The prevalence of hirsutism in overweight and obese females attending obesity research and therapy unit

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Abstract

**Background:** Hirsutism is a condition of excessive terminal hair growth in women, with a typical male pattern distribution. It affects 5%-15% of women of reproductive age and has a negative impact on their quality of life. Hirsutism may be associated with obesity, insulin resistance, polycystic ovary syndrome and menstrual irregularities.

**Objectives:** To investigate the prevalence of hirsutism among overweight and obese females attending obesity research unit of Alkindy college of medicine, and to compare the results with that of normal weight females to determine if hirsutism is associated with BMI.

**Patients and methods:** This is a comparative cross-sectional study, involved 300 females: 120 normal weight, 55 overweight and 125 obese females. All patients were interviewed and detailed questionnaires were completed for each of them, including menstrual history. Height and weight were measured by a Seca scale. Body Mass Index was calculated as weight/height² (kg/m²). Hirsutism was determined by the *Simplified Ferriman-Gallwey* scoring system. The collected data were analyzed by the SPSS software version 2 using chi-square test (x²-test).

**Results:** 32 (25.6%) of 125 obese females were hirsute compared to 10 (18.2%) of 55 overweight and 9 (7.5%) of 120 females with BMI within normal. There was a significant association between hirsutism and BMI (p=0.001). Hirsutism was most common in the age group of 15-24 years.

**Conclusion:** The findings of this study suggest the presence of significant association between BMI and hirsutism. Thus the higher the BMI, the higher the risk of having hirsutism.

**Keywords:** Hirsutism, overweight, obesity
Introduction

Hirsutism is a condition of excessive terminal hair growth in women, with a typical male pattern distribution in androgen-dependent areas (including upper lip, chin, chest, upper back, lower back, upper abdomen, lower abdomen, arm and thigh), which is extremely distressing for patients and it affects women psychologically and has a negative impact on their quality of life. Hirsutism affects 5%-15% of women of reproductive age. Hirsutism may result from increased hair follicle sensitivity to normal levels of circulating androgen, or abnormal circulating levels of androgens which may be endogenous or exogenous. In women androgen biosynthesis is normally takes place in the ovaries and adrenal glands. Excessive androgen secretion may result from functional excesses or rarely from neoplastic process. Ovaries secrete testosterone and the androgen precursor androstenedione, and are the major source of increased levels of testosterone in women who have hirsutism. The adrenal contributions are preandrogens: dehydroepiandrosterone (DHEA) that arises almost exclusively from the adrenal gland but is an uncommon cause of hirsutism, DHEA sulfate and androstenedione. Nearly all circulating testosterone is bound to sex hormone binding globulin (SHBG) and albumin, with free testosterone being the most biologically active form. When elevated insulin levels are present, SHBG levels decrease while free testosterone levels increase. The most common causes of hirsutism are polycystic ovarian syndrome (PCOS) followed by idiopathic hirsutism. Other causes include late onset congenital adrenal hyperplasia and Cushing’s syndrome. Pituitary, ovarian and adrenal tumors are rare causes of hirsutism. The hair type present in most women with a hormonal hyperandrogenic disorder is coarse, thickened, pigmented, and long and is called terminal hair. It differs from vellus hair, which is fine, soft and present in areas where hair growth is not androgen dependent. Hirsutism must be distinguished from hypertrichosis which is a generalized excessive hair growth that occurs as a result of either heredity or the use of medications such as phenytoins, minoxidil, or cyclosporine. In hypertrichosis, the hair is distributed in a generalized, nonsexual pattern and is not caused by excess androgen (although hyperandrogenism may aggravate this condition).

Obesity is a major public health problem of global significance. It has adverse effects on both morbidity and mortality, since Obesity is linked with higher risk for several serious health conditions, such as hypertension, type 2 diabetes, hypercholesterolemia, coronary heart disease (CHD), stroke, asthma, and arthritis.

The prevalence rates of obesity are increasing in all parts of the world, both in affluent countries and in poorer nations. In 2014 about 13% of the world’s adult population (11% of men and 15% of women) were obese, and 39% of adults aged 18 years and over (38% of men and 40% of women) were overweight. In Iraq the prevalence of obesity among men was 18.3% and for women was 32.1%, furthermore 53% of men and 63% of women were overweight in 2014. Body mass index (BMI) is a simple index of weight-for-height that is commonly used to classify overweight and obesity in adults. It is defined as a person’s weight in kilograms divided by the square of his height in meters (kg/m²). BMI-based categories are: underweight (BMI of <18.5), normal weight (BMI of 18.5-<25), overweight (BMI of 25-<30), and obesity (BMI of ≥30). Grade 1 obesity was defined as a BMI of 30 to less than 35; grade 2 obesity, a BMI of 35 to less than 40; and grade 3 obesity, a BMI of 40 or greater.
The insulin resistance associated with obesity leads to compensatory hyperinsulinemia, which increases androgen production in the ovaries. At the same time insulin also inhibits the synthesis of sex hormone–binding globulin in the liver, leading to increased levels of free active testosterone.[2,17] In addition human adipose tissue is capable of active androgen synthesis (conversion of androstenedione to testosterone) catalyzed by 17β-hydroxysteroid dehydrogenase type 5, and increased expression in obesity may contribute to further increase in circulating androgen level.[18]

Moreover, obesity is a common finding in women with polycystic ovarian syndrome which is the most common cause of hirsutism, as between 40–80% of women with this condition are reported to be overweight or obese. The reproductive features of PCOS include increased androgen production and disordered gonadotropin secretion leading to menstrual irregularity, hirsutism, and infertility. [8,19]

Objectives:

To investigate the prevalence of hirsutism among overweight and obese females attending obesity research unit of Al-Kindy College of Medicine. And To compare the results with that of normal weight females to determine if hirsutism is associated with BMI.

Patients and methods

This is a comparative cross-sectional study, conducted in the Obesity Research Unit of Alkindy College Of Medicine, during the period from January 2017 to the end of April 2017. The study involved 300 females aged between 15 to 45 years; 55 overweight and 125 obese females attending the unit and 120 normal weight females who were randomly selected.

Inclusion criteria were premenopausal, non pregnant and non lactating females with no drug history of corticosteroids, hormonal therapy or hormonal contraceptives and no history of laser therapy for ablation of hirsutism.

All patients were interviewed and detailed questionnaires were completed for each of them, including menstrual history.

Menstrual pattern was defined as regular if the length of the cycle was between 21 and 35 days. The cycle was considered irregular if the patient had either oligomenorrhea (cycle length over 35 days), polymenorrhea (cycle length less than 21 days) or amenorrhea (absence of menstruation for 6 months or longer).[20]

Height and weight were measured by a Seca-703 digital scale. Body Mass Index was calculated as weight/height² (kg/m²).

Hirsutism was determined by the Simplified Ferriman-Gallwey scoring system. Which involves the evaluation of a three body areas (upper abdomen, lower abdomen and chin), in each of these areas a score of 0 (absence of terminal hairs) to 4 (extensive terminal hair growth) is assigned. A sFG score of ≥3 was considered as hirsutism.[21]

Physical examination for those sites was performed after participants verbal consent, and for females who refused physical examination, hair distribution was determined by a pictorial scale of which they could select the hair distribution that they had.

The Statistical data were analyzed using the SPSS (Statistical Package for Social Sciences) software version 21 for Windows, and chi-square test (χ²-test) was applied to evaluate the association between the qualitative data, which is considered statistically significant if P-value is less than 0.05.

Results

A total of 300 females participated in this study. The age range of participants was 15-45 years with a mean age of 25.67±7.88 years. The mean of age, weight, height and BMI are shown in table 1.
Table 1: Age, weight, height and BMI of the study sample

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>25.67</td>
<td>7.88</td>
</tr>
<tr>
<td>Weight</td>
<td>78.89</td>
<td>26.0</td>
</tr>
<tr>
<td>Height</td>
<td>159.6</td>
<td>5.46</td>
</tr>
<tr>
<td>BMI</td>
<td>31.01</td>
<td>10.24</td>
</tr>
</tbody>
</table>

Of the 300 participants, 120 (40%) had BMI within normal (BMI of 18.5-<25), 55 (18.3%) were overweight (BMI of 25 -<30), and 125 (41.7%) were obese (BMI of ≥30).

51 females (17%) of the study sample had hirsutism. The association between hirsutism with age was statistically insignificant. However hirsutism was most common in the age group of 15-24 years. The mean age of hirsute patients was 27.43±7.37.
Figure 2: Age distribution of hirsutism.
32 (25.6%) of 125 obese females were hirsute compared to 10 (18.2%) of 55 overweight and 9 (7.5%) of 120 females with BMI within normal. The association between hirsutism and BMI was statistically significant (p=0.001). Table 2.

**Table 2: Association of hirsutism with BMI**

<table>
<thead>
<tr>
<th>BMI</th>
<th>Hirsutism</th>
<th>Total (%)</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>no (%)</td>
<td>yes (%)</td>
<td></td>
</tr>
<tr>
<td>Normal</td>
<td>111 (92.5%)</td>
<td>9 (7.5%)</td>
<td></td>
</tr>
<tr>
<td>Overweight</td>
<td>45 (81.8%)</td>
<td>10 (18.2%)</td>
<td></td>
</tr>
<tr>
<td>Obese</td>
<td>93 (74.4%)</td>
<td>32 (25.6%)</td>
<td></td>
</tr>
<tr>
<td>Total (%)</td>
<td>249 (83.0%)</td>
<td>51 (17%)</td>
<td></td>
</tr>
</tbody>
</table>

Menstrual history revealed that 72 (24%) of 300 female participants had menstrual cycle irregularities. Furthermore, the percentage of menstrual irregularities was higher among obese females 34 (27.2%) compared to overweight females 13 (23.6%) and females with normal BMI 25 (20.8%). the association between menstrual irregularity and BMI was statistically insignificant (p=0.505). Table 3.

**Table 3: Association of menstrual irregularities with BMI**

<table>
<thead>
<tr>
<th>BMI</th>
<th>Menstrual irregularity</th>
<th>Total (%)</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>no (%)</td>
<td>yes (%)</td>
<td></td>
</tr>
<tr>
<td>Normal</td>
<td>95 (79.2%)</td>
<td>25 (20.8%)</td>
<td></td>
</tr>
<tr>
<td>Overweight</td>
<td>42 (76.4%)</td>
<td>13 (23.6%)</td>
<td></td>
</tr>
<tr>
<td>Obese</td>
<td>91 (72.8%)</td>
<td>34 (27.2%)</td>
<td></td>
</tr>
<tr>
<td>Total (%)</td>
<td>228 (76.0%)</td>
<td>72 (24.0%)</td>
<td></td>
</tr>
</tbody>
</table>
Discussion

Obesity is recognized as a major public health problem and is increasing in prevalence. It is implicated in a wide spectrum of dermatological diseases, including hirsutism.[22] Hirsutism is a term that refers to the presence of excess body and facial hair in females that is more typical of the hair growth pattern in men. [23]

According to results of the current study, hirsutism was most prevalent in the age group of (15-24) years, as (47.1%) of hirutes belong to this age group. Subsequently, the percentage undergoes gradual decline with further increase in age. This is likely due to the gradual decrease in the testosterone levels with the age in females. So females in their forties have blood testosterone levels on average half of those of females in their twenties.[24]

In our study, the mean age of hirsute patients was 27.43±7.37. And this is in agreement with a study done by Farnaghi et al which investigated 110 patients with hirsutism in Razi Hospital of Tehran, mean age of the patients was 29.7±3.2 years.[25]

The current study showed that (17%) of the sample were hirsute. The percentage of hirsutism was higher in obese (25.6%) than in overweight and normal weight females; (18.2%) and (7.5%) respectively. which in turn reflects a positive association between hirsutism and body mass index which is statistically significant (p<0.05).

The positive relation between hirsutism and increasing BMI appear to be well supported and explained by the fact that obesity influences many endocrine functions, including alterations in sex hormones metabolism. Several studies on this subject have reported an increase in androgen production rate (e.g. testosterone). Furthermore, obesity is associated with a decrease in SHBG, and consequently with an increase in the biologically active free-testosterone levels. [23] Our finding regarding the percentage of hirsutism in obese females is consistent with previous results reported by Leonnardou J. et al who found in a study involved 592 Greek females, that obese females were hirsute in a percentage of (25%), while (5.5%)and (25.9%) of the normal and overweight females respectively had hirsutism.[23]

The possible cause that might have contributed to the higher percentage of hirsutism in overweight group than in the obese one, in Leonnardou J. et al. study is the small number of obese females in the study sample which was 8 as compared to 54 overweight.

On the other hand, a study done by Reyes-Muñoz, et al. in Mexico revealed even higher percentages of hirsutism among obese(34%) ,overweight (30.9%) and normal weight females (25.3%).[26]

This difference could be due to racial influences. In addition, all patients enrolled in that study had polycystic ovary syndrome, which is usually associated with increased level of androgen which might have resulted in hirsutism. Considering that one of the symptoms of hormonal disturbances is irregular menses, menstrual cycle irregularity was also investigated in this study.

In the present study the percentage of menstrual irregularities in the sample was (24%) .This is similar to a percentage of (21.9%) reported by Leonnardou J. et al. [23]

In the current study the association between BMI and menstrual cycle irregularities was statistically insignificant (P>0.05). However, there was positive relation between BMI and menstrual irregularities as the percentage of menstrual irregularity in obese females (27.2%) was higher than that in normal (20.8%) and overweight (23.6%) females.

Which is in accordance with the finding of Mustaqeem M. et al who reported that obese females had higher percentage of menstrual irregularity (24%) compared to (9.5%) and (14.09%) of normal and overweight females respectively.[27]

Conclusion

The findings of this study suggest the presence of a significant association between BMI and hirsutism. Thus, the higher the BMI, the higher the risk of having hirsutism. Also, we have obtained clear results demonstrating that hirsutism is more common in younger age groups. Another finding has been encountered in this study states a positive relation between BMI and menstrual irregularity but still statistically insignificant.
References


