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A prospective study of association of body mass index with menstrual disturbances in a tertiary care setting

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Abstract

Aims: To establish the association between body mass index and menstrual disturbances. **Materials and Methods**: A prospective study was conducted in the department of obstetrics and gynaecology in Patna medical college and hospital ,Patna, Bihar India for a period of one year. Total 200 patients were included in the study. Patients with age ranging from 20-40yrs, coming to the departmental OPD with presenting history of menstrual irregularities were included. Patients with normal cycles and pregnancy were excluded. Data regarding age, marital status, parity, symptoms, menstrual history, obstetric history, examination, co-morbidities, investigation findings, associated pathology and treatment modality were noted. **Results:** The mean age of the study participants was 32.12 (±8.12) years and their mean age at menarche was 12.47 (±1.82) years. Majority of the study participants were belonging to class IV (lower middle class 30%) and class III (middle class 25%) socio-economic status. Most of the females were married (85%), Majority of the females were housewives (60%) followed by working women (35). Those belonging to nuclear family (55%). More than 60% of the females who participated in the study were educated till high school. Around 50 (25%) women have BMI within the normal range, 20 (10%) are underweight, 120 (60%) women falls in overweight category and 10 (5%) of the study participants were obese as per the WHO standards. Among the obese women, more than 76.92% have menstrual irregularities suggesting a strong relationship between the two when compared to women with normal BMI. **Conclusion**: BMI plays a very important role in menstrual cycle regulation. Life style modifications and nutritional counselling could decrease the incidence of menstrual irregularities. Healthy eating habits and maintaining optimal BMI improves menstrual health.

Introduction

Menstruation is a normal physiological process which every woman undergoes for more than 35 years in her lifetime from menarche till menopause.[1] Menstrual cycles are said to be regular when the cycle length is between 21 to 35 days with a menstrual flow for 2 to 7 days and any deviation from this normal menstrual pattern i.e., either with increased or decreased duration of cycles (polymenorrhea or oligomenorrhea), heavier (menorrhagia) or decreased flow, associated with other symptoms like severe abdominal cramps (dysmenorrhoea) is considered as abnormal or irregular menstrual cycle.

Irregular cycles is common during the beginning phase of menstruation in life (menarche), around the time when it is going to end (peri-menopausal period), after pregnancy and during some medications like hormonal contraceptives but if the cyclesare continuously irregular in the last six months without any physiological reasons it needs to addressed as early as possible.[2-4] There are many factors responsible for the irregular menstrual pattern which includes stress, hormone imbalance, thyroid disorders, increased

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weight gain, polycystic ovarian disease, diabetes, metabolic syndrome, medications, environment, behavioural and lifestyle factors. Irregularity in the menstrual cycles can have a serious impact on the immediate as well as long- term health of the women causing distressing symptoms affecting the metabolism, sleep, fertility, sexual, reproductive life andmore.

Obesity or excessive weight gain is a global issue affecting more than 13% of the adult population particularly females (15%). Overweight a prequel to obesity was present in almost 39% of the global adult population with slightly female predominance (40%).[5] Although irregular menstrual pattern has numerous causes, obesity is one of the most important risk factors as most of the time the women failed to realise it as a cause for the irregularity and also it is easily preventable and modifiable with simple but effective lifestyle, behavioural and dietary modifications without the support of unnecessary medications. Body mass index (BMI) is one of the simple and commonly used indices (taking into account the height and weight of the individual which can be easily recorded without much intervention) for the assessment of obesity among adults. Although many studies conducted across the globe to establish the association between body weight and menstrual pattern among adolescent girls, the current study focusses on women in the reproductive age group as a whole instead of particular age groups and tried to bring out the relationship between the BMI and irregular menstrual pattern .

A prospective study was conducted in the department of obstetrics and gynaecology in patna Medical College and Hospital Patna Bihar India for a period of one year between April 2017 and March 2018.

Methodology

Using convenience non- probability sampling method all female patients attending the outpatient department of the hospital and fulfilling the eligibility criteria (i.e., non-pregnant women in reproductive age group without using any hormonal contraceptives and free from any pre-existing chronic disorders like thyroid, reproductive tract diseases, diabetes etc.,) during the study duration were included in the study after giving proper information regarding the nature of study and obtaining the consent to participate in the study. Using a pre-tested questionnaire, socio- demographic profile of the study participants were collected by personal interview. The height and weight of all the study participants was recorded usinga stadiometer and standardized weighing scale for calculating the BMI.

We were able to collect the data from 200 women in the reproductive age group within the study duration which is well above the minimum sample sizerequired.

WHO classification of BMI was used to classify the study participants as normal (18.5-24.99), underweight (<18.5), overweight (25-29.99) and obese (≥30).

Statistical analysis

Results were tabulated and descriptive statistics was used for socio-demographic profile of the study participants was used to find out the association between the BMI and other variables with the menstrual irregularity.

Materials and Methods
Results

Table 1: Socio-demographic profile and BMI of the study participants

Socio-demographic profile		
Age of the study participants (years)	Mean	32.12
	S.D	8.12
Age at menarche (years)	Mean	12.47
	S.D	1.82
Education of the study participants		
Primary	30 (15.0%)	
Secondary	50(25.0%)	
Higher secondary	40(20.0%)	
Undergraduate	30(15.0%)	
Post graduate	10(5.0%)	
Illiterate	40 (20.0%)	
Occupation of the study participants		
Student	10 (5.0%)	
Housewife	120(60.0%)	
Working	70 (35.0%)	
Marital status of the study participants		

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Sonal *et al*   International Journal of Health and Clinical Research, 2020;3(8):193-197
www.ijhcr.com
194

Single	20 (10.0%)
Married	170(85.0%)
Divorced	4(2.0%)
Widowed	6(3.0%)
Type of family	
Nuclear	110 (55.0%)
Joint	90 (45.0%)
SES	
I	20 (10.0%)
II	40(20.0%)
III	50 (25.0%)
IV	60 (30.0%)
V	30(15.0%)

Table 2: distribution of study population according to Body Mass Index

18.5 (underweight)	20 pts
18.5-24.9 (normal weight)	50 pts
25- 29.9 (over weight)	120pts
30-39.9 (obesity)	10pts
>40 (morbid obesity)	NIL

Table 3: Relation between BMI and Menstrual Disturbances

BMI	Patients with menstural distrubances
Normal BMI	70 (35.0%)
High BMI	130 (65.0%)

Table 4: distribution of study population according to Menstural Distrubances

Heavy menstrual bleeding	12pts
Increased frequency of cycles	25pts
Intermenstural bleeding	6 pts
Continuous bleeding PV	8pts
Decreased frequency with menorrhagia	4 pts
Post menopausal bleeding	2 pts
Amenorrhoea f/b menorrhagia	2pts
Post coital bleeding	1pts
Spotting PV	1 pts

Table 5:distribution of study population according to Pain

Congestive dysmenorrhea	7 pts
Spasmodic dysmenorrhea	10 pts
Continuous pain	12pts
Dyspareunia	10 pts

Discussion

The mean age of the study participants was 32.12 (±8.12) years which is almost similar to a study conducted by Gunjan et al in Delhi among the reproductive age group women win which the mean age of the study participants was 29.9 (±9.7) years.[6] Likewise the mean age at menarche of the study participants (12.47±1.82 years) matches with the study

conducted by Siti-Arffah et al in Selangor (12.21±1.09 years) and also with various other studies.[7,8,9] Most of the study participants belongs to lower socio-economic class and educated only up to high school level or even lower which may have determined their knowledge and awareness level regarding the importance of maintaining the body weight under control and its relationship with menstrual cycle. Although other studies show a significant association between the age at menarche and socio-economic status with the menstrual irregularity our study failed to establish the same, may be due to the small sample size or the sampling methodology we used involving all eligible participants within the time frame and restricting the study to rural area only.[8,10] But there are some studies which favour our insignificant association of age at menarche with menstrual irregularity.[11] Majority of the study participants were married and housewives which may be a reason for their weight gain due to lack of self-care and in turn the irregularity in menstrual pattern. The prevalence of obesity in our study was around 5% which is slightly lower than the global prevalence which is around 15% among adult females.[5]Increase in BMI is a risk factor for menstrual disturbances due to the excess production of estrogen. 65% of patients belongs to abnormal BMI group. . Our study finds a very strong and significant association between the BMI and irregular menstrual pattern similar to various studies across the globe.[12,13] This strong association particularly among obese when compared with those belongimg to other categories of BMI signifies that if BMI is kept within the normal range or even switching over to a lower weight category (i.e., obese to overweight) by adapting simple but proven effective measures like physical activity, dietary modifications etc., we can regulate the menstrual cycles to a certain extent without the requirement of any medications.

Conclusion
Although many factors contribute to irregularity in menstrual cycle, we studied the relationship between the BMI and menstrual irregularity and found a significant association between the two highlighting the importance of adapting simple and effective behavioural, lifestyle and dietary modifications to maintain the BMI within the normal range by losing the excess weight gained thereby preventing the irregularity in menstrual cycles and eventually leading to a healthy and productive reproductive life among women.

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