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Original Article

Etiology of hirsutism. Is there a correlation between menstrual regularity, body mass index and severity of hirsutism with the cause?

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Abstract

Background Hirsutes having regular menstrual history or with body mass index (BMI) within normal range or mild hirsutism are often taken as idiopathic hirsutism.

Objective To investigate the etiology of hirsutism in patients presenting in the Fauji Foundation Hospital (FFH), Rawalpindi and to determine if menstrual regularity, BMI and severity of hirsutism correlates with the cause.

Patients and methods It was a descriptive study over a period of fourteen months in the departments of Dermatology and Gynecology & Obstetrics of FFH, Rawalpindi. Females who presented to either department with hirsutism were enrolled in this study. A detailed history, clinical examination with special reference to Ferriman-Gallwey (FG) scoring system, endocrinological workup and abdominopelvic ultrasonography (USG) was done in all patients. SPSS version 12 was used for statistical analysis.

Results Out of a total of 71 patients, the commonest cause of hirsutism in our study was polycystic ovarian syndrome (PCOS) in 57.7%. Idiopathic hirsutism was present in 22.6% and late onset congenital adrenal hyperplasia in 9.9% patients. Hyperprolactinemia and thyroid disorders were diagnosed in 4.2% respectively. One (1.4 %) patient had multiple etiologies. The correlation between menstrual regularity, BMI and severity of hirsutism with the cause of hirsutism was not statistically significant (p 0.05).

Conclusion PCOS is the commonest cause in our study population. The correlation of menstrual regularity, BMI and severity of hirsutism with its cause is not statistically significant.

Key words
Hirsutism, polycystic ovarian syndrome, idiopathic hirsutism.

Introduction

Hirsutism is characterized by excessive growth of terminal hair in a male pattern in women.[1] It is a common disorder affecting between 5-15% of women of reproductive age.[2] Hirsutism is a perplexing issue, having variable presentations including different severity of hirsutism, with menstrual history regular or irregular, body mass index (BMI) within normal range or obese or overweight and yet some have a family history of hirsutism. Hirsutes with regular menstrual history, mild hirsutism or BMI within normal

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range is often taken as idiopathic hirsutism and workup in these patients is usually not done. Most common causes of hirsutism are polycystic ovarian syndrome (PCOS) and idiopathic hirsutism.[3,4] Other causes include late onset congenital adrenal hyperplasia and Cushing's syndrome. Pituitary, ovarian and adrenal tumors are rare causes of hirsutism.[5]

The objective of this study was to investigate the etiology of hirsutism in patients presenting to the Dermatology and Gynecology & Obstetrics Department of Fauji Foundation Hospital, Rawalpindi and to determine if menstrual regularity, BMI and severity of hirsutism correlates with the cause.

Patients and methods

This study was conducted over a period of fourteen months in the Departments of Dermatology and Gynecology & Obstetrics of Fauji Foundation Hospital, Rawalpindi. All female patients who presented with hirsutism at these departments were enrolled in the study. After taking an informed consent from the patient, a detailed history, including the onset of hirsutism, menstrual history and family history of hirsutism was taken. The severity of hirsutism was scored according to the Ferriman-Gallwey (FG) scoring system.[6] It is a quantitative method of measuring hair growth which enables the determination of severity of hirsutism by assessing the extent of hair growth in nine key anatomical sites; face, chest, linea alba, inner thighs, external genitalia, medial surface of upper arm, upper and lower back, and buttocks. The FG scoring was done in the patients at the time when they had maximal hair growth; the patients were instructed not to remove hair and report when their hair had regrown since they had last removed it. A score of 7-9 was considered mild hirsutism, 10-14 moderate and 15 or more severe hirsutism.[6] Breast examination for galactorrhea and abdominopelvic examination to detect mass lesion that may indicate an androgen secreting tumor was also done. Height, weight and a calculation of BMI was obtained. The normal range of BMI was taken as 18-24.9 Kg/m^2. Women with BMI 25-29.9 were labeled overweight and those having 30 or more were labeled obese.[1]

Endocrinological work up included day 2 serum follicle stimulating hormone (FSH), luteinizing hormone (LH) levels, serum prolactin, testosterone, estradiol, mid-luteal progesterone, fasting insulin, dehydroepiandrosterone sulphate (DHEAS), 17-hydroxyprogesterone, and thyroid function tests. The normal values/ranges of hormones were followed according to the kits used. All these tests were carried out in the hospital's laboratory. Abdominopelvic USG was done for adrenal tumors, ovarian tumors and polycystic ovaries. An average of three visits was required to complete all these investigations. The detailed history, clinical examination and the results of all the investigations were recorded in a specially designed proforma. Data was analyzed for descriptive statistics by SPSS version 12.

We labeled our patients as having PCOS if two of the following three criteria were present[7]: 1) Oligomenorrhea and or anovulation, 2) Hyperandrogenism (clinical or biochemical), and 3) Polycystic ovaries on USG. (criteria for labeling polycystic ovaries on USG was an ovarian volume of 10 ml).[8]

Clinical features of PCOS was based on history (menstrual irregularity, obesity, hirsutism),[9,10] BMI 30Kg/m^2.[11] Biochemical criteria for PCOS was high serum LH levels with normal or low FSH on day 2 of the menstrual cycle,

elevated testosterone levels[12,13] and insulin resistance evidenced by raised fasting insulin levels.[14] The patients who had normal ovulatory function were labeled as having idiopathic hirsutism. Normal ovulatory function was evidenced by normal mid-luteal progesterone and androgen levels.[15] Late onset congenital adrenal hyperplasia was labeled if patient had raised 17-hydoxyprogesterone levels.

Results

A total of 71 hirsutes were enrolled in the study. The age range was 13-48 years with a mean age of 23.55±6.86 years. Twelve patients had a positive family history of hirsutism. Oligomenorrhea was recorded in 57.7%, hypomenorrohea in 5.6%, polymenorrhea in 4.2% and secondary amenorrhea and menopause in 1.4% each. However, 29.6% hirsutes had a regular menstrual history. Severity of hirsutism according to the FG scoring system was mild hirsutism in 9.9%, moderate in 23.9% and severe in 66.2% of patients. 40.8% of hirsutes had a BMI within normal range, 25.4% each were obese and overweight. 8.5% patients were underweight. The commonest cause of hirsutism in our study was PCOS in 41 patients (55.7%), followed by idiopathic hirsutism in 16 (22.5%) patients and late onset CAH in 7 (9.9%) patients. Hyperprolactinemia and thyroid disorders were present in 3 (4.2%) patients each and one patient (1.4%) had multiple etiologies.

The severity of hirsutism in relation to the etiology of hirsutism (**Table 1**) revealed that hirsutes with all three grades of severity had PCOS. Severe hirsutism was observed in 27, out of a total of 41 cases of PCOS. On the other hand, 9 out of a total of 16 hirsutes with idiopathic hirsutism had severe hirsutism. **Table 2** shows menstrual cycle in relation to etiology of the hirsutism. Out of a total of 41 patients with oligomenorrohea, 32 had PCOS, 5 had idiopathic hirsutism and 2 had CAH. In our study population, twelve patients had a positive family history of hirsutism out of which 7 had PCOS, 2 had idiopathic, 2 had CAH, and 1 had hyperprlolactinemia.

BMI in relation to the etiology of hirsutism is shown in **Table 3.** Amongst hirsutes with BMI within normal range, 17 had PCOS, 6 idiopathic, 5 CAH and 1 had hyperprolactinemia. Using Pearson chi-square test, severity and family history of hirsutism, menstrual cycle, BMI in relation to the etiology of hirsutism in the present study was not statistically significant (*p* 0.05).

Discussion

The present study clearly shows that in our study population PCOS is the commonest cause of hirsutism followed by idiopathic hirsutism. The same has been seen in other studies. [3,5,16,17]

However, the study conducted by Malik *et al*,[18] at Lahore, Pakistan, found idiopathic hirsutism to be the commonest cause (47.3%), followed by PCOS (44.6%) in their study population. The higher percentage can be attributed to the fact that criteria used for labeling idiopathic hirsutism was different in this study. 32% of idiopathic hirsutes had raised testosterone levels, in the above mentioned study whereas in the present study these patients would not be labeled as idiopathic.

Zargar *et al.*[19] studied Kashmiri Indian women and found idiopathic hirsutism in 38.7% and PCOS in 37.3% in their study. It is worth mentioning that in this particular study, the cause remained undetermined in 10.6% of hirsutes due to inadequate information.[19]

Table 1 Severity of hirsutism cross-tabulation with causes.

		Causes						*Total*
		PCOS	*Idiopathic*	*CAH*	*Hyper-prolactinemia*	*Thyroid dysfunction*	*Multiple*	
Severity	Mild	3	3	1	0	0	0	7
	Moderate	11	4	0	0	2	0	17
	Severe	27	9	6	3	1	1	47
Total		41	16	7	3	3	1	71

CAH=Congenital adrenal hyperplasia, PCOS=polycystic ovarian syndrome

Table 2 Menstrual cycle cross-tabulation with cause of hirsutism.

		Causes						*Total*
		PCOS	*Idiopathic*	*CAH*	*Hyper-prolactinemia*	*Thyroid dysfunction*	*Multiple*	
Cycle	Regular	4	8	4	2	3	0	21
	Oligomenorrhea	32	5	2	1	0	1	41
	Hypomenorrhea	2	2	0	0	0	0	4
	Secondary amenorrhea	1	0	0	0	0	0	1
	Polymenorrhea	1	1	1	0	0	0	3
	Menopause	1	0	0	0	0	0	1
Total		41	16	7	3	3	1	71

CAH=Congenital adrenal hyperplasia, PCOS=polycystic ovarian syndrome

Table 3 BMI cross-tabulation with cause of hirsutism

BMI	*PCOS*	*Idiopathic*	*CAH*	*Hyper-prolactinemia*	*Thyroid Disorder*	*Multiple*	*Total*
Underweight	3	2	0	0	1	0	6
Normal	17	6	5	1	0	0	29
Overweight	11	3	1	2	1	0	18
Obese	10	5	1	0	1	1	18
Total	41	16	7	3	3	1	71

CAH=Congenital adrenal hyperplasia, PCOS=polycystic ovarian syndrome

66.2 % of our study population had severe hirsutism. This is in contrast to the other studies where the percentage of severe hirsutism is much less.[16,19] There are multiple plausible reasons for this difference. Firstly, Fauji Foundation Hospital, Rawalpindi is a tertiary care center for ex-servicemen and their families. The patients residing in the same city (Rawalpindi) report directly whereas other patients are referred from the satellite dispensaries and hospitals. Therefore, the patients with relatively milder severity of hirsutism are filtered. Secondly, in the present study, FG scoring for the severity of hirsutism was done at the time when patients had maximal hair growth. This particular aspect has not been mentioned in the studies done previously. Thirdly, the patients were enrolled both from Dermatology and Gynecology & Obstetrics out-patient clinics and the aforementioned studies have been done either in a single specialty unit (endocrinology, gynecology, dermatology) alone or in combination with primary care clinics. Fourthly, a higher percentage in our study can merely be coincidental.

Hirsutes with mild hirsutism or regular menstrual cycle or with BMI within the normal range can mislead the physicians towards a diagnosis of idiopathic hirsutism. In the present study, of the 7 hirsutes who had mild hirsutism, (**Table 1**) three were labeled as having PCOS and idiopathic hirsutism respectively and one with congenital adrenal hyperplasia. This study shows that there is no correlation between severity (mild/moderate/severe) of hirsutism and its cause (*p* value 0.05). A history of regular menses is not sufficient to exclude ovulatory dysfunction, since 40% of eumenorrheic hirsute women are anovulatory.[15] In the present study, 21 hirsutes with a history of regular menstrual cycle (**Table 2**), 38% were labeled as having idiopathic hirsutism, 19% each as having PCOS and CAH, 14.5% as thyroid dysfunction and 9.5% as hyperprolactinemia.

A study conducted by Carmina *et al.*[20] in 62 hirsutes with regular menstrual cycle, 13% were labeled as idiopathic hirsutism. On the other hand, in the present study, PCOS (**Table 2**) was found more frequently in women with menstrual irregularity than eumenorrheic patients. But the correlation between menstrual cycle and the cause of hirsutism in this study was insignificant (*p* 0.05). The same has been found in other studies.[3] In our study, (**Table 3**) 51% patients having PCOS and 50% patients having idiopathic hirsutism had BMI above 24.9 (overweight and obese) and the correlation between BMI and the cause of hirsutism was found to be statistically insignificant.

These findings are in contrast with the study conducted by Malik *et al.*[18] which recommended that a rational diagnostic approach in a hirsute should be made depending upon the age, severity of the problem and other clinical findings, which in turn would avoid unnecessary investigations. There is no doubt that the work up is both exhaustive (required three visits in the present study) and costly. But it must be borne in mind that the criteria used for labeling patient as PCOS include clinical, biochemical and USG features. Two out of three criteria are required to label patient as PCOS.[7] On the other hand, normal androgen and mid-luteal progesterone levels are required to label patient as idiopathic hirsutism.[15] There are multiple other facets of hirsutism which should compel a doctor (dermatologist/ gynecologist/ endocrinologist) to investigate for the etiology of hirsutism in an individual patient. Firstly, hirsutism has a negative psychosocial impact on the patient and affects quality of life.[18,21] Terminal body hair normally seen in men on the face, chest, abdomen and back is considered abnormal in women.[22] Secondly, hirsutes can have associated or etiological abnormalities and disorders e.g. ovulatory dysfunction, adrenal hyperplasia, diabetes and thyroid abnormalities.[23,24] Thirdly, PCOS is the most common cause of hirsutism. It is not only associated with reproductive morbidity and increased risk of endometrial cancer but also increased risk of metabolic and cardiovascular complications.[24] Fourthly, non-pharmacological treatment in the form of threading, waxing, bleaching, electrolysis and laser-assisted hair removal is considered in all hirsutes but pharmacological treatment is instituted according to the cause.[2,25]

Conclusions

Our study concludes that, 1) PCOS is the commonest cause of hirsutism followed by idiopathic hirsutism, 2) Menstrual cycle, BMI and severity of hirsutism do not correlate with the etiology of hirsutism, and hirsutes should be investigated to exclude underlying etiology.

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