epidemiological and clinical pattern of premature graying of hair in the population of Hadoti region which includes districts like Bundi, Baran, Kota and Jhalawar. It has also given more insight into its distribution according to age group, an association with atopic diathesis, sedentary lifestyle and irregular food habits which have been driven as statistical significant unlike the case of previous studies. The lipid profile abnormalities may be helpful to further inquire the role of premature graying as a risk factor for coronary artery disease.

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None.

CONFLICT OF INTEREST

None.

SOURCE OF SUPPORT

Nil.

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