

Original Research Article

A cross-sectional study on obesity and menstrual abnormalities among women of reproductive age in urban field practice area of Kempegowda Institute of Medical Sciences, Bangalore

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ABSTRACT

Background: Obesity is on the rise among Indian women; increasing from 12.6% (NFHS-3) to 20.7% (NFHS-4). This leads to dysregulation of several groups of hormones and has deleterious effect on the reproductive system. Extra adipocytes are sources of extra estrogen that can cause menstrual disorders such as oligomenorrhoea, polymenorrhoea, menorrhagia and metrorrhagia. Counselling women about weight reduction will help in improving their reproductive health and quality of life. Thus, the present study was done to assess obesity among women and to describe the menstrual abnormalities among them; simultaneously, the perception of obesity among these women was also assessed.

Methods: A cross-sectional study was conducted by doing house to house survey among 250 women of reproductive age residing in the urban field practice area of KIMS, Bangalore for a period of 3 months from June to August 2018. Details about socio-demographic factors, presence of any menstrual abnormalities and perception of obesity were collected using questionnaire by house to house survey. Anthropometric measurements were done and BMI was calculated. Data was entered in MS excel and analysed using appropriate statistical tests.

Results: The study included 250 subjects among whom 59.2% were obese. The common menstrual problems reported were dysmenorrhea (52.8%), oligomenorrhea (20.4%), hypomenorrhea (14.1%), menorrhagia (13.6%) and polymenorrhea (1.6%). Menstrual problems affected daily activities in 50.7% subjects. The difference between perception of their body image and their actual weight was found to be statistically significant.

Conclusions: Obesity is an important health issue among women and most of them had menstrual abnormalities.

Keywords: Obesity, Perception, Dysmenorrhea, Menorrhagia, Oligomenorrhea

INTRODUCTION

According to WHO, overweight and obesity are defined as abnormal or excessive fat accumulation that presents a risk to health.¹ It is a growing public health concern as it is associated with many co-morbidities. It is inevitable that diseases related to obesity will become more prevalent due to rising life expectancy and growing population. Furthermore, there is a drastic change from

healthy eating habits and agile lifestyle to poor eating habits and sedentary lifestyle due to modernization, which in turn predisposes individuals to obesity. Rising obesity is a major concern as it is increasingly affecting the reproductive health of women. The prevalence of obesity is higher in women than men. In the last decade, it has been noticed that obesity is on the rise among women in India. The prevalence of obesity among Indian

women has increased from 12.6% (NFHS-3) to 20.7% (NFHS-4).²

There is a relationship between obesity and menstruation since the adipocytes contain lipids like cholesterol which can be changed into a form of estrogen called “estrone.” Obese women carry extra fat cells which act as “little estrogen making factories,” and in turn have an oestrogenic effect on glands. This added estrogen can cause bleeding or menstrual disorders.³ A significant proportion of obese women in reproductive age have some problems such as menstrual abnormalities such as oligomenorrhoea, polymenorrhoea, menorrhagia, metrorrhagia and secondary amenorrhoea. The prevalence of menstrual irregularity that has been documented in India is about 30%.³

There are two important tools to indicate obesity which is body mass index and waist-hip ratio. Body mass index (BMI) has certain limitations for determination of obesity as is influenced by factors such as a variation in race, gender, and age. BMI is also independent of body size, thus cannot determine the type of obesity and body fat distribution. Moreover, previous data suggests that centrally distributed body fat may be more strongly associated with menstrual abnormalities and adverse hormonal profiles than peripheral body fat alone or overall adiposity.⁴

The concept of body image has been defined in different ways. As per Gardener’s definition, body image is “the mental picture we have of our body’s measures, contours and shape; and our feelings related to these characteristics and to our body parts”.⁵ Body weight is associated with body image and health status of individuals and is also associated with their social and reproductive life. In India, women in urban areas are more involved in various dietary activities to reduce body weight and are more conscious for their body image than their rural counterparts.⁶ It has been observed that Indian females restrict their diet rather than doing physical exercise to control their weight.⁵

Since, developing countries like India are witnessing concurrent rise in both obesity and malnutrition, accurate estimation of body-weight plays an important role in weight management and underestimation of body-weight can be a risk factor for obesity.⁷ Counselling women about correct methods of weight reduction will help in improving their reproductive health and quality of life.

Keeping the recent rise in obesity in mind, especially abdominal obesity and the lack of sufficient research in Indian scenario about the correlation between anthropometric indices and menstrual characteristics, the present study was undertaken to estimate the magnitude of obesity among the reproductive age women in urban field practice area of KIMS, Bangalore using Asia-Pacific guidelines and describe the menstrual abnormalities reported by them.^{8,9} Information was also collected about

body image perception, weight control practices among women of reproductive age group.

Objectives

- To assess obesity and describe the menstrual abnormalities among women of reproductive age group.
- To assess the perception of obesity among women of reproductive age group.

METHODS

Study place: Yarab Nagar, urban field practice area of KIMS, Bangalore.

Study period: 3 months (June–August, 2018).

Study subjects: Women of reproductive age group (15–49 years).

Study design: Cross-sectional study.

Sampling design: Simple random sampling.

Sample size: The sample size was calculated as follows:

$$n = \frac{Z_{(\alpha/2)}^2 p q}{d^2}$$

Z= value from standard normal distribution table at $\alpha=5\%$ (95% confidence level=1.96); p= women who are overweight or obese in age group of 15–49 years=31.8%;¹⁰ (BMI ≥ 25.0 kg/m²); q=(1-p)=68.2%; d=desired relative precision (20% of 31.8%=6.36); Assuming 20% of non-response=206 $\times$ 0.20=42; Net sample size=206+42=248 $\approx$ 250.

Inclusion criteria

- Females who have attained menarche.
- Females residing in Yarab Nagar in the age group of 15–49 years and willing to participate in the study.

Exclusion criteria:

- All those who are pregnant and lactating.
- All those on OCP, IUDs and undergone hysterectomy.
- All those with systemic illness.

The study was conducted in urban field practice area of Kempegowda Institute of Medical Sciences (KIMS) Hospital and Research Centre, Bangalore for a period of 3 months from June to August 2018 after obtaining clearance from institutional ethics committee. House to house survey was conducted and their socio-demographic details were collected using a pre-structured and pre-tested proforma. Each study subject was enquired regarding any menstrual abnormalities like dysmenorrhea, menorrhagia, oligomenorrhea, hypo-

menorrhea, polymenorrhea and metrorrhagia and if any present, then the details regarding the same were recorded.

Regular menstruation was defined as menstrual cycle length of 21-35 days and irregular menstruation as menstrual cycle length less than 21 days or more than 35 days. Dysmenorrhoea was defined as painful menstruation of sufficient magnitude so as to incapacitate day-to-day activities. Menorrhagia was defined as cyclic bleeding at normal intervals; the bleeding was either excessive in amount (>80 mL) or duration (>7 days) or both. When the menstrual bleeding was unduly scanty and/ or lasted for less than or equal to 2 days, it was called hypomenorrhea. Polymenorrhea was defined as cyclic bleeding where the cycle was reduced to an arbitrary limit of less than 21 days. Menstrual bleeding occurring more than 35 days apart and which remained constant at that frequency was called oligomenorrhea. Metrorrhagia was defined as irregular, acyclic bleeding from the uterus.

Anthropometric measurements such as height, weight, waist circumference, hip circumference was taken in standing position with feet close together and arms at the side. Height was measured in centimetres. Weight was measured using a weighing machine graduated in kilograms. The waist circumference was measured with accordance to the World Health Organization's data collection protocol wherein it was measured at the midpoint between the lower margin of the last palpable rib and the top of the iliac crest using a measuring tape. Similarly, the hip circumference was measured around the widest portion of the buttocks.

The body mass index will be calculated using the formula:

$$\text{BMI} = \text{Weight (kg)} / \text{Height (m)}^2.$$

Asia Pacific guidelines was used for grading obesity. All the study subjects were asked regarding their perception about obesity.

Data was entered in MS excel and analysed using appropriate statistical tests.

RESULTS

The study included a total of 250 subjects; majority (41.2%) were in the age group of 26-35 years followed by 32% aged 15-25 years and 26.8% in the age group of 35-49 years. In the present study, majority of the subjects were Muslims (60.8%) followed by 35.6% Hindus and 3.6% Christians (Table 1).

A large proportion of 30.8% of the study subjects were educated upto middle school, 28.8% had received education upto high school, 27.6% were illiterate, 11.6%

had studied upto pre-university and 1.2% upto primary school as shown in Table 1.

Table 1: Distribution of study subjects according to socio-demographic details.

Socio-demographic characteristics		Frequency	%
Age	15-25	80	32
	26-35	103	41.2
	35-49	67	26.8
Education	Illiterate	69	27.6
	Primary school	3	01.2
	Middle school	77	30.8
	High school	72	28.8
	Pre-university	29	11.6
Occupation	Housewife	183	73.2
	Housemaid	16	6.4
	Labourer	25	10
	Tailor	04	1.6
	Student	22	8.8
Religion	Hindu	89	35.6
	Muslim	152	60.8
	Christian	9	03.6
Marital status	Unmarried	24	9.6
	Married	214	85.6
	Widow	12	4.8

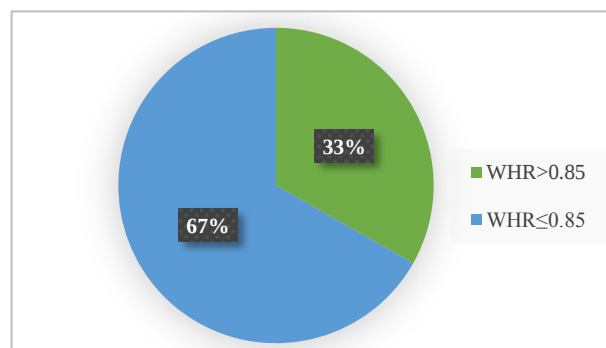


Figure 1: Distribution of the study subjects according to WHR.

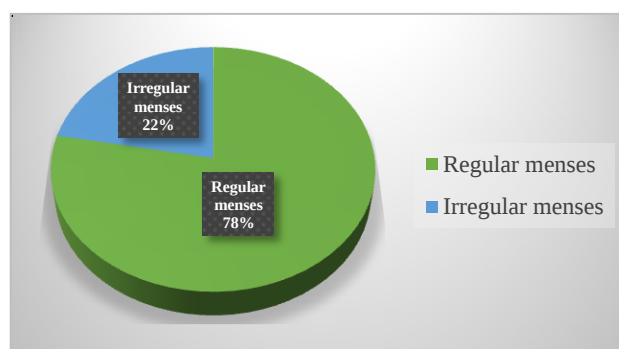


Figure 2: Distribution of the study subjects according to regularity of menses.

Table 2: Distribution of study subjects according to BMI (Asia Pacific classification).

BMI	Frequency	%
Underweight (<18.5)	22	8.8
Normal (18.5-22.9)	42	16.8
Overweight (23-24.9)	38	15.2
Obese 1 (25-29.9)	79	31.6
Obese 2 (>30)	69	27.6
Total	250	100

Table 3: Distribution of the study subjects according to type of menstrual abnormalities.

Type of menstrual abnormalities	Frequency*	%*
Dysmenorrhoea	132	52.8
Oligomenorrhea	51	20.4
Hypomenorrhea	≤2 days	2
	Scanty flow	14
	Both	1.6
Menorrhagia	>7days	9.2
	Heavy flow	13.6
	Both	2.8
Metrorrhagia	8	03.2
Polymenorrhea	4	01.6

*multiple response.

Figure 1 shows that majority of the study subjects (67%) were not abdominally obese i.e., had waist-hip ratio ≤0.85 and rest of the subjects (33%) had waist-hip ratio >0.85.

Most of the study subjects were obese i.e., 148 (59.2%), 38 (15.2%) were overweight, 42 (16.8%) had normal weight and 22 (8.8%) were underweight (Table 2).

In the present study, 78% of the study subjects had regular menses i.e. cycle length of 21-35 days while 22% gave history of irregular menses i.e., cycle length less than 21 days or more than 35 days (Figure 2). Out of 22% subjects who had irregular menses, 92.7% subjects had menstrual cycle length more than 35 days and rest 7.3% had cycle length less than 21 days.

Table 3 shows various types of menstrual abnormalities reported by the study subjects. 52.8% complained of dysmenorrhoea. 51 out of 250 study subjects had cycle interval of more than 35 days i.e., oligomenorrhea and only 4 out of 250 had complaints of polymenorrhea i.e., cycle interval less than 21 days. 14% of total subjects had history of scanty flow during menses, 2% had duration of menses less than or equal to 2 days and 1.6% had both scanty flow and less duration of menstrual cycle. Among all study subjects, 13.6% of subjects had complaints of heavy flow during menses, 9.2% had duration of menses

more than 7 days and 2.8% had reported both heavy flow and longer duration of menses.

Table 4: Association between obesity grading and menstrual cycle regularity.

Category	Regular cycle	Irregular cycle	Significance
Normal	50	14	$\chi^2=13.97$ P=0.002952
Overweight	35	3	
Obese1	66	13	
Obese 2	44	25	
Total	195	55	

Table 5: Distribution of the study subjects according to body image perception.

Category	Frequency	%
Body image perception		
Thin	26	10.4
Average	91	36.4
Overweight	113	45.2
Obese	20	8
Total	250	100
Reason for body image perception		
Self-perception	234	93.6
Friends	6	2.4
Relatives	33	13.2
Desired weight		
Little lighter	124	49.6
Present weight	101	40.4
Little heavier	25	10

Table 6: Distribution of the study subjects according to methods of weight loss.

Category	Frequency	%
Source of information for weight loss		
Friends/relatives	86	34.4
Doctor	68	27.2
Self	68	27.2
Media	38	15.2
Different methods of weight loss		
Exercise	183	73.2
Dieting	108	43.2
Medicines (ayurvedic/allopathic)	33	13.2

Obesity grade was significantly associated with irregular menstrual cycle (Table 4). Majority of the subjects (45.2%) perceived their body image as overweight, 36.4% of them thought themselves as average weight, 8% perceived as obese and 10.4% subjects had perception of their body image as thin. Out of 250 study subjects, majority of them i.e., 234 had self-perception of their body image while others were influenced by relatives (13.2%) and friends (2.4%). A large proportion of them

i.e., 49.6% subjects desired to have less weight than present while 10% of them desired to have more weight than present. 40.4% study subjects did not want to increase or decrease their present body weight (Table 5).

Table 5 shows that the source of information to the study subjects pertaining to weight loss was variable. The most common source was subjects' friends or relatives accounting to 34.4% of the total. 27.2% subjects had obtained source of information for weight loss from doctors and 27.2% subjects had the insight for losing weight from self. Rest 15.2% of them had gained knowledge regarding weight loss from media (radio/television). The different methods adopted or known to

the study subjects for decreasing weight were exercise (73.2%), dieting (43.2%) and both ayurvedic and allopathic medicines (13.2%) (Table 6).

The perception of their body image and their actual weight was found to be statistically significant. 13 out of 26 study subjects who perceived them as thin had actually normal BMI while 13 were actually overweight/obese. Majority of the subjects who thought they had average body image i.e., 58 out of 91 were actually overweight/obese. 95.6% of the subjects who perceived as overweight were actually overweight. Out of 20 study subjects perceiving them to be obese, 18 were actually obese (Table 7).

Table 7: Association between perceived and actual weight.

Category	Perceived	Actual		Significance
		Normal	Overweight/obese	
Thin	26	13	13	$\chi^2=45.81$ $p<0.0000001$
Average	91	33	58	
Overweight	113	5	108	
Obese	20	2	18	
Total	250	53	197	

DISCUSSION

Obesity is a risk factor which is associated with both short- and long-term health effects for women as well as for their offspring. It is a growing public health challenge in women of reproductive age. Obese individuals often experience disruption of the menstrual cycle, including irregular menstrual cycle, abnormal menstrual flow and duration and increased pain associated with menstrual cycle.¹¹

In our study, 59.2% of the study subjects were found to be obese, 15.2% were overweight and waist-hip ratio >0.85 was seen in 33% subjects. A cross sectional study carried out in the rural field practice area of Medical College in Kolar district, Karnataka by Manjunath et al showed that 27.2% of the women in the reproductive age group were overweight, 6.1% were obese and 36.67% women had a waist hip ratio of more than 0.85, a similar finding to our study.¹² Shashikantha et al conducted a study on the women in the reproductive age group in the rural field practice area of Adichunchangiri Institute of Medical Sciences, Mandya, Karnataka which showed 28.6% were overweight and 6.5% were obese.¹³ On the contrary, prevalence of overweight and obesity was 5.4% and 6.5% respectively among college going girls in Mysore District, Karnataka as shown in study by Srinivas et al.⁶ Another study by Rashmi et al, noted that 15.9% of the female students of Vijayapur, North Karnataka were overweight/obese.⁵

In the present study, 22% subjects had complaint of irregular menses. 20.4% had oligomenorrhea and only 1.6% had complaints of polymenorrhea. Among all study subjects, 13.6% of subjects had complaints of heavy flow

during menses, 9.2% had duration of menses more than 7 days and 2.8% had reported both heavy flow and longer duration of menses. Castillo-Martinez et al showed similar findings in his study on female patients aged 18 to 40 years who attended an outpatient obesity clinic in Mexico that 30% had menstrual cycle irregularities out of which 18.3% had oligomenorrhea.¹⁴ The prevalence of menstrual irregularity, prolonged menstrual bleeding and dysmenorrhea in a study by Cakir et al among university students in Turkey were 31.2%, 5.3% and 89.5% respectively. The daily activities were limited by dysmenorrhea in 29.7% girls in his study.¹⁵ On the contrary, daily activities were adversely affected in 50.7% subjects in the present study.

A study done on 399 subjects by Deborah et al in a district of Tamil Nadu, showed that, 23.3% of the students had menstrual irregularities. Among the menstrual irregularities, dysmenorrhea accounted for the maximum of 22.6%, menorrhagia 19.4%, oligomenorrhea 18.3%, hypomenorrhea and polymenorrhea 14%, amenorrhea 10.8%, and metrorrhagia 1%.³ A study by Danasu et al on nursing students in Puducherry showed that 46.5% of the subjects had normal menstrual flow, whereas 40.8% had mild menstrual irregularities and 12.7% had moderate menstrual irregularities.¹¹ A study done in Sangli district, Maharashtra by Waghachavare et al observed that menstrual problems were reported by 58.4% of female students of degree colleges, out of which dysmenorrhea was the commonest (47%).¹⁶ Similar findings were noted in our study i.e., 52.8% of the women complained of dysmenorrhoea.

A significant association was seen between obesity grade and amenorrhea as well as oligomenorrhea in a study in

outpatient obesity clinic in Mexico by Castillo-Martinez et al which was similar to the present study.¹⁵ The prevalence of menstrual cycle irregularities in women who were 74% overweight was 8.4%, as opposed to 2.6% in women who were <20% overweight. It has been documented that being 15% overweight was associated with a significantly higher chance of having a menstrual cycle longer than 43 days.¹⁷

It was observed in the present study that majority (45.2%) perceived their body image as overweight, 36.4% of them thought themselves as average weight and 8% perceived themselves as obese. There was a gross mismatch between perception of their body image and actual weight and this association was found to be statistically significant. A study by Srinivas et al among college going girls in Mysore District, Karnataka showed 10.6% of the girls felt themselves as obese. Among these girls only 59.2% ever practiced weight control methods and their body image perception and actual weight were found to be statistically significant.⁶ A cross-sectional study by Rashmi et al in Vijayapur, North Karnataka among female students showed the girls who perceived themselves as normal weight were actually 72% underweight and 89% overweight.⁵ Similar findings were noted in our study.

CONCLUSION

As obesity increases, there is higher chance of menstrual cycle irregularities, hence, control of weight is advised. The study also indicates that a larger proportion of the subjects were not able to correctly perceive their body image. Women should be sensitised to correctly perceive their body image so that women will be motivated to adopt weight loss strategies. For reproductive age women, health education on nutrition and physical activity will have a great impact on improving their overall health.

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