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Is Body mass index associated with irregular menstruation

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إهداء

إلى من علّمني كيف اقف بثباتُ فوق الأرض

إلى ابي المحترم، إلى نبع المحبة والإيثار والكرم

أمي الموقرة، إلى أقرب الناس إلى نفسي

أخوتي وأخواتي

إلى جميع الشهداء رحمهم الله

إلى جميع من تلقيت منهم النصح والدعم

من الأقارب والأصدقاء

أهديكم خلاصة جهدي العملي

الشكر والتقدير

الحمدلله الذى هدانا

وأعدنا وأمدنا وألهمنا الصبر على المشاق

ووفقنا لما نحن عليه

فله الحمد والشكر أبتداءاً وأنتهاءاً

وأرفع كلمة الشكر الى

الأستاذة الدكتورة سوسن طالب سلمان

وفقها الله فقد كانت سنداً لى على طول الطريق

والى كل من مد يد العون لى

من قريب او بعيد

Abstract

Background: irregular menstrual cycle including the length of cycles and menses, and heavy menstrual blood loss are linked to many gynecology diseases. Obesity has been reported to associated with irregular menstrual cycles. Weight loss, especially due to stressful situation lead to hypothalamic amenorrhea.

Methods: questionnaire date were collected from 91 women aged (18-40). Data on age, weight and height, gravida, the length of menstrual cycles and menses, and the number of pads used during menses were collected. Factors associated with menstrual cycle according to BMI categories were analyzed.

Results: there were no difference in the length of menstrual cycles and menses in women of different body mass index (BMI) groups. There was also no significant difference in menstrual blood loss in women of different BMI categories, also no significant difference between different age groups and BMI with P-value (0.536).

Conclusion: BMI was not correlated with menstrual cycle irregularities including length, menstrual blood loss, dysmenorrhea, also there was no significant relationship between BMI and different age group (18-40).

Keywords: BMI, menstrual blood loss, Iraqi women, dysmenorrhea, irregular menstrual cycle.

Introduction

Menstrual cycle is a determinant of women's health. Disorders in cycle or it's irregularities are a major gynecological problem among female adults, especially adolescent and a major source of anxiety to them and their family [1]. A number of factors that often play a role in the regularity and blood loss of a woman's menstrual cycle include female sex hormone changes ,genetic, serious medical conditions, body mass index(BMI) ,lifestyle and stress [2] .

Obesity is one of the most important health-related problems around the world. It has raised as an emerging epidemic issue which leads to many problems such as cardiovascular disorders , diabetes ,asthma, arthritis , chronic pains and Alzheimer's disease(3).

Obese individuals often experience disruption of the menstrual cycle, including interruption of the menstrual cycle, abnormal menstrual flow and increased pain associated with menstrual cycle (4).Scientific evidence indicates that body mass index (BMI) is an important factor affecting irregular menstrual cycles (5).body mass index (BMI) is defined as the individual's body weight (kg) divided by the square of height (m2).

The formulae universally used in medicine produce a unit of measure of kg/m2 (6).There is growing evidences also suggesting that menstrual cycle dysfunction in women is linked to breast cancer, endometrial cancer, cardiovascular disease and neurologic disorders (7).

Overweight or obese women carrying extra fat cell have little estrogen-making factories which have an estrogenic effect on glands moreover extra estrogen can cause bleeding. Underweight women and women eating disorders like anorexia nervosa that result in extreme weight loss may also be unintentionally impacting their menstrual cycle (8).

Rapid weight loss ,especially due to stressful situations, eating disorders and excess physical activity, leads to hypothalamic amenorrhea(9) , therefore this study done to see if there is association between BMI(body mass index) and menstrual cycle irregularities.

Methods

A cross-sectional study was conducted on 91 women who were admitted to outpatient in Al-Batool teaching hospital in obstetrics and gynecology word in Baqubah city, Diyala, Iraq.

During the period from February till April2022.in this study total of 91 women who came to our hospital for routine gynecological examination were randomly selected and asked to voluntarily complete a questionnaire.

women with any chronic gynecological disorders that could potentially affect the menstrual cycle and women with any endocrinological disorders including diabetes were excluded.

in addition, women who had a pregnancy within 12 months were also excluded .All these women voluntarily completed the questionnaire. The questionnaire included age, weight and height ,parity and gravida, the average length of menstrual cycles, the length of menses and the number of pads used during menses.

To date there is no well described standard method to measure menstrual blood loss. therefore , in our current study we divided the amount of menstrual blood loss into three groups, light (less than 15pads used during menses), medium (15 to 20 pads used during menses) and heavy (more than 21pads used during menses) .

BMI was calculated and classified according to the ethnicity-specific WHO classification for Asian women : underweight (<18.4kg/m2) , normal weight (18.5-22.99kg/m2) , overweight (23-27.49kg/m2),   and obese (over27.50kg/m2) [10].

Statistical Analysis

The statistical analysis was done by using program (spss) -2016,version 26, number, percentage, and proportion and chi-square were used to test the effect of different factors in the study , for a significant comparison, we used the (0.05) probability. for scale variables according to analysis of variance (ANOVA) and the comparison among means using Duncan multiple ranges test at(0.05) probability.

Results

Figure 1, shows a total of 46(50.5%) out of 91 women has overweight body mass index, And as shown in the figure 1 below it was the highest group and the smallest group belonged to 7 women (7.7%) with BMI $\geq$ 30 belong to obese group while 12 women (13.2%) were underweight BMI and the normal BMI counted 26 women (28.6%).
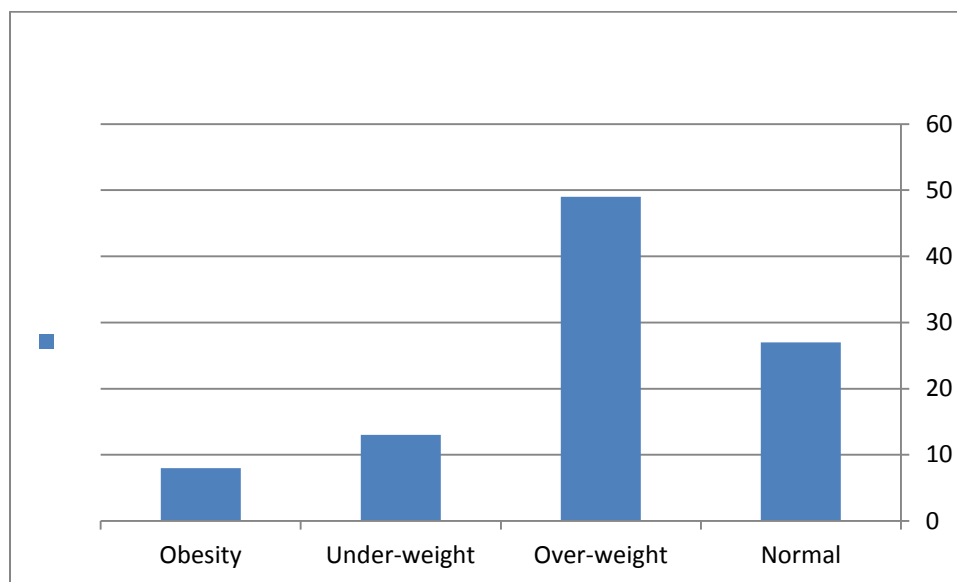

Figure 1

Table (2): displayed the relationship between BMI and the different age group (18-40). There was no significant relationship between body mass index (BMI) and different age group, p-value (0.536).

BMI	18-29N%	30-40N%	Total	Chi-square
18.5-24.9	19(33.3%)	7(20.6%)	26(28.6%)	0.536
<18.5	6(10.5%)	6(17.6%)	12(13.2%)	
25-29.9	28(49.1%)	18(52.9%)	46(50.5%)	
30-34.9	4(7%)	3(8.8%)	7(7.7%)	

Table (2) shows the relation between BMI and menarche age

Regarding the relationship between dysmenorrhea and body mass index, table (3) indicates that there is no significant relationship between BMI and dysmenorrhea p-value (0.181).

BMI	Negative(N%)	Positive(N%)	Total	P-value
18.5-24.9	23(26.4%)	4(40%)	27(27.8%)	0.181
<18.5	11(12.6%)	2(20%)	13(13.4%)	
25-29.9	47(54%)	2(20%)	49(50.5%)	
30-34.9	6(6.9%)	2(20%)	8(8.2%)	

Table (3) correlation between BMI and Dysmennorrhea

Table (4), shows the patterns of menstrual blood loss among different BMI categories, it observed that no significant difference with p-value (0.094), explain that normal body mass index have highest women with medium blood loss 18(29.5%) same with other MBI categories, overweight 29(47.5%), underweight 9(14.8%) and obese group 5(8.2%).

BMI	Light	Medium	Heavy	Total	P-value
18.5-24.9	6(28.6%)	18(29.5%)	3(20%)	27(27.8%)	0.904
<18.5	3(14.3%)	9(14.85%)	1(6.7%)	13(13.4%)	
25-29.9	11(52.4%)	29(47.5%)	9(60%)	49(50.5%)	
30-34.9	1(4.8%)	5(8.2%)	2(13.3%)	8(8.2%)	

Table (4) BMI and menstrual blood loss

Table (5), explained the relationship between BMI and menstrual cycle length, shows that no significant relationship between BMI and cycle length with p-value (0.982).

BMI	Days	p-value
18-24.9	27(28.6%)	0.982
<18.5	13(13.2%)	
25-29.9	49(50.5%)	
30-34.9	8(7.7%)	

Table (5) association between BMI and menstrual cycle length

Discussion

In this study, we investigate the influence of BMI on age group (18-40) as well as the pattern of menstrual cycle and menstrual blood loss and dysmenorrhea in Baqhuba city, Iraq. Our study show there was no statistically significant relationship between body mass index(BMI) and different age group; this result is consistent with the findings of studies conducted by [Naeimeh T. and Gharavi et.al](11),who found there is no significant relationship between body mass index and age .Also another study carried out in Netherlands indicated that there was no relationship between BMI and age(12).

Our study disagree with a study of [inland et.al] who concluded that people with menarche were taller and heavier than with delayed menarche and the percentage of body fat and BMI in girls with early menarche was significantly higher than those with delayed menarche (13).

Our present study disagree also with a study found by Anderson , who found the girls with higher BMI had lower age of menarche (14).

This difference may be due to differences in geographical conditions and people lifestyle(15).

In this study we found there was no significant relationship among BMI and menstrual cycle length. In support to our findings Mirfat M.et.al, who find that no statistical difference between women who belonged to different body mass index categories regarding menstrual length (16). But our study inconsistent with the report that shows, overweight and obese young female are at a greater risk of experiencing longer and frequent periods(17). Also disagree with another report that explain the women with low or high BMI related to obesity experience more prolonged menstrual cycles, high BMI and sedentary behaviors may influence the level and equilibrium of endogenous hormones required for optimal menstrual function, thus resulting in irregular menstrual cycle length(18).

Our present study shows there is no significant relationship between BMI and menstrual blood amount (heavy, light, medium). our study inconsistent with a study conducted by Sultan and Nadir , who found that oligomenorrhea 30% in overweight and amenorrhea about 40% in obese group[19]. also disagree with another study conducted by Agaral, that show BMI was associated with increase oligomenorrhea p-value (<0.001) and when BMI was decreased the prevalence of polymenorrhea was reported more ; based on logistic regression analysis, BMI is considered as one of the most important factor in menstrual cycle regulatory, although avariety if sex hormones play an important role in affecting menstrual cycle, studies have suggested that having a high BMI may cause an abscence of menstruation[20]. Also we found in our study that no significant relationship between BMI and menstrual pain(dysmenorrhea), our study inconsistent with a study done by Damrat that show high BMI may cause an abscence of menstruation and dysmenorrhea[21] .

 In support to our findings a study conducted in Japan among female workers in 2011, determined that stress is the major factor related to menstrual cycle irregularities and menstrual pain ,in that study ,factors such as smell of cigarettes, stress, age, BMI, smoking habits and sleeping hours were investigated if they were associated with menstrual disorders, furthermore the factors that showed significance are stress ,age ,smoking habits. stress activate the release of corticotrophin in the nervous system causing menstrual cycle irregularities and dysmenorrhea, but the BMI factor in this study showed no significant[22].

 Another study support our study findings conducted in Malaysia in 2006, showed that BMI is not one of the factors that associated with menstrual disorders such abnormal period of menstrual flow, heavy menstrual flow and dysmenorrhea, however BMI associated with premenstrual syndrome, that are more commonly among overweight or obese women[23].

 The difference between our study and the study that inconsistent with us may be due to different in socio-economic status and genetic , psychological factors[24].

Conclusion

In this study, we found that no relationship between different body mass index (BMI) categories and menstrual cycle irregularities. we found that no significant relationship between BMI and age of different groups , also no significant difference between BMI and menstrual cycle patterns including (length, amount of blood loss , and dysmenorrhea).

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