

## ORIGINAL ARTICLE

## FREQUENCY OF METABOLIC SYNDROME IN PATIENTS WITH FEMALE PATTERN HAIR LOSS

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**Background:** Female androgenetic alopecia is a common cause of non-scarring alopecia in women. There is strong pathogenetic link between metabolic syndrome (MetS) and androgenetic alopecia in men. The available evidence on the frequency of metabolic syndrome in women with androgenetic alopecia is limited while there is no local published material which necessitated the present study. **Methods:** It was a hospital based cross-sectional study conducted at Dermatology Department, Jinnah Hospital, Lahore, from 1<sup>st</sup> Jan to 30<sup>th</sup> Jun 2023. Ninety-six women aged 19–45 years fulfilling the inclusion criteria were evaluated for metabolic syndrome. The frequency of metabolic syndrome was noted and compared across various subgroups based on patient's age, duration of disease and pattern of hair loss. **Results:** The mean age of the patients was 29.2±7.2 years, 66.7% of the women were aged 30 years while 33.3% were above 30 years. The mean duration of disease was 2.6±1.2 years; it was 3 years in 70 (72.9%) women, more than 3 years in 26 (27.1%). Forty-two (43.8%) women had Christmas tree pattern, 32 (33.3%) had diffuse central thinning and 22 (22.9%) had fronto-temporal recession. Metabolic syndrome was diagnosed in 57 (59.4%) women with female pattern hair loss (FPHL). When stratified, there was no statistically significant difference in the frequency of metabolic syndrome across various subgroups. **Conclusion:** A substantial proportion of patients with female pattern hair loss suffered from metabolic syndrome.

**Keywords:** Androgenetic Alopecia, Female Pattern Hair Loss, Metabolic Syndrome

Pak J Physiol 2025;21(1):14–6, DOI: <https://doi.org/10.69656/pjp.v21i1.1767>

## INTRODUCTION

Female pattern hair loss (FPHL) is the pattern of hair loss occurring in women having androgenetic alopecia, i.e., androgen dependent patterned hair loss on scalp. Its different presentations include diffuse central thinning, Christmas tree pattern, fronto-temporal recession and bitemporal thinning. Multiple factors contribute to the development of FPHL including hormonal influences, hair follicle miniaturization and genetic predisposition.<sup>1</sup> Studies have reported prevalence of FPHL in 3–6% of women under 30 years, increasing to 29–42% in age 70 years and above in European population and 5.6% in Asian women. There are reported incidences of 12% in females around 30 years of age and of 30–40% in age 60 and above.<sup>1–3</sup>

Metabolic syndrome (MetS) is a set of diseases including high blood pressure, high blood sugar, increase waist circumference, high cholesterol and triglyceride levels.<sup>4</sup> There is an increased risk of stroke, cardiovascular disease and diabetes in patients of MetS.<sup>5–8</sup> Almudimeegh AM *et al*<sup>3</sup> found 26.4% of the women with FPHL to have metabolic syndrome which was assessed according to the Adult Treatment Panel III Criteria. An Indian study by Singh S *et al*<sup>4</sup> showed that 34.4% cases of FPHL were found to have MetS and correlated with onset, duration and severity of FPHL. In a study by El Sayed *et al*<sup>5</sup>, 45 cases of FPHL and 45 healthy controls were taken. Metabolic syndrome was

assessed according to the Adult Treatment Panel III Criteria. The study showed 68.9% cases of FPHL to have MetS.<sup>5</sup>

Several studies are available that demonstrate an association between male pattern hair loss and MetS but internationally only a few studies have been conducted to examine the association of FPHL and MetS. Also in Pakistan and South Asia very limited data is available. The results of our study may help in establishing FPHL as a cutaneous sign of a systemic condition like MetS and may help in early detection and treatment of MetS.

## PATIENTS AND METHODS

It was a cross-sectional study conducted at Department of Dermatology, Jinnah Hospital, Lahore, from 1<sup>st</sup> Jan to 30<sup>th</sup> June 2023. Sample size of 96 cases was calculated based on the prevalence rate of MetS in a similar study<sup>4</sup> with 95% confidence level, acceptable difference=0.105, and assumed proportion=0.486.<sup>4</sup>

Patients were selected by non-probability, purposive sampling. Female patients with aged 19–45 years, having any pattern of female pattern hair loss were included in the study. Pregnant ladies and lactating mothers, patient receiving any hormone replacement therapy including testosterone, contraceptives or chronic or acute corticosteroids therapy, smokers, patients receiving or have received treatment for polycystic

ovarian syndrome, patients having any underlying malignancy as well as cases on chemotherapy, or who had received chemotherapy over past 5 years were excluded.

Subjects fulfilling the inclusion criteria were recruited for the study after approval of Hospital Ethical Committee and informed consent. Relevant demographic details were taken and entered in the proforma. Physical examination was done for MetS, i.e., blood pressure monitoring, height, waist circumference, and weight measurement. Pattern of FPHL was noted.

Relevant investigations such as fasting lipid profile, and fasting blood glucose were done. Patient was diagnosed to have metabolic syndrome when 3 or more of the following (Adult Treatment Panel III Criteria) were present:

- BP >130/85 mmHg
- Abdominal circumference >88 Cm
- Hypertriglyceridemia >150 mg/dL
- HDL-C <50 mg/dL
- Fasting Blood Sugar >110 mg/dL

All patients were managed as per standard protocols.

Data was entered and analysed on SPSS-22. Numerical variables, i.e., age and duration of disease are presented as Mean±SD. Categorical variables, i.e., pattern of hair loss and metabolic syndrome have been presented as frequency and percentage. Data has been stratified for age, duration of disease and pattern of hair loss to address effect modifiers and post-stratification, Chi-square test was applied taking  $p \leq 0.05$  as statistically significant.

## RESULTS

The age of the patients ranged from 19 years to 45 years with a mean of  $29.2 \pm 7.2$  years. Mean duration of the disease was  $2.6 \pm 1.2$  years. The stratification of patients on the basis of age, duration of disease, and pattern of hair loss is shown in Table-1.

**Table-1: Baseline characteristics [n (%)]**

Characteristics	No. of Participants
<b>Age (Years)</b>	
≤30 Years	64 (66.7)
>30 Years	32 (33.3)
<b>Duration of Disease (Years)</b>	
≤3 Years	70 (72.9)
>3 Years	26 (27.1)
<b>Pattern of Hair Loss</b>	
Diffuse Central Thinning	32 (33.3)
Christmas Tree Pattern	42 (43.8)
Fronto-temporal Recession	22 (22.9)

Metabolic syndrome was diagnosed in 57 (59.4%) women with FPHL. When stratified, there was no statistically significant difference in the frequency of MetS across various subgroups based on patient's age ( $p=0.659$ ), duration of disease ( $p=0.793$ ) and pattern of hair loss ( $p=0.999$ ). (Table-2).

**Table-2 Frequency of metabolic syndrome across various subgroups of women with FPHL (n=96)**

Subgroups	n	MetS [n (%)]	p
<b>Age</b>			
≤30 Years	64	37 (57.8)	0.659
>30 Years	32	20 (62.5)	
<b>Duration of Disease</b>			
≤3 Years	70	41 (58.6)	0.793
>3 Years	26	16 (61.5)	
<b>Pattern of Hair Loss</b>			
Diffuse Central Thinning	32	19 (59.4)	0.999
Christmas Tree Pattern	42	25 (59.5)	
Fronto-temporal Recession	22	13 (59.1)	

Chi-square test, observed differences were statistically insignificant

## DISCUSSION

Female pattern hair loss is the most common form of alopecia in women. Affected women may experience psychological distress and impaired social functioning.<sup>1-3</sup> Early diagnosis and initiation of treatment are desirable because treatments are more effective to avoid progression of hair loss than stimulating regrowth.<sup>2</sup> In addition to psychological distress, there are more subtle systemic disturbances associated with androgenetic alopecia both in men and women.<sup>3</sup>

Metabolic syndrome is associated with a lot of inflammatory diseases including psoriasis, acne, hidradenitis suppurativa, lichen planus, atopic dermatitis, seborrheic dermatitis etc.<sup>4,5</sup> There is link between MetS and androgenetic alopecia in men<sup>6</sup> but the evidence on link between MetS and FPHL in women is scarce<sup>3,7,8</sup>. The mechanism linking FPHL and MetS is not clear but studies suggest that excess of androgens causes hypertension and decrease in level of HDL cholesterol.<sup>3,4</sup> As MetS increases the risk of stroke and cardiovascular diseases, this study can help in establishing FPHL as a cutaneous marker of this systemic condition and help in early detection and treatment of MetS.

In the present study, the mean age of the patients was  $29.2 \pm 7.2$  years. HendM El-Zeftawy *et al*<sup>7</sup> and Özkoca D *et al*<sup>9</sup> reported similar mean age of their patients with FPHL. A study conducted by Singh S *et al*<sup>4</sup> reported  $31.3 \pm 1.3$  years as mean age of onset, while Ohn J *et al*<sup>10</sup> reported it to be  $27.3 \pm 5.1$  years in Korea. We observed that majority (66.7%) of the women with FPHL were aged ≤30 years while 32 (33.3%) women were aged above 30 years. Our observation is in line with that of Tandon S *et al*<sup>11</sup> who reported similar frequency of ≤30 years (79.9) and >30 years (20.1) age groups in Indian patients. Mansuri *et al*<sup>12</sup> reported similar distribution of ≤30 years (70.0%) and >30 years (30.0%) age groups in such patients in India.<sup>12</sup> Verma D *et al*<sup>13</sup> who reported contrary distribution of ≤30 years (44%) and >30 years (44%) age groups in patients presenting with androgenic alopecia.

In this study, the mean duration of disease among women with FPHL was  $2.6 \pm 1.2$  years. It was less than 3 years in 70 (72.9%) women while in 26 (27.1%)

women the disease duration was more than 3 years. This is in agreement with that of Verma D *et al*<sup>13</sup> who reported that 52.0% of women having FPHL had a disease duration of 6 months to 2 years in Indian population.

In the present study, metabolic syndrome was diagnosed in 59.4% women with FPHL and they fulfilled the Adult Treatment Panel III Criteria. When stratified there was no statistically significant difference in the frequency of metabolic syndrome across various subgroups based on patient's age, duration of disease and pattern of hair loss which is in line with the findings of Singh S *et al*<sup>4</sup>. El Sayed *et al*<sup>5</sup> observed similar frequency of metabolic syndrome in Egyptian women with FPHL and reported it to be 68.9%. Some other studies gave contrary results. Almudimeegh AM *et al*<sup>3</sup> showed that MetS was found in 26.4% of females having FPHL whereas Singh S *et al*<sup>4</sup>, Verma D *et al*<sup>13</sup> and Zhu H *et al*<sup>14</sup> found it to be 34.4%, 24% and 27.87% respectively. The present study adds to already published international research evidence on the topic. The present study observed that a substantial proportion of patients with FPHL also suffer from MetS.

The limitations to the present study were that neither did we consider the effect of treatment of FPHL on associated MetS nor we considered the effect of management of concomitant MetS on the outcome of FPHL in these women. Also we did not have a control group for comparison of our results. This information could have helped in the management planning of such cases. Such a study in future is highly recommended. Timely identification and management of this co-morbid state of metabolic disarray may improve the outcome of such cases. It was a single centre study, further studies from different centers are recommended to determine the frequency of MetS in Pakistani population.

## CONCLUSION

We observed that 59.4% of patients with female pattern hair loss suffered from metabolic syndrome which warrants routine screening of these women so that

timely diagnosis and management may improve the outcome of such cases.

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Received: 28 Sep 2024

Reviewed: 21 Jan 2025

Accepted: 23 Jan 2025

## Contribution of Authors:

**AN:** Principal author and data collection

**SF:** Manuscript writing

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**MWA:** Analysis and interpretation of patients

**MQ:** Data analysis, review and editing

**SK:** References and tables

**Conflict of Interest:** None  
**Funding:** None