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).

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 girls 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.[1] 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.[2] 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.[3] 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.[4] 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/m².[5] 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](image1.png)

![Figure 2: Correlation of symptoms associated with BMI](image2.png)

<table>
<thead>
<tr>
<th>Amount of Blood Loss</th>
<th>Psychological Changes</th>
<th>P-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mood Change</td>
<td></td>
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<tr>
<td>Irritability</td>
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<tr>
<td>Depression</td>
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Table 1: Correlation between Psychological changes and blood loss.
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.[6]  

**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 12th, 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)[7] 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)[8] 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)[9] 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).[10,11] In another study conducted by Nirmal JL (2014) it was 12.6±1.32 years which was less when compared our study.[12]

**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.[6]

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overeating/craving, muscle/joint pain/pain in thighs. Jailkhani et al (2014) 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.

REFERENCES