Original Article

Relationship of androgenic alopecia with higher BMI in Pakistan: A cross sectional study

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Abstract   ***Objective***   To determine the relationship of higher basal metabolic index (BMI) with severity of androgenic alopecia.

Methods   A hospital-based analytical cross-sectional study was done in men in the age group of 17-55 year. Weight and height were taken to determine BMI and Norwood scale was used to grade AGA.

Results   In this cross sectional study a total of 246 participants were included. Majority of them were (69.90%) of 31-40 years. Most of the men (45.10%) were in severe stage (6,7) of alopecia trailed by (43.09%) those having moderate stage (3,4,5). Most of them (62.60%) having AGA were obese (BMI > 30).

Conclusion   Patients with severe AGA were significantly and strongly associated with higher BMI.

Key words
Androgenetic, alopecia, BMI, metabolic.

Introduction

Androgenic alopecia (AGA) is a condition characterized by loss of hair in genetically predisposed men and women.[1,2] AGA is essentially a cosmetic disorder besides affecting the patient psychologically.[3] Its frequency increases with age and affect up to 70% Caucasian male.[4] There is a gradual recession and thinning of the frontal hairline early in the process producing reshaping of the anterior part of the hairline.[6]

Obesity is defined as an abnormal accumulation of fat in body, usually 20% or more over a

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person's body weight. Obesity is usually associated with increased risk of morbidity and mortality.[7]

Recent studies showed that increase in body mass index is significantly related to more severe loss of hair in men with AGA. Obesity is a main feature of metabolic syndrome and is associated with multiple metabolic and hormonal changes in body.[8] Possible explanations for the relationship between androgenic alopecia and obesity may include the presence of insulin resistance and up-regulation of insulin-like growth factor-1 in people who have excessive weight. Insulin and IGF-1 are closely related peptide hormones that may induce 5α-reductase activity, leading to an increased conversion of testosterone to dihydrotestosterone, which is responsible for male pattern baldness.[9]

Methods

A hospital-based, analytical cross-sectional study was done in men in the age group of 17-55 years. They were divided into three groups according to BMI. BMI≤24 is considered normal, 25-29 as overweight and ≥30 is taken as Obesity. Diagnosis of AGA was made according to pattern of hair loss, excluding other non-scaring Alopecia. AGA was scored using Norwood classification chart and BMI was calculated for each patient base upon their height and weight.

Norwood scale[10]

Originally designed by Hamilton in 1950s, the pattern of baldness classification system was modified in its current form by Norwood in the 1970.

Inclusion Criteria

1. Male
2. Age 17-55

Exclusion Criteria

1. Hair loss due to other dermatological conditions.
2. Alopecia due to chronic systemic conditions, nutritional deficiencies and psychiatric disorders.
3. Alopecia due to medication i.e. Anti Mitotics and Anti Psychotics.

Sample size was 246, according to WHO Calculator; frequency of Androgenic Alopecia was 80%, precision level of 5% and confidence interval of 95%.

Our study was conducted for the period of 6 months 1st May to 30th October, 2016. SPSS 17 is use for data entry and analysis.

Results

Considering the age of our study group, majority of men (69.90%) were of 31-40 years old, followed by (21.90%) 20-30 years age group. Most of the patients (45.10%) were in severe stage of Alopecia (6,7), trailed by (43.00%) having moderate stage (3,4,5). Only few (11.80 %) presented with mild stage (1-2). Greater number (62.60%) of the patients having AGA

Evaluate Yourself

I   II   III   III vertex   IV   V   VI   VII
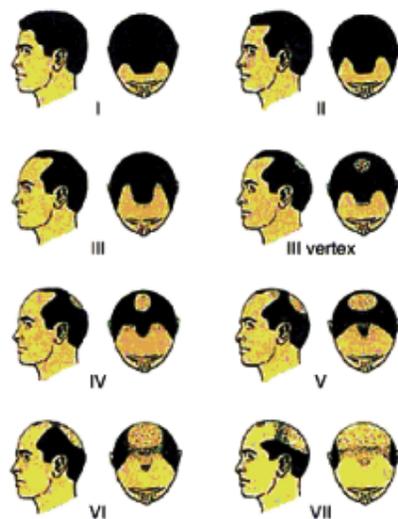
There are seven levels of loss in the Norwood scale:

Norwood 1
Normal head of hair with no visible hair loss.

Norwood 2
The hair is receding in a wedge-shaped pattern.

Norwood 3
Same receding pattern as Norwood 2, except the hairline has receded deeper into the frontal area and the temporal area.

Norwood 4
Hairline has receded more dramatically in the frontal region and temporal area than Norwood 3 and there is the beginnings of a bald spot at the back of the head.

Norwood 5
Same pattern as Norwood 4 but much reduced hair density.

Norwood 6
The strip of hair connecting the two sides of the head that existed in Norwood 4 and 5 no longer exists in Norwood 6.

Norwood 7
Norwood 7 shows hair receding all the way back to the base of the head and the sides just above the ears.

Table 1 Distribution of age, stage of Alopecia and body mass index.

Parameters	Frequency	Percentage
Age of Patient		
20-30	54	21.95
31-40	172	69.92
40 +	20	8.13
Stage of Alopecia		
Mild (1-2)	29	11.79
Moderate (3,4,5)	106	43.09
Severe (6,7)	111	45.12
Body Mass Index (BMI)		
Normal (below 24)	27	10.98
Over weight (25-29)	65	26.42
Obese (30 +)	154	62.60
Total	246	100

were obese, having (BMI>30), following by men having BMI (25-29), who fall in the overweight category. It was observed that only few (11.00%) were of normal weight (with BMI< 24), as elaborated in **Table 1**. Most of the men (41.50%) presented with alopecia stage (6,7) and had BMI>30. They are followed by

patients (21.00%) having moderate stage (3,4,5) of alopecia with BMI > 30.

Similarly in overweight category of patients, who had BMI between (25-29) range, 15.85% of patients presented with moderate stage (3,4,5) of alopecia and 3.66% presented with severe stage (6,7). In men having normal weight, 4.87% presented with moderate stage (3,4,5) and mild stage (1-2) respectively, as shown in **Figure 1**.

The results were analyzed to find out the association between body mass index (BMI) and stage of Alopecia and it was found that there is significant relationship between high body mass index and severe stage of Alopecia (P-value<0.05). It is obvious from the results that in our sample of alopecia patient's majority (62.60%) were having obesity, as elaborated in **Table 2**.
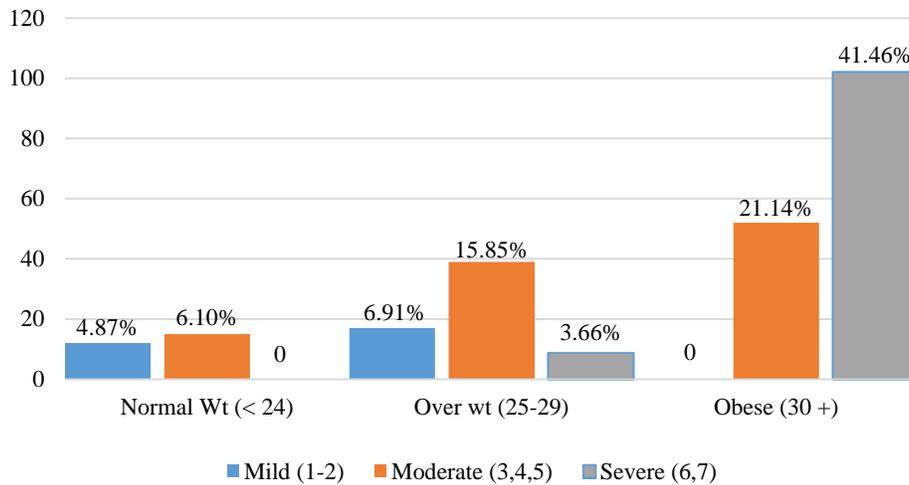

Figure 1 Distribution of BMI in patients.

Table 2 Association of body mass index and stage of alopecia.

Body Mass Index	Stage of Alopecia			Total	P-Value
	Mild (1-2)	*Moderate (3,4,5)*	*Severe (6,7)*		
Normal (≤ 24)	12	15	0	27	
Over weight (25-29)	17	39	9	65	0.000
Obese (≥ 30)	0	52	102	154	
Total	29	106	111	246	

Discussion

In this cross sectional study which we conducted in Pakistan, we evaluated 246 patients with AGA. The results showed that most of our subjects with AGA, were also obese. Our observations are comparable to recent work,[1] although our sample size was much bigger than the counterpart study.

In our population the severity of AGA was more than Taiwan and our patients were much younger than Yang *et al*.[1] Moderate to severe AGA were noted in around 90% in our subjects, while in Taiwan they were 28%.[1] Therefore, we assessed that the persons who were overweight had higher grade AGA. In fact, it had already been proven that being overweight is fast becoming a problem in our country.[11] Similarly a large majority of men (90%) in our study were overweight and had severe grade of alopecia.

In view of our study we recommend that all patients who are suffering from severe AGA should be evaluated for BMI and metabolic syndrome. Since the main risk of metabolic syndrome is coronary heart disease,[10] so it is desirable to evaluate such patients for these complications. Another important relationship evaluated by Lotufo *et al*. was that severe and rapidly progressing Alopecia seems to be marker for increased risk of heart disease leading to Myocardial Infarction.[9]

Nowadays, the relationship of AGA, Insulin resistance or metabolic syndrome is an area of great interest. Metabolic syndrome includes Hypertension, Hyperlipidemia, Hyperinsulinemia and Obesity. Lately, researchers have found out that AGA, obesity and Metabolic syndrome are interrelated risk factors of developing cardiovascular disease.[13-16] Therefore, the patients with severe AGA should be observed for BMI and eventually the

respective risk of cardiovascular diseases.

Conclusion

Patients with severe AGA were significantly and strongly associated with higher BMI and should be evaluated for cardiovascular risk factors.

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