

## ASSOCIATION OF BODY MASS INDEX AND MENSTRUAL PATTERN AMONG SCHOOL GOING ADOLESCENT GIRLS IN SCHOOLS OF JAIPUR: A CROSS SECTIONAL STUDY IN THE DEPARTMENT OF OBSTETRICS AND GYNAECOLOGY, SMS MEDICAL COLLEGE, JAIPUR (RAJASTHAN)

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### Abstract

**Introduction:** Adolescence is the transitional phase of physical and mental development between childhood and adulthood and is characterized by immense hormonal changes. Menstruation is one of the most important changes during adolescent years. It occurs once a month as a regular rhythmic period. Factors that frequently play a role in the regularity, and flow of a woman's menstrual cycle include hormonal changes, genetics, serious medical conditions, and body mass index (BMI). **Aim and Objective:** To find out the association between menstrual pattern and body mass index. **Materials and Methods:** This was a Descriptive type of observational study started from July 2021 to June 2022 or till the desired sample had achieved at Government and Private Schools of Jaipur City, Rajasthan, India. The study included Sample size of 250 adolescent school going girls (who has attained menarche till the age of 18 years). Sample size calculated at 95% confidence level expecting at least one menstrual irregularity in 64% of adolescent school going girls. **Results:** The study included Sample size of 250 adolescent school going girls (who has attained menarche till the age of 18 years). Here we found that mean age of girls whose BMI is <18.5 was 14.2 years, for BMI 18.5-24.9 mean age was 14.59 years and in >25 BMI mean age was 16.72 years. we found that in class 12, 16.6%, 13.4% and 55.5% girls had BMI <18.5, 18.5-24.9 and >25. We found increasing trend in BMI as the level of class increases. This is because of increasing growth of girl we had seen increasing BMI. we found that mean duration of menstrual flow for BMI <18.5 girls was 4.6 days followed by 4.55 days of girls whose BMI was 18.5-24.9 followed by 4.22 days for BMI >25. There was no correlation seen between BMI and duration of menstrual flow. **Conclusion:** The study concludes that a majority of the girls had clinically obvious nutritional efficiency diseases. Problems related to menstruation are quite frequent and often result in the interruption of the daily routine of the adolescent girls, therefore it is important that school officials and school health programme staff recognize these problems and need to be sensitive to their problems. Further studies should be performed to determine the reason for this trend, and newer strategies need to be employed.

## INTRODUCTION

World Health Organization (WHO) defines "Adolescence" as the time period between 10 and 19 years of life characterized by critical physical and psychological changes leading to adulthood.<sup>[1]</sup> Adolescence is the transitional phase of physical and mental development between childhood and adulthood and is characterized by immense hormonal

changes. This age group requires adequate nutrition, education, counselling, and guidance to ensure their development into healthy adults.<sup>[2]</sup> Menstruation is a natural physiological process experienced by 1.8 billion girls, women, transgender and non-binary persons, globally. There is increased recognition that this experience is not always positive, with a rapidly expanding coalition of academics, non-government organisations, social enterprises, activists and multinational feminine hygiene companies

mobilising action to address barriers to menstrual management.<sup>[3]</sup>

Menstrual disorders can be affected by a number of factors, including age, ethnicity, family history, smoking and physical activity. It is important to understand the effects of physical activity on reproductive hormones and ovulation, which can subsequently influence fertility outcomes. A number of medical conditions can cause irregular menstruation, which can be diagnosed and treated at early stage. However, this part of women's health is mostly neglected. More than 90% of menstrual problems are preventable just by early detection and appropriate treatment.<sup>[4]</sup> Factors that frequently play a role in the regularity, and flow of a woman's menstrual cycle include hormonal changes, genetics, serious medical conditions, and body mass index (BMI). Obesity is a growing worldwide epidemic. According to the World Health Organization in 2008, over 1.4 billion adults, twenty and older, were overweight. This included 200 million men and almost 300 million women who were considered to be obese with a body mass index (BMI) over 30 kg/m<sup>2</sup>.<sup>[5]</sup> India is a country of contrasts, with extreme wealth and poverty and gender-related disparities, resulting in significant variation in health and social indicators among girls and women. Of the 113 million adolescent girls, 68 million attends about 1.4 million schools, with poor MHM practices and cultural taboos considered to be impediments to their school attendance. This study was carried out to assess the relationship between menstrual irregularities and BMI among adolescent schoolgirls.

## MATERIALS AND METHODS

This was a descriptive type of observational study conducted at SMS Medical College, Jaipur (Raj.). In this study we included 250 adolescent girls as final sample size.

### Inclusion Criteria

1. Adolescent school going girls who have attained menarche till the age of 18 years.
2. Written informed consent from school authority, parents and school going girls.

### Exclusion Criteria

1. Girls with comorbidities (PCOD, Thyroid abnormal levels, Anaemia, Coagulation disorders).
2. Girls who suffered from psychosis, depression, anxiety disorder, mood disorder, bipolar disorder and taking their medicines.

## RESULTS

There In this study we included 250 adolescent girls. The mean age of girls whose BMI is <18.5 was 14.2

years, for BMI 18.5-24.9 mean age was 14.59 years and in >25 BMI mean age was 16.72 years. The majority of girls were from urban area while 18 girls were form rural area.

We found that majority (116) girls were from lower socio-economic status followed by 119 girls of middle-class status. We found that the mean age of menarche (fig 1) for BMI <18.5 was 12.5 years followed by 12.7 years for BMI 18.5-24.9 followed by 13.1 years for BMI >25.

We found that mean interval between two cycles for BMI <18.5 was 28.6 followed by 29.8 days for girls with BMI in between 18.5-24.9 and 25.1 days in BMI >25.

In fig 2. we found that backache was seen in 148 girls followed by leg pain and cramps in 73 girls while headache and body ache was seen in 75 girls and 88 girls. Psychological symptoms like mood change were seen in 96 girls while irritability was seen in 145 girls and depression was seen in 55 girls.

In table no 1, we found any significant correlation between amount of blood loss and psychological changes.

We observed that mood change, irritability and depression did not depend on amount of blood loss. Majority of girls with average blood loss had severe mood change, irritability and depression.

In table 2, we had seen that with excessive pain during period there will be increase of mood change, irritability and depression. The increase in pain might increase the chances of increasing mood change and irritability.

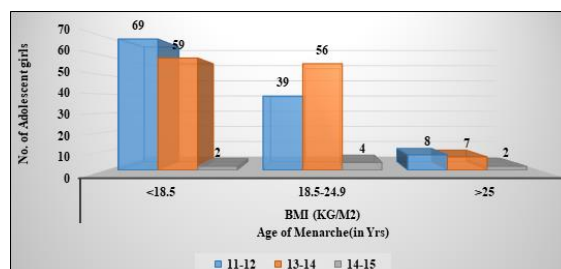


Figure 1: Distribution of Adolescent girls according to Age of Menarche

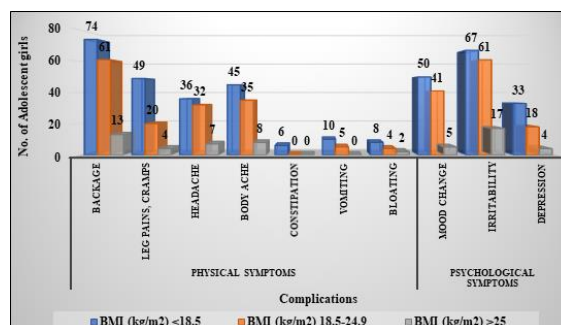


Figure 2: Correlation of symptoms associated with BMI

Table 1: Correlation between Psychological changes and blood loss.

Amount of Blood Loss	Psychological Changes			P-Value
	Mood Change	Irritability	Depression	

	No. of Adolescent girls	%	No. of Adolescent girls	%	No. of Adolescent girls	%	
Average	79	82.29	116	80.00	42	76.36	0.8
Scanty	7	7.29	13	8.97	7	12.73	
Excessive	10	10.42	16	11.03	6	10.91	
Total	96	100.00	145	100.00	55	100.00	

**Table 2: Correlation between Psychological Changes and pain during periods.**

Pain during Period	Psychological Changes						P-Value
	Mood Change		Irritability		Depression		
	No. of Adolescent girls	%	No. of Adolescent girls	%	No. of Adolescent girls	%	
Mild	12	12.50	15	10.34	14	25.45	0.07
Moderate	80	83.33	123	84.83	40	72.73	
Excessive	4	4.17	7	4.83	1	1.82	
Total	96	100.00	145	100.00	55	100.00	

## DISCUSSION

Menstruation is one of the most important changes during adolescent years. It occurs once a month as a regular rhythmic period and remains as a normal physiological phenomenon from menarche to menopause. It is considered as an indicator of women's health, so adolescent girls need to have an understanding of menstruation pattern and the factors that may attribute in menstrual disorders or changes such as age, activities, and BMI. It is essential to increase their understanding of menstruation, appropriate management for it, and clarify the ignorance of menstruation issues.<sup>[6]</sup>

### Demographic Data

The mean age of girls whose BMI <18.5 was 14.2 years, for BMI 18.5-24.9 mean age was 14.59 years and in > 25 BMI mean age was 16.72 years. In our study we found that in class 12<sup>th</sup>, 16.6%, 13.4% and 55.5% girls had BMI <18.5, 18.5-24.9 and >25. We found increasing trend in BMI as the level of class increases. This is because of increasing growth of girl. A study by Patavegar B N et al (2014)<sup>[7]</sup> found that out of 440 school going adolescent girls studied, maximum numbers were in the age group between 13 to 15 years. Mean age was found to be 14.26±1.36 years. Dars S et al (2014)<sup>[8]</sup> found that mean age of the girls was 14.96 with a standard deviation of 1.5 years (range 12 – 18 years).

### Age of Menarche

In our study the mean age of menarche for BMI <18.5 was 12.5 years and 12.7 years for BMI 18.5-24.9 and 13.1 years for BMI >25. We found, in 30.43% girls with lower socio-economic status and 39.8% girls with middle socio-economic status and 42.8% girls with upper socio-economic status, age of menarche was 12 years. We found vegetarian diet and intake of junk food frequently increased the age of menarche. Jeevitha K J et al (2019)<sup>[9]</sup> found that mean age of menarche in study was 13.38 years. which was consistent with study conducted by Shabnam Omidvar and Khyrunnisa begum (13.4±1.2 years) and study conducted by Solanki H and Vibha G (14.5 years).<sup>[10,11]</sup> In another study conducted by Nirmal JL

(2014) it was 12.6±1.32 years which was less when compared our study.<sup>[12]</sup>

### Dysmenorrhea

In our study we found that in 14.4%, 80.4% and 4% girls had mild, moderate and severe pain during period. Here we did not see any relation with BMI with pain during period. We had seen that in 6.8% girls with excessive blood loss had moderate pain and 1.2% girls with excessive pain in excessive blood loss during period. Here we can say that less blood loss makes excessive pain.

Patavegar B N et al (2014)<sup>[7]</sup> found that dysmenorrhea was reported by about 62 % of the girls. Mild dysmenorrhea was reported by 32%, moderate 19.8 % and severe by 10 % of girls. It was found that the prevalence of severe dysmenorrhea significantly increased with age. Our findings on the prevalence of dysmenorrhea only slightly differ from previous studies done by Jaikhani et al<sup>[13]</sup> (2014) and Dambhare et al (2012)<sup>[14]</sup> who estimated it 67.2% and 56.15% respectively because the change in demographic area and age group may differ the study outcome as the study place changes the life style, food habits, food pattern and body type of study subjects.

### Physical And Mental State

In our study we found that backache was seen in 59.2% girls followed by leg pain and cramps in 29.2% girls while headache and body ache was seen in 30% girls and 35.2% girls. Psychological symptoms like mood change were seen in 38.4% girls while irritability was seen in 58% girls and depression was seen in 22% girls. We had seen that with excessive pain during period there will be increase of mood change, irritability and depression. The increase in pain might increase the chances of increasing mood change and irritability.

Patavegar B N et al (2014)<sup>[7]</sup> found that Common premenstrual symptoms among the girls were abdominal cramps (49%), moodiness (31%) and irritability (30%). Other PMS symptoms were headache, anxiousness, fatigue, sleep disturbance, skin problems like acne, abdominal bloating, constipation/ diarrhoea, breast fullness/ tenderness, nausea/ vomiting changes in appetite/

overeating/craving, muscle/ joint pain/ pain in thighs. Jaikhani et al (2014).<sup>[13]</sup> in their study in Maharashtra reported PMS in 74.3% girls; with abdominal pain in 35.5%, moodiness in 30.4% & irritability in 33.3%.

## CONCLUSION

Due to lack of knowledge, education, male dominance majority of adolescent girl and young women do not seek the health care services, at the same time high prevalence of malnutrition among adolescent girls results in increased reproductive problems in young women. Problems with menstrual pattern may affect 75% girls and are the major cause of recurrent short term school absenteeism in female college students. The study concludes that a majority of the girls had clinically obvious nutritional efficiency diseases. Problems related to menstruation are quite frequent and often result in the interruption of the daily routine of the adolescent girls, therefore it is important that school officials and school health programme staff recognize these problems and need to be sensitive to their problems. Further studies should be performed to determine the reason for this trend, and newer strategies need to be employed.

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