An epidemiological study of female pattern hair loss at a referral centre in South India

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Abstract

Back ground and Objectives: Female pattern hair loss (FPHL), also called as female androgenic alopecia, is one of the common causes of diffuse hair loss in women, characterized by widened midline part in the front of the scalp. Studies have revealed that the FPHL is more common than previously thought and the data pertaining to the same is lacking in the Indian literature. The present study was undertaken to extrapolate the demographic variables and clinical features of FPHL and also to identify the possible risk factors associated with it.

Material and Methods: This study was done at our department, involving 100 women with FPHL. Details pertaining to the epidemiological variables, clinical features and risk factors were noted.

Results: In the present study, FPHL accounted for 15.3% of diffuse hair loss in women. Mean age and mean age of onset of FPHL among the 100 women was 31.26±9.85 years and 28.03±8.05 years respectively. A positive family history was noted in 51% of patients, with no difference in the age of onset of FPHL in patients with family history positive or negative. The most common pattern of hair loss was diffuse hair loss over the vertex (72%), followed by Oslen pattern (16%) and Hamilton pattern (12%). The age specific frequency of the hair loss severity showed an increase in the severity of FPHL with advancing age (Sinclair grade V was 5.8% in third decade to 74.5% in fifth decade). Polycystic ovarian syndrome, hypothyroidism and BMI more than 25 (overweight and obesity) were noted in 23%, 15% and 65% of patients respectively.

Conclusion: FPHL is certainly more frequent than perceived among Indian women. Diffuse hair loss over vertex is the most common pattern of hair loss encountered and the family history does not influence the age of onset and the severity. Overweight and obesity is one of the important risk factor for FPHL.

Keywords: Female pattern hair loss, Family history, Obesity.

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Introduction

Diffuse alopecia is a common and often distressing complaint among women. Chronic telogen effluvium, female pattern hair loss (FPHL) and diffuse alopecia areata are the common causes for the diffuse hair loss in women.[1] FPHL is a non-scarring diffuse alopecia, characterized by a reduction in hair density over the crown and frontal scalp with retention of the frontal hairline. Its prevalence increases with age from approximately 12% amongst women aged between 20 and 29 years to over 50% in women over the age of 80.[2] 3 patterns have been recognized.

1. Diffuse thinning of the crown with preservation of frontal hair line. Ludwig classified it into three grades of severity referred to as Ludwig grades I, II, and III.[3] There is also the Sinclair scale, which is a modified version of the Ludwig scale, using a five-point visual analogue scale for hair loss, as well as the Savin scale.[4,5]
2. Oslen's "Christmas tree pattern" with frontal midline breach and widening of the central part of the scalp without diffuse hair loss.[6]
3. Thinning associated with bi temporal recession (Hamilton type).[7]

The histological hallmark of FPHL is miniaturization of hair follicles with a progressive transformation of terminal hair follicles into vellus-like follicles. In addition, women with FPHL have more follicles in the telogen phase of hair cycle, and fewer in the anagen phase.[8]

The role of androgens in FPHL is less certain than in men and other factors like higher levels of 5-α reductase, more androgen receptors and lower levels of cytochrome P450-aromatase (which converts testosterone to estrogen) in hair follicles of frontal areas may be involved.[9] Genetic pre-disposition is a pre-requisite and a polygenic mode of inheritance for FPHL has now been well established. It is said that these genes may determine the age of onset, progression, pattern, and severity.[10] Besides genetics, other external factors like testosterone, stress, hypertension, diabetes mellitus, smoking, minimal physical activity[11], hypothyroidism, hyperprolactinemia[12], obesity[9], fewer child births, ultraviolet light exposure, breast feeding[13], and lower serum ferritin levels[14] are implicated as risk factors for FPHL.

So far, the data pertaining to the prevalence and risk factors for FPHL is available from western literature and few Asian studies from South Korea, China and Taiwan.[13,15,16] There is a paucity of data from our sub continent, except for a study by Okram S et al[17] involving 50 patients with FPHL. Hence in the view of a dire need for the studies in this aspect, the present study was undertaken and the observations are presented hereunder.

Materials and Methods

This observational study was undertaken at the Dept. of Dermatology, Venereology & Leprosy among the females aged more than 18 years, presenting with patterned hair loss, after obtaining the Institutional Review Board clearance. The data pertaining to age, sex, age at onset, course of hair loss (chronic or intermittent), hair thinning, period of active shedding prior to the hair loss, personal history as well as the family history of hair loss, systemic or newly diagnosed disorders in the past year, eating behavior, drug history, hair care and hair styling practices, menstrual and obstetric history were noted in a pre-structured case proforma.

The diagnosis was made clinically based on the pattern of hair loss. The pattern of hair loss was then graded as per the 5 point Sinclair scale, Olsen scale (frontal accentuation⁄ christmas tree pattern) and Hamilton-Norwood scale. Simple test like hair pull test and friction test were performed to get a global impression of hair quality and hair growth activity. Hirsutism, acne, seborrhea, obesity and other features of hyperandrogenism were noted down. The data thus recorded was analyzed using Microsoft XL and SPSS software version 22.0.

Results

During the study period of one year, of the 873 cases of diffuse hair loss in women, we encountered about 134 cases of female pattern hair loss (FPHL), there by accounting for 15.3% of diffuse hair loss among women. Of these, 100 consenting patients were included in the study.

Table 1: Age of onset of female pattern hair loss with respect to the family history

Family history	Age of onset (mean age±SD)	Number	Chi-Square test
Positive	28.4±8.22 years	51	**p 0.424**
Negative	27.61±7.9 years	49	

Table 2: Hair loss patterns in the cohort of female pattern hair loss

Grade of hair loss	Age (in years)				Total
	18-30	31-40	41-50	>50	
Sinclair II	16(88.8%)	2(11.2%)	0(0%)	0(0%)	18
Sinclair III	8(28.5%)	14(50%)	6(21.5%)	0(0%)	28
Sinclair IV	1(5.8%)	5(29.4%)	7(41.2%)	4(23.5%)	17
Sinclair V	0(0%)	1(11.2%)	3(33.3%)	5(55.5%)	9
Oslen	8(66.6%)	3(25%)	1(8.3%)	0(0%)	12
Hamilton-Norwood	7(43.7%)	4(25%)	3(18.7%)	2(12.5%)	16
Total	40	29	20	11	100

Table 3: Hair loss patterns with respect to the family history

	Pattern of hair loss						Total	Chi-Square test
	Sinclair II	Sinclair III	Sinclair IV	Sinclair V	Oslen	Hamilton -Norwood		
Family history positive	12 (23.5%)	10 (19.6%)	9 (17.7%)	7 (13.7%)	4 (7.8%)	9 (17.7%)	51 (100%)	**p 0.354**
Family history negative	6 (12.2%)	18 (36.7%)	8 (16.4%)	2 (4.1%)	8 (16.4%)	7 (14.2%)	49 (100%)	
Total	18	28	17	9	12	16	100	

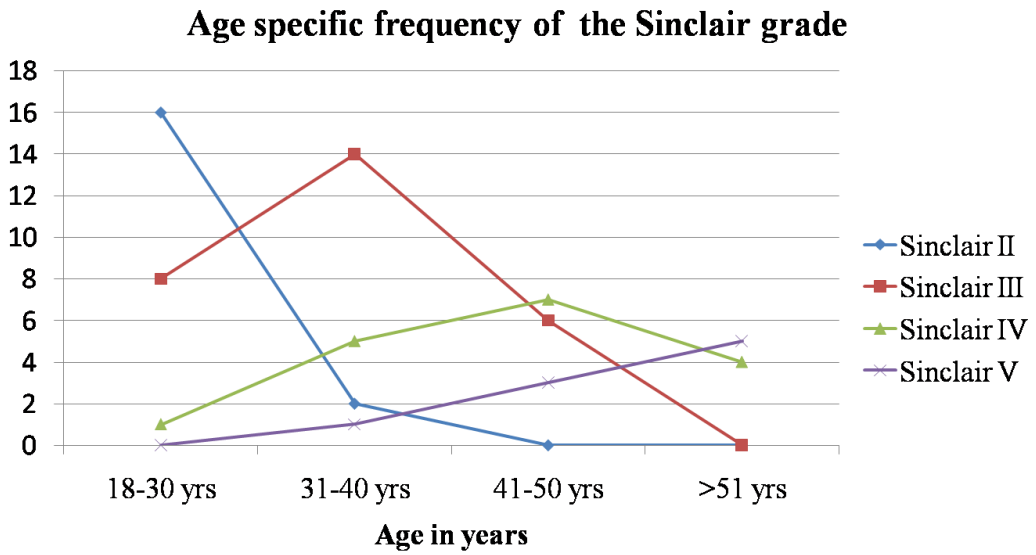

Fig. 1: The age specific frequency of hair loss severity in patients with female pattern hair loss

Demographic profile

Of the 100 patients, 40 (40%) of patients were in the age group of 18-30 years, followed 29(29 %), 20(20%) and 11(11%) patients in the age group of 31-40 years, 41-50 years, more 51 years respectively. The mean age of our patients was 31.26±9.85 years with a mean duration of 3.39±2.9 years before seeing the doctor. The mean age of onset of the hair loss among the patients were 28.03±8.05 years, with 60% of the patients having the onset of hair loss within 30 years. Though 52(52%) of patients were asymptomatic, itching and burning sensation were noted in 31(31%) and 17(17%) of the patients. 83(83%) of women presented with thinning of the hair, with reduced growth rate. A period of active shedding, prior to the onset of the thinning was noted in 59(59%) of the women. 46(46%) had the onset after the first child birth. A positive family history was noted in 51(51%) of the patients. 27(52.9%) had a positive family history in father, while 15(29.4%) reported a positive family history in mother. 9(17.6%) had a positive family history in both father and mother. There was no difference in the age of onset of hair loss between the patients with positive family history (28.4±8.22 years) and those with no family history (27.61±7.9 years) (Table 1). Hair pull test was positive in 24(24%) of patients.

Stage of hair loss

18(18%), 28(28%), 17(17%), 9(9%), 16(16%) and 12(12%) of the women presented with patterned hair loss of grade Sinclair stage II, Sinclair stage III, Sinclair stage IV, Sinclair stage V, Hamilton-Norwood scale and Oslen scale respectively. Sinclair stage I is the normal female hair pattern and is found universally among pre-pubertal girls and hence was not included in the case definition for FPHL. The age specific frequency of hair loss severity depicted in the figure 1 and table 2 shows that the frequency of Sinclair stage 2 decreased from third decade (88.8%) to forth decade (11.2%), while the frequency of Sinclair stage 4 and 5 increased from third decade (5.8%) to fifth decade (74.5%). As shown in table 3, a positive family history was not associated with advanced severity in the hair loss.

Associated medical conditions

23(23%) of women had a previous history of polycystic ovarian syndrome (PCOS) and 15(15%) had a history of hypothyroidism. 4(4%) had a history of iron deficiency anemia. Other conditions noted were hypertension (15%), diabetes mellitus (22%) and rheumatoid arthritis (7%). 42(32%) were overweight with BMI (Body mass index) of more than or equal to 25, while 23(23%) were obese with the BMI more than or equal to 30. The mean BMI was 27.9±3.8 Kg/m^2. 9 (43%) patients with PCOS had Hamilton-Norwood pattern of hair loss.

Discussion

In our study involving the cohort of FPHL among the patients actively seeking treatment for their hair loss, we found that the FPHL accounts for 15.3% of diffuse hair loss in women. It is very low in comparison to the observation made by Siah TW et al.[18] This may be due to the ethnic variations in the prevalence of the FPHL and lack of data pertaining to FPHL from our country. Previous population studies have revealed that the prevalence of FPHL in the community was higher in Caucasoid women than in Asian women.[11]

The bulk of our patients were in the age group of 18-40 years. A similar trend was seen in a study conducted by Okram S et al.[17] Though the previous studies has concluded that the prevalence of FPHL

increases with advancing age, we did not come across the same trend.[15,16,19] This may be as our study is a hospital based study and greater demand for treatment is among patients aged 25-40 years of age.[11]

In concordance with the studies by Okram S et al[17] and Zhang X et al[20], the mean age of onset of FPHL was 28.03±8.05 years which is in the reproductive age group. Though majority complained of reduced size of plait[3], a period of active telogen effluvium prior to the onset of the hair thinning was noted in a small percentage of our patients. This was also reported by Siah TH et al.[18] It is postulated that, lack of estrogen during menopause is associated with increased prevalence of FPHL in post-menopausal women. Hence the short duration of reduced circulating level of estrogen in the immediate post-partum may first precipitate an acute telogen effluvium and then trigger FPHL.[21]

We are in agreement with the observation made by Saih et al[18] and Zhang et al[20] regarding positive family history either paternal or maternal or both relatives n patients with FPHL. As against the observation of an early age of onset and advanced grade of hair loss in patients with positive family history in the studies by Zhang et al[20] and Okram S et al[17], we did not notice any such difference. Hence this high prevalence of family history, with varying degrees of intensity of hair loss and the onset at different ages, suggest a polygenic pattern of inheritance with incomplete penetrance. Further besides genetics, external factors may also be important for the development of FPHL.[11]

Sinclair grade was most common type of FPHL, of which majority was were in Sinclair grade III, which clinically correspond to Ludwig grade II. This trend was also noted by Fatemi et al and Okram S et al.[17.19] Similar to the observation by the former author we noted Hamilton-Norwood type in 12% of the patients.[19] Sinclair scale was used to grade hair loss in order to identify early perceptible hair loss. Identical to the finding by Sinclair RD and Gan DCC,[2] we noted a higher grade of hair loss with advancing age, as it is influenced by the duration of the disease.[20]

Studies have shown an association of FPHL with PCOS in a range of 22 to 67%, while in our study it was 23%.[22,23] The occurrence of the Hamilton Norwood type (male pattern) of hair loss (bi temporal recession) in women with PCOS in the present study, supports the role of androgens in the pathogenesis of FPHL. Futterweit et al found that, of 109 patients with hair loss studied, only 38.5% had a clinical or biochemical evidence of hyperandrogenism.[24] This may be as apart from androgens, other androgen independent mechanisms are involved in the development of FPHL.[25]

As seen in study by Siah et al, we also noted preexisting hypothyroidism in 15% of the patients. The lack of optimal thyroid hormone levels may be responsible for the outbreaks of telogen effluvium in women with androgenic alopecia,[26] as we noted a positive diffuse hair pull test in 24% of patients.

We noted that 65% of our patients were either overweight or obese with the mean BMI of our patients comparable with the case control study by Zaki MS and Ahmed IZ. In their study, it was found that patients with FPHL had 5.95 times greater probability of metabolic syndrome compared to those without FPHL with 75.8% of patients having a waist circumference of ≥ 88cm indicating abdominal obesity. Obesity and the hyperinsulinemia which follows, decreases circulating levels of sex-hormone binding globulin (SHBG), increases the ovarian production of androgens and thus aggravating or initiating the patterned hair loss in females.[9]

Conclusion

Hence with this study, we infer that FPHL is not an uncommon cause of the diffuse hair loss in Asian women. Though the prevalence and the severity of the disease increases with advancing age, there is a substantial proportion women who present in third decade of life, with lower grade (grade III) on Sinclair scale, coinciding with the post partum telogen effluvium. Family history of FPHL either in the paternal or maternal relatives, does not influence it's the age of onset or severity. Obesity, PCOS are some of risk factors which should be addressed in patients with FPHL, for better treatment response and hence compliance. Lack of case control design, institution based cross sectional study is the lacunae noted in the present study. Population based descriptive study, helps to identify the exact prevalence and other risk factors of the FPHL.

In conclusion, owing to the high prevalence of FPHL in Indian woman, while dealing with diffuse hair loss in females, we should also consider FPHL as one of the etiology and assess for the risk factors associated with it. Early diagnosis and counseling helps in prompt treatment and compliance among the patients.

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