Hirsutism and body mass index in a representative sample of Iranian people

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Abstract

BACKGROUND: Hirsutism is the condition of excessive terminal hair growth in women with a typical male pattern distribution. Hirsutism is a common disorder that affects about 5% -10% of women of reproductive age. Adipose tissue contributes up to 50% of the circulating testosterone in premenopausal women Because of excessive androgen production in fat tissue. Therefore, it seems that hirsutism must be more common in people with simple obesity but controversy exist regarding this subject. The aim of this study is to evaluate the relation between Body Mass Index and hirsutism in a representative sample of Iranian woman.

METHODS: This is a cross sectional case control clinical trial. The study involved 800 individuals; 400 hirsute females and 400 healthy women as control group. The mean age of the participants was 28 ± 6.2 years. Hirsutism was determined by the Ferriman-Gallwey scoring system. Height and weight were measured by a Seca scale, Body Mass Index was calculated as weight/height² (kg/m²), and collected data were analyzed by SPSS software version 18 using T-test and chi-square statistical test.

RESULTS: There were no significant differences between the two groups regarding age and height. However, Body Mass Index and weight were significantly higher in the case group than the control group. The chi square test revealed significant differences between the case and control groups regarding Body Mass Index ($P < 0.001$).

CONCLUSION: In the current study hirsutism was more common in patients with a higher Body Mass Index. The increased frequency of hirsutism in overweight women could be explained by increased insulin resistance and more androgen production by adipose tissue.

Keywords: Body Mass Index, Hirsutism, Obesity.

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Introduction

Hirsutism is the presence of terminal hairs in females, in a male-like pattern, affecting between 5%-15% of women.[1,2] Hirsutism is extremely distressing for patients and has a significant negative impact on their psychosocial development.[3] More than 70% of hirsutism cases are caused by polycystic ovary syndrome (PCOS).[4] PCOS is the most common endocrinopathy in females, affecting 5%-10% of women of childbearing age.[4]

70–80% of patients with excess androgen demonstrate hirsutism, this sign may be less prevalent among women of Asian origin.[5] Conversely, not all hirsute patients have evidence of detectable androgen excess, as 5%–15% of these women have "idiopathic hirsutism," with normal ovulatory function and androgen levels. It is thought that hirsutism results from excessive sensitivity of the skin to normal levels of circulating androgens. Body Mass Index (BMI) is a person's weight in kilograms divided by their height squared in meters. It is one of the most commonly used methods of estimating whether a person is overweight. Interestingly, serum androgens are positively associated with BMI not only in PCOS, but also in women with simple obesity.[6] It seems that hirsutism is more common in people with simple obesity. The relation between obesity and hirsutism may be modified by racial and ethnic characteristics of different populations.[7] for example in a retrograde 2 year cohort study by Khalil et al. of adult Saudi populations the associations between obesity and certain skin diseases such as hirsutism, dry skin, pruritus, and planter keratosis were all nonsignificant.[8] So this study was designed to evaluate the relation between BMI and hirsutism in a group representing Iranian women.

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Materials and Methods

This is a cross sectional case control clinical trial. The study involved 800 individuals; 400 hirsute patients and 400 healthy people as control group. The participants' ages were between 20 to 40 years. Demographic data were collected by a questionnaire. Height and weight were measured by a Seca scale, BMI was calculated as weight/height^2 (kg/m^2). Hirsutism was determined by the Ferriman-Gallwey scoring system. In this method 9 different body sites (upper lip, chin, chest, upper back, lower back, upper abdomen, lower abdomen, arm and thigh) were scored. In each of these areas a score of 0 (absence of terminal hairs) to 4 (extensive terminal hair growth) was assigned. Score of over 8 was considered as hirsutism. Collected data were analyzed by SPSS software version 18 using t-test and chi-square statistical test.

Results

The mean age of participants was 28 ± 6.2 years. The mean of age, BMI, weight and height are shown in table 1. There were no significant differences between the two groups regarding age and height. However, BMI and weight were significantly higher in the case group than the control group ($P < 0.001$).

Frequency of distribution of BMI is shown in table 2. The chi square test revealed significant differences between the case and control groups regarding BMI ($P < 0.001$).

Discussion

In the current study hirsutism was more common in patients with increased BMI.

Hirsutism results from an interaction between the androgen level and the sensitivity of the hair follicle to androgen. Most women with androgen levels that are twice the highest normal limit or higher have some degree of hirsutism.[9]

In premenopausal women, approximately 50% of plasma testosterone is derived in equal proportions from ovarian and adrenal secretion. The remaining 50% is derived from the conversion of androstenedione in peripheral tissues, including adipose tissue.[10] Adipose tissue contains a wide spectrum of enzymes involved in steroid metabolism and, contributes up to 50% of the circulating testosterone in premenopausal women.[11,12] The increased frequency of hirsutism in overweight women could be explained by excess androgen production in their fat tissue.

Asian populations, such as the Japanese and Chinese are known to have a lower prevalence and severity of hirsutism and obesity than Caucasians, which might result from genetic and environmental differences.[13]

Insulin resistance and increased insulin level of serum is a metabolic consequence of obesity.[14-16] Hyperinsulinemia acts as a co-gonadotropin with LH to increase androgen production by ovarian theca cells, as the ovary remains sensitive to the actions of insulin.[17] Additionally, insulin suppresses hepatic production of SHBG, leading to marked elevation of free or unbound plasma testosterone.[18]

It seems that when the insulin level reaches a specific level, it activates the insulin-like growth factor 1 receptors in the theca cells; this in turn results in increased androgen production. The increased serum level of androgen with the above mechanism increases the prevalence of hirsutism in overweight people.

Table 1. BMI, weight and height in case and control groups (t- test)

	Number	Case	Control	All	P
		Mean ± SD	Mean ± SD	Mean ± SD	
Age	400	27.8 ± 6.46	28.28 ± 6	28 ± 6.2	0.28
Weight	400	64.82 ± 8.89	60.57 ± 6.66	62.7 ± 8.13	0.001
Height	400	162.39 ± 5.82	162.48 ± 5.85	162.44 ± 5.83	0.82
BMI	400	24.57 ± 3.04	22.92 ± 1.98	23.7 ± 1.98	0.001

Table 2. BMI Frequency of distribution in case and control groups, chi square

		Case		Control		All	
	BMI	Number	percent	Number	percent	Number	percent
Under weight	< 18	19	4.8	8	2	27	3.4
Normal	18-25	86	21.5	223	55.8	309	38.6
Overweight	25-30	212	53	144	36	356	44.5
Obese	> 30	83	20.8	25	6.3	108	13.5
P				> 0.001			

Not all hirsute patients are overweight, in this group of patients the increased sensitivity to the normal level of sex hormones may be the cause of hirsutism. Insulin resistance occurs in non- obese patients with idiopathic hirsutism and appears to be related to android (abdominal) obesity.[19]

Normal weight and overweight women with hirsutism can have normal insulin sensitivity and normal levels of circulating androgens in the presence of PCOS.[20]

Conclusion

In this sample of Iranian people there was a positive relation between body mass index and hirsutism. This may be a sign of an underlying metabolic disorder, which will lead to the greater risk of the development of cardiovascular disease and type-2 diabetes.

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Conflict of Interests

Authors have no conflict of interests.

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