<u>Original research article</u>

Diffuse non scarring alopecia in women: A clinico-etiological study

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Abstract
Woman's hair is symbolically linked to femininity, sexuality, attractiveness, and personality rather than in men. Hair loss is a common disorder, with an estimated life time prevalence of 1.7%. However, this figure is not a reliable estimate, as very limited epidemiological studies have been published in this regard, owing partly to under reporting. Most adults presenting with a complaint of hair loss will complain of either gradual thinning of hair in a pattern over time or a rapid increase in the amount of hair being shed, with hair being evident in the shower, on pillows and carpets and hair coming out easily when brushed. A detailed history and clinical examination findings were noted after taking a written informed consent from the informant. Questionnaires regarding age, duration, onset and progression of hair loss, family history, systemic illness and associated symptoms like scalp itching, pain, seborrhea were recorded in a pre-structured case proforma. Majority of patients (62%) of participants in our study had a gradual progression of hair loss and 38% had rapid progression of hair loss. Majority of women (28%) presenting with hair loss had loss of around 300 hairs per day, 25% patients had loss of around 100 hairs per day, 22% patients had loss of around 200 hairs per day, 10% patients had loss of around 400 hairs per day, 6% patients had loss of around 600 hairs per day, 5% patients had loss of around 50 hairs per day, 4% patients had loss of around 500 hairs per day.
Keywords: Diffuse non scarring alopecia, women, clinico-etiological study

Introduction
Hair is an ectodermal structure with great cosmetic importance and helps an individual to maintain self-image, carry on healthy and meaningful social interactions. Woman's hair is symbolically linked to femininity, sexuality, attractiveness, and personality rather than in men [1]. Hair loss is a common disorder, with an estimated life time prevalence of 1.7%. However, this figure is not a reliable estimate, as very limited epidemiological studies have been published in this regard, owing partly to under reporting [2]. Most adults presenting with a complaint of hair loss will complain of either gradual thinning of hair in a pattern over time or a rapid increase in the amount of hair being shed, with hair being evident in the shower, on pillows and carpets and hair coming out easily when brushed [3].
There are various causes for Diffuse Hair Loss (DHL), which include Telogen Effluvium (TE), Female Pattern Hair Loss (FPHL), Chronic Telogen Effluvium (CTE), Anagen Effluvium (AE), loose anagen hair syndrome and diffuse type of Alopecia Areata (AA) [4]. DHL is precipitated by multiple etiological factors such as child birth, fever, acute or chronic illness, renal disorder, chronic hepatic disorder, thyroid disorders, iron deficiency anaemia and other nutritional deficiencies, or drugs [5, 6]. Hair loss is associated with significant psychological morbidity leading to reduced quality of life of the patient, emotional suffering, social, personal and work-related problems in women [7]. Traditionally good nutrition is believed to play role in improving hair growth while nutritional deficiency or imbalance diet is believed to contribute to hair loss [8].
In females with hair loss, it is important to study the various causes and to classify it into the different types and evaluate the biochemical parameters related to it like complete hemogram, serum ferritin, vitamin B12, vitamin D3, blood glucose level and thyroid profile.
Aim of our study is to understand the clinico-etiological profile of non-scarring DHL in women thus helping us to administer the appropriate treatment.
Iron is involved in critical physiological processes within the hair follicle, suggesting that iron deficiency (ID) could disrupt hair synthesis. It is an essential co-factor needed for the rate limiting enzyme ribonucleotide reductase which is required for DNA synthesis. The hair follicle matrix cells are actively

dividing dynamic cells as they require this enzyme and are sensitive to minor iron deficiency. As a result, hair follicles that shed their hair at the end of telogen may temporarily fail to re-enter anagen leading to slow onset diffuse hair loss.

The relationship between body iron status and hair loss has been investigated in a number of studies, however, with relatively discrepant findings. The prevalence of anemia in women of reproductive age in general population is estimated to be 30-50%, depending on various socio-economic factors, like community, education, place of living, etc.

Hemoglobin (Hb) consists of Iron containing a heme molecule and attached four globin chains. Hemoglobin concentration alone cannot be used to diagnose iron deficiency, however it should be measured as it provides information about severity of iron deficiency. Iron deficiency anaemia (IDA) results from inadequate dietary iron intake, decreased iron absorption, increased iron demand and increased iron loss.

Methodology
Source of Data
The cases presented in this study included female patients in the age group of 18 to 45 years with features of diffuse non scarring alopecia attending the Department of Dermatology, Venereology and Leprosy.

Inclusion criteria
▪ All consenting females 18 to 45 years of age with non- scarring diffuse hair loss and diffuse thinning of hair.

Exclusion criteria
▪ Not willing to participate.
▪ Participants on iron therapy, medications for systemic disorders.
▪ Trichotillomania.
▪ Alopecia areata.
▪ Anagen Effluvium.

Study design
Cross sectional study.

Method
History taking
A detailed history and clinical examination findings were noted after taking a written informed consent from the informant. Questionnaires regarding age, duration, onset and progression of hair loss, family history, systemic illness and associated symptoms like scalp itching, pain, seborrhea were recorded in a pre- structured case proforma. History of trigger factors like stress, febrile illness, chronic or acute blood loss, hair care products usage, recent childbirth and abortions, recent hospitalizations and surgeries were noted. Previous similar history in the past with menstrual and obstetric history were recorded. Hamilton anxiety and depression scoring was done.

Clinical examination
A thorough general physical and systemic examination was carried out to look for any abnormalities. Scalp examination included type of hair loss, hair thinning, temporal recession and hair pull test was done in all cases. Diagnosis was made clinically based on the history and pattern of hair loss. Patients were categorised into three groups of Acute Telogen Effluvium, Chronic Telogen Effluvium and Female pattern hair loss. Patients of FPHL were sub grouped based on pattern as Ludwig type, Olsen type and Hamilton type. Patients with Ludwigs type of FPHL were graded with Sinclaire scale (Type I to V).

Investigations
The following laboratory investigations were done and recorded.
▪ Haemoglobin.
▪ Serum Ferritin.
▪ Serum Vitamin B12.
▪ Serum Vitamin D3.
▪ Thyroid function test-TSH, T3, T4.
▪ LFT.
▪ RFT.

Results
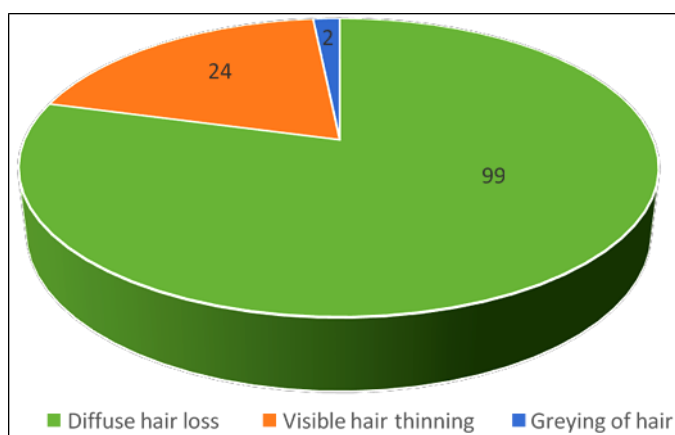
*(Multiple responses possible)

Fig 1: Presenting Complaints

Among the total patients, the most common presenting complaint was diffuse hair loss (99%). The second most common presenting complaint was visible thinning of scalp hair (24%). 2% women presented with greying of hair as shown in the Figure 15.

Table 1: Duration of Hair Loss

	Duration	Count	Percentage
1.	<2 months	12	12
2.	2-6 months	35	35
3.	>6months	53	53

The duration of hair loss ranged from to 15 days to 3 years in our study. The mean duration was 12.73 ± 14.12 months. Majority of the patients (53%) presented with duration of hair loss more than 6 months. 35% presented with 2-6 months duration, 12% of the patients with <2 months duration as depicted in the Table 10.

Table 2: Age-Wise Distribution of Duration of Hair Loss

Age (years)	Duration							
	Overall (n=100)		< 2 months (n=12)		2-6 months (n=35)		>6 months (n=53)	
	Count	%	Count	%	Count	%	Count	%
18-25	61	61	9	75	20	57.1	32	60.4
26-30	21	21			5	14.3	16	30.2
31-35	5	5			4	11.4	1	1.9
36-40	7	7	2	16.7	4	11.4	1	1.9
41-45	6	6	1	8.3	2	5.7	3	5.7

As depicted in the, 75% of patients presented within 2 months of onset in 18-25 years, 16.7% with 36-35 years, 8.3% with 41-45 years. 57.1% of patients presented within 2-6 months of onset in 18-25 years, 14.3% with 26-30 years, 11.4% with 31-35 years, 11.4% with 36-40 years and 5.7% with 41-45 years. 60.4% of patients presented within 2- 6 months of onset in 18-25 years, 30.2% with 26-30 years, 5.7% with 41-45 years 1.9% with 31-35 years and 1.9% with 36-40 years.

Table 3: Progression

	Progression	Count	Percentage
1.	Rapid	38	38
2.	Gradual	62	62

Majority of patients (62%) of participants in our study had a gradual progression of hair loss and 38% had rapid progression of hair loss as shown the Table.
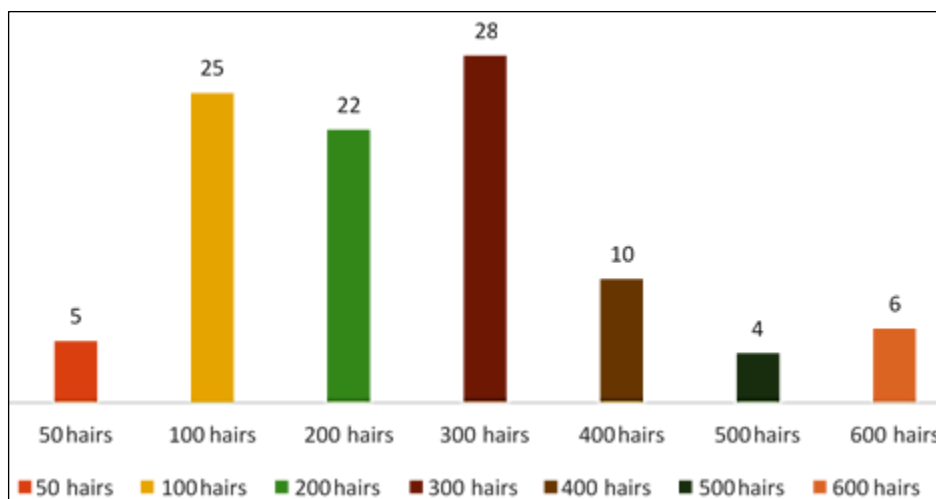
Fig 2: Average number of hairs lost per day

Majority of women (28%) presenting with hair loss had loss of around 300 hairs per day, 25% patients had loss of around 100 hairs per day, 22% patients had loss of around 200 hairs per day, 10% patients had loss of around 400 hairs per day, 6% patients had loss of around 600 hairs per day, 5% patients had loss of around 50 hairs per day, 4% patients had loss of around 500 hairs per day as shown in the Figure.

Table 4: Patterns of Alopecia

Diagnosis	Count	Percentage
ATE	39	39
CTE	37	37
FPHL	24	24
FPHL (M)	2	2
FPHL (O)	2	2
FPHL 2	7	7
FPHL 3	7	7
FPHL 4	4	4
FPHL 5	2	2

Among the total patients, the most common pattern of alopecia was acute telogen effluvium (39%), followed by chronic telogen effluvium (37%) and female pattern hair loss (24%) as shown in the Figure 18.
Furthermore, Sinclaire FPHL Grade II and III were observed in 7% each, grade IV was seen in 4%, grade V was seen in 2%, Hamilton (Male type) and Olsen type was seen in 2% each.

Discussion
Among the total patients in our study, the most common presenting complaint was diffuse hair loss (99%). Visible thinning of scalp hair and greying of hair was seen in 24% and 2% cases respectively.
A study conducted by Patel KB *et al*., found majority of patients who presented with complain of diffuse hair loss (58%) and other presentations like visible thinning, patchy hair loss etc. were found in variable number of patients [7].
The duration of hair loss in the present study ranged from to 15 days to 3 years. The mean duration was 12.73 ±14.12 months. Majority of the patients (53%) presented with duration of hair loss more than 6 months, 35% patients presented with 2-6 months duration, 12% patients with <2 months duration.
An observational study by Patel KB *et al*., showed 52% of patients presented with hair loss <6months, 48% patients with hair loss >6 months duration and the duration of hair loss ranged from <1month to >5 years which was almost similar to our study [7].
According to study by Agarwal S *et al*., the duration of hair loss ranged from 15 days to 2 years, and the mean duration observed was 18.84 ± 25.5 months [9].
Rustom and Pasricha in their study reported the duration of less than 6 months in 50% patients, 6 to 12 months in 44% patients and more than 12 months in 6% patients. The duration of hair loss ranged from 1 month to 22 months [10].
In a study of 100 female participants conducted by Poonia K *et al*., the duration of hair loss ranged from 1 month-60 months with mean duration of hair loss was 14.4 ± 14.2 months [11].
Majority of women (28%) presenting with hair loss had loss of 300 hairs per day, 25% women had around 100 hairs loss per day, 22% women had loss of around 200 hairs per day, 10% women had around 400 hairs per day, 6% women around 600 hairs per day, 5% women had around 50 hairs per day

and 4% women had around 500 hairs per day in the present study.

This was in contrast to observation made by Patel KB *et al*., in their study that 37% of women having <100 hairs lost per day, 55% women with 100-200 hairs lost per day and 8% of women with >200 hairs lost per day [7]. Majority of study population had features of TE, hence presented with hair loss of more than 100 hairs per day.

Based on history and clinical examination in the present study, the most common pattern of alopecia observed was ATE (39%), followed by CTE (37%) and FPHL (24%). The most common type of presentation of FPHL was Sinclaire grade 2 and 3 followed by Sinclaire grade 4 and 5 and the least by Olsen pattern and Hamilton pattern.

Similar observation was made by Malkud S *et al*., in their study of 180 females with diffuse hair loss in which 64.44% women had telogen effluvium, 15.55% had CTE, 11.66% had FPHL and 0.55% had AE [1]. Another study by Patel KB *et al*., found that most of the patients (53%) had TE either acute or chronic followed by patterned hair loss in 10% of patients, CDHL in 16% of patients and other causes accounting for the rest [7]. According to the study conducted by Deo K *et al*., common types of alopecia in their study were TE (62.2%) and FPHL (23.7%).

This was in contrast to the study by Agarwal S *et al*., in which the most common presentation was FPHL (61%), followed by TE (25%), and CTE (14%).9Srivastav *et al*., in their study found the prevalence of FPHL and CTE was almost equal in percentage that was 35% for FPHL and 35.5% for CTE, whereas TE was seen in 23% of cases [4]. In a study of 100 female participants conducted by Poonia K *et al*., the commonest presentation was CTE (62%), followed by FPHL (22%) and ATE (16%) [11].

Majority of TE cases observed in our study could be related to the COVID 19 pandemic that occurred in the study period and the regional variation of prevalence of hair loss.

The most common site of alopecia noted in the present study was diffuse pattern (94%) followed by other sites like vertex (20%), frontal (17%), temporal (15%), parietal (2%), and occipital (1%) regions. All cases of ATE and CTE in this study had diffuse alopecia and the most common site of alopecia in FPHL was vertex.

According to study by Deo K *et al*., majority (63.7%) of patients had diffuse hair loss followed by hair loss over the vertex (20.7%) [12].

Conclusion

- The most common presenting complaint was diffuse hair loss followed by visible thinning of scalp hair and greying of hair.
- The duration of hair loss ranged from to 15 days to 3 years in our study. The mean duration of hair loss was 12.73 ± 14.12 months.
- Majority of the patients (53%) presented with duration of hair loss more than 6 months.

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