



Correlation of Body Mass Index with Menstrual Cycle among Young Females [15 to 25 Years]

Authors

Neena Agrawal^{1*}, Renu Rohatgi²

¹M.D. (Obst. & Gynae.), Assistant Professor, Department of Obstetrics & Gynaecology, Nalanda Medical College & Hospital, Patna, Bihar

²Professor and Head of Department, Department of Obstetrics & Gynaecology, Nalanda Medical College & Hospital, Patna, Bihar

*Corresponding Author

Dr Neena Agrawal

Assistant Professor, Department of Obstetrics & Gynaecology, NMCH, Patna, Bihar, India

Email: drneenaagrawal@yahoo.com

Introduction

Adolescence is a period of maturity, a point of physical, emotional, social and psychological change. It is considered to be the period between ages 10 and 19. Puberty is the process of biological, psychological and physical development through which sexual reproduction becomes possible. Progression occurs through sequential changes described as Thelarche – Adrenarche – Peak growth spurt – Menarche – Ovulation.

Menstruation is described as the exclusive sign of femininity. It is well known that the terms menstruation and menses are derived from the Latin word menses (month), which in turn relates to the Greek word 'mene' (moon) and to the roots of the English word month reflecting the fact that the moon also takes close to 28 days to revolve around the Earth (actually 27.32 days).

The age of menarche is determined by general health, genetic, socio-economic, nutritional factors, geographic location, exposure to light and

psychological state. The mean age of menarche is typically between 12 and 13 years. The initial cycles after menarche are often irregular with a particularly greater interval between first and second cycle. The early menstrual cycles are thought to be anovulatory.

Most women bleed for 2 to 7 days during their first menses. Most normal cycles range from 21 to 45 days, despite variability even in the first gynaecologic year, although short cycles of fewer than 20 days and long cycles of more than 35 days may occur. By the third year after menarche, 60% to 80% of menstrual cycles are 21 to 34 days long, as is typical of adults.

Menstruation is a physical manifestation of complex endocrine axis. Thus, the regularity and frequency of the menstrual cycle is sensitive to endocrine disturbances that may otherwise remain sub clinical. Many girls or women may be unfamiliar with what constitutes normal or abnormal menstrual pattern. Additionally, girls often are reluctant to discuss this very private

topic with parents. Some girls seek medical advice for cycle variations that may be within the normal range. Others are unaware that their bleeding patterns are abnormal, with potential health consequences.

Body Mass Index, or Quetelet Index = MASS (kg) / Height (m)²

Ranges of BMI

CATEGORY	BMI range -Kg/m ²
Very severely underweight	Less than 15
Severely underweight	From 15.0 to 15.99
Underweight	From 16.0 to 18.49
Normal	From 18.50 to 24.99
Overweight	From 25 to 29.99
Obese class 1 (Moderately obese)	From 30 to 34.99
Obese class 2 (Severely obese)	From 35 to 39.99
Obese class 3 (Very severely obese)	Over 40

The increasing trends in the prevalence of childhood obesity, early puberty and menarche, and ethno racial differences in the effect of BMI on the reproductive characteristics of young females around the world, warrant continuous evaluation. Hence, we aim to investigate possible variations in the influence of BMI on the age at menarche as well as duration of menstrual cycle and menses in young girls.

Medical students need to study harder and are vulnerable to stress, which may lead to dysfunction of hypothalamo-pituitary ovarian axis causing menstrual abnormalities. A number of medical conditions can cause irregular or missed menses which can be diagnosed and treated at early stage. However, this part of women's health is mostly neglected by primary health care. More than 90% of menstrual problems are preventable just by early detection and appropriate treatment. An etiological relationship between menstrual disorders, Body Mass Index (BMI), dietary habits, may be sought for early prevention. With this backdrop, a cross-sectional study was conducted in undergraduate female medical and paramedical students in Rural Institute of Medical Sciences & Research, Saifai, Uttar Pradesh, India to determine average age of menarche, the patterns of menstrual cycles, prevalence and types of menstrual disorders and their association with

family history, body mass index (BMI), dietary habits.

Aim

To study the correlation of body mass index with menstrual cycle among young females (15-25 yrs).

Objectives

1. To determine the magnitude of menstrual problems among young females (15-25 yrs).
2. To calculate the BMI of young females by using standardised weighing machine and measuring tape.
3. Correlation of Body Mass Index with menstrual problems.

Material and Methods

The present study has been conducted on 150 young females in Department of Obstetrics & Gynaecology, Nalanda Medical College & Hospital, Patna (Bihar), over a period of 12 months, with an objective to evaluate the correlation between Body Mass Index (BMI), and menstrual cycle pattern on young females of age group 15- 25 years.

Place of Study: The study was conducted in the in Department of Obstetrics & Gynaecology, Nalanda Medical College & Hospital, Patna (Bihar)

Study Population: The population in this study consisted of young female present in OPD 15-25 years.

Method of Data Collection

Sample size

Sample size is 150 (young females)

Inclusion criteria

1. Young females in the age group of 15-25 years.
2. Those who were willing to participate in the study.

Exclusion criteria

1. The young females who were not willing to participate.

2. Those who were on treatment for menstrual problems.
3. Those having primary amenorrhoea.
4. Those who have undergone pelvic surgery.
5. Young females suffering from systemic and metabolic disease.
6. Young females on oral contraceptive pills.

Instruments used

Structured questionnaire was used to determine the occurrence of menstrual problems among young females.

Standardised weighing machine and measuring tape was used to calculate the BMI of young females.

Data collection method

Permission was taken from the above selected college. Consent was taken from the selected females and a structured questionnaire was given to identify menstrual problems.

The questionnaire consisted detailed history of the cases like present age, daily calorie intake, socioeconomic status, daily intake of junk foods, their detailed history of menstrual cycle pattern, age of menarche (on recall basis), dysmenorrhoea, passage of clots, hypomenorrhoea, menorrhagia, premenstrual symptoms if any, medical and drug history family history, etc. Detailed history of menstrual cycle was evaluated to find out the menstrual abnormality among these theoretically described ones. Short cycles (polymenorrhoea) with cycle length less than 21 days, long cycles (oligomenorrhoea) with cycle length more than 35 days, normal cycles from 21 to 35 days, normal duration 2 to 7 days were taken. Amount of bleeding was assessed by the number of pads used/day and presence and absence of clots. A thorough general examination with special attention to pallor, icterus, thyroid enlargement, per abdominal examination was done.

Standardised weighing machine and measuring tape was used to determine the BMI among cases. BMI was calculated using the formula $\text{weight}/(\text{height})^2$ (Kg/m^2).

Data analysis plan

The collected data was analysed using descriptive (mean, median and standard deviation) and inferential statistics and the results are presented by using diagrams, graphs and tables.

The relationship between the parameters i.e. BMI and menstrual abnormality was tested using the Chi – square test and independent sample t- test.

Probability value: “P” is level of significance of an occurrence of an event.

$P > 0.05$	Non significant
$P < 0.05$	Significant
$P < 0.01$	Highly significant

Results

This study was done among young females in the age group of 15 -25 years.

The mean age of the study population was 21.94 yrs. Among different age groups maximum number of cases were of 22 and 23 yrs. followed by 21 yrs. Minimum number of cases were of age 24 yrs.

The approximate calories intake was 2212.86 kcal/day with standard deviation of 217.978. This calorie intake was found to be in accordance with the daily calorie requirement in the age group of 15- 25 yrs for a moderately active Females.

The mean age of Menarche was found to be 13.53 years with standard deviation of 1.339. This was also in accordance with the results of previous studies.

The average duration of menstrual blood loss was found to be 4.18 days with standard deviation of 1.106. The average duration of normal blood flow for reproductive age group as estimated is 2 – 5 days.

The mean of menstrual cycle length came out to be 29.94 days with a standard deviation of 5.093.

The average amount of blood loss during each menstrual cycle was found to be 66.66 with a standard deviation of 11.25.

The mean of BMI in the study population was found to be $21.57\text{kg}/\text{m}^2$. Thus the average study population fall in normal BMI category ($18.5 - 24.99\text{ kg}/\text{m}^2$).

Most common premenstrual symptom was found to be Backache & Pain in thighs i.e. Dysmenorrhoea. It was seen in 112 (74.67%) cases.

Abdominal cramps (67%), leg cramps (53), & fatigue (54.3%) were some other common symptoms after dysmenorrhoea.

Conclusion

Irregular menses (including short and long cycles) is highly significantly associated with underweight and overweight BMI as clear with P- value of 0 .000 and 0.010 respectively. Irregular cycles were seen in 27 cases out of which 5 were having polymenorrhea i.e. cycle length less than 21 days, 6 were having irregular cycle with no fixed length, and 16 were having oligomenorrhea. Out of 27 cases with irregular cycle 11 were in underweight category, 5 in overweight category, and 2 in obese class 1 and rest 9 in normal BMI category.

Age of Menarche was significantly associated with BMI (p-value .0116). It has inverse relation with BMI i.e. age of menarche is early in high BMI group and late in lower BMI group.

No significant correlation was seen between BMI and menstrual cycle duration as P-value obtained was .222 and Pearson correlation was .101.

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