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Can Age at Menarche be Associated with Premenstrual Psychological Symptoms?

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Abstract

Introduction: Premenstrual syndrome is very common in women of the reproductive age group and it significantly impairs their routine activities. In addition, it has been noticed that in recent years there is an early development of puberty and age at menarche is declining in children. Thus, we planned to conduct this study to assess the prevalence of premenstrual psychological symptoms and to determine its association with age at menarche in young females. *Materials and Methods:* A cross-sectional study was conducted after the approval of the Institutional ethics committee. One hundred and fifty health science students aged between 18 - 25 years with a normal menstrual cycle duration of 28+/- 7 days were selected as study groups by pretested and validated questionnaire on premenstrual symptoms. Statistical analysis was done using SPSS for Windows, IBM SPSS Statistics 23 version. *Results and Conclusions:* The mean age of menarche of the study participantswas 13 years. We found 91% had Premenstrual syndrome (PMS) among that 74 % reported at least one psychological symptom. The most common symptoms experienced by them were altered sleep patterns (48%) followed by irritability (45%), mood swings (37%) and depression (35%). We also found that the number of premenstrual psychological symptoms had a significant negative correlation with age at menarche. The findings of this study highlight the high prevalence of Premenstrual syndrome (PMS) and the effect of early onset of menarche on psychological symptoms during the menstrual cycle. This study also emphasizes the importance of maintaining a healthy lifestyle, average body weight and to incorporate adequate physical activities in childhood.

Keywords: Menstrual cycle; Menarche; Premenstrual syndrome; Psychological symptoms.

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Introduction

Menstruation is a physiological process that begins during adolescence (puberty) and persists till menopause. The onset of the menstrual cycle is called menarche which results from the activation of complex neuro-endocrine regulatory mechanisms due to the pulsatile release of gonadotrophic releasing hormone from the pituitary gland. It usually begins from the 8th year of life and usually culminating in the onset of menstruation between 11-16 years of age (average - 13 years). The menstrual cycle is very essential for the wellbeing of the woman. Hormonal changes occurring during the menstrual cycle affect the reproductive system and various physiological and biochemical changes. It involves cyclical changes in hypothalamo-pituitary-ovarian-uterine axis.[1-3] Any variations in this axis may lead to irregular cycles, infertility or premenstrual syndrome (PMS).

Premenstrual Syndrome is described as a cluster of physical, cognitive, affective and behavioral symptoms that occur cyclically in relation to the luteal stage of the menstrual cycle and subside quickly or within a few days of the onset of menstruation. The severe form of premenstrual syndrome is called Premenstrual Dysphoric Disorder.[4-6] Numerous broad spectrum symptoms are attributed to the PMS which includes physical (lower abdominal pain, painful or swollen breasts, headache, and backache), behavioral (altered appetite, oily skin, acne, weight gain) and psychological symptoms (depression, anxiety, mood swings, altered sleep, crying and irritability). Women experience any one or more combination of the above-mentioned symptoms.

Consistently higher levels of progesterone were found in the luteal phase of the menstrual cycle among women who experienced less aggressive behavior and fatigue than those with high aggression or irritability and fatigue.[7] Significantly higher progesterone levels were observed during the luteal phase in the PMS group compared to the non-PMS group.[8] Progesterone was found to lower the noradrenaline levels in medulla, pons, midbrain, hypothalamus, thalamus and pituitary gland, thus leading to depression.[9]

Blum I et al. studied serum estrogen levels in PMS and non-PMS groups and found that estrogen levels were higher in the PMS group in the follicular phase and lower in the luteal phase of the menstrual cycle when compared with the non-PMS group.[8] Estrogen determines concentration, availability and functioning of serotonin by enhancing the synthesis of serotonin, preventing serotonin breakdown and enhancing the action by increasing serotonin receptors or binding sites. The decrease in estrogen levels has been associated with a decrease in serotonin levels and has been linked to mood disturbances.[10]

Premenstrual syndrome affects the daily activities of an adolescent girl and women. A study carried out on medical students of the sample size of 250 reported that about 48% had limited concentration in class, 46% missed the class, 43% were not stepping out of the house and 41% reported that they were unable to perform daily activities.[11] It adversely affects the quality of life and living of women. Premenstrual syndrome is the prime reason for women to miss class, college or work.Very few studies regarding the association of psychological symptoms and age at menarche were found in the literature. So we decided to conduct this study.

Objectives

The prevalance of PMS and psychological symptoms like irritability, anxiety, mood swings, altered sleep patterns and depression.

Association of number of psychological premenstrual symptoms with age at menarche.

Materials and methods

This cross-sectional study was conducted in the Department of Physiology, Tertiary Care Medical College setup, Karnataka, India. Approval of the Institutional ethics committee was taken before conducting the study. One hundred and fifty health science students aged between 18 - 25 years with a normal menstrual cycle duration of 28+/- 7 days were selected as study groups by pretested and validated questionnaire on premenstrual symptoms by convenient sampling method. The questionnaire was developed in consultation with experts and validated appropriately. The details and purpose of the study were discussed with the subjects. The study protocol was explained and written informed consent was taken before enrolment. Premenstrual symptoms were assessed for three consecutive cycles after giving the questionnaire. Subjects were reminded and encouraged to note the premenstrual symptoms during the study period by message or in person. The questionnaire was collected and their responses were analyzed. Subjects having excessive menstrual flow or irregular cycle, on oral contraceptive pills, endocrine or gynecological abnormalities, pregnant ladies, chronic diseases like diabetes, hypertension and on any other medication like steroids were excluded from the study. Anthropometric parameters like height and weight were recorded. A general physical examination including vital signs and complete systemic examinations was done. A detailed history including physical activity, diet, family, personal and drug history was taken.

The data of this study were tabulated in an excel sheet. Statistical analysis was done using SPSS for Windows, IBM SPSS Statistics 23 version. The analysis was done using Pearson's correlation. $P < 0.05$ was considered statistically significant.

Results

The mean age of menarche in our study group

was 13 years. We studied the prevalence of PMS and psychological symptoms like irritability, anxiety, mood swings, altered sleep patterns and depression. Among the study participants having PMS(91%), 74% had psychological symptoms whereas, 26% of participants did not report any psychological symptoms (Fig. 1).

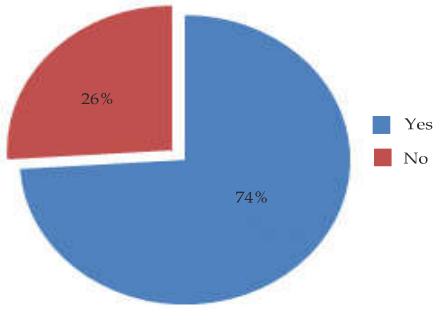

Fig. 1: Incidence of Psychological Premenstrual Symptoms.

Among the psychological symptoms, participants faced higher frequency of altered sleep patterns (48%) followed by irritability (45%), mood swings (37%), depression (35%) and anxiety (9%) (Fig. 2). The number of premenstrual psychological symptoms had significant negative correlation ($p<0.05$) with age at menarche i.e. earlier the age at menarche, more the number of symptoms.

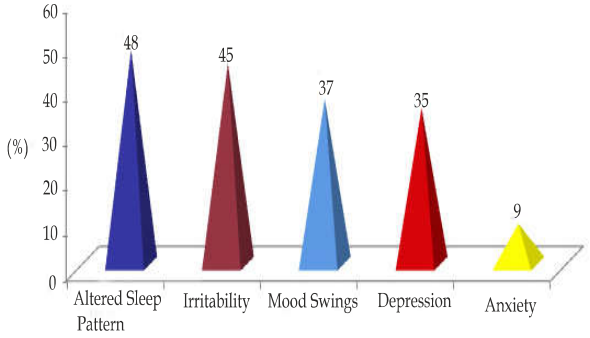

Fig. 2: Incidence of Different Psychological Premenstrual Symptoms.

Discussion

On account of the high prevalence of premenstrual symptoms, women in their childbearing age experience various symptoms that impair their daily routine activities and adversely affect their general wellbeing. This study was planned to assess the prevalence of premenstrual psychological symptoms and its correlation with the onset of menarche.

In our study, we found that the prevalence of PMS was 91.3% and among them, 74% of participants experienced psychological symptoms. One of the studies carried out on 300 Iranian adolescent students reported that 98.2% had at least one mild to severe premenstrual symptom which is in consistent with our study.[12] A study carried by Tabassum S et al.[13] in Peshawar in 2005 on 250 college girls reported that 53% of study participants were diagnosed to have PMS. There are large variations in incidence rates of PMS in various studies which may be because of differences in diagnostic criteria and the factors affecting PMS including body weight, stress, culture, ethnicity, health, and family status.

In our study, we found a significant negative correlation with the onset of menarche and psychological symptoms. Study participants who attained early or late menarche encountered more number of symptoms when compared to those who attained at the appropriate age. During puberty, girls are exposed to higher levels of estrogen and there is a constant flux of estrogen and progesterone throughout the reproductive years which results in modification of the neurotransmitter systems altering its sensitivity which leads to the development of PMS.[14]

The energetics theory suggests that energy availability (nutritional intake) during childhood influences the timing of menarche.[15] The psychosocial acceleration theory states that the experience of high levels of emotional stress in and around a girl's family leads to earlier menarche.[16] Khadgawat R et al.[17] documented the early onset of menarche in overweight and obese girls. A decrease in average menarcheal age is registered in literature.[18] According to the above-mentioned theories and studies; the standard of living in the reproductive age group is highly dependent on the early life factors of girls including her body weight, lifestyle, socioeconomic status and exposure to stressors. Relatively smaller sample size, nutritional status, body weight and stressors at the time of age at menarche are the confounding factors that were not assessed in this study. A prospective study including children with a larger sample size and considering early life factors form the future scope of the study.

Conclusion

A high prevalence of PMS was noted and psychological premenstrual symptoms were significantly correlated with the age at menarche.

There are certain factors that affect the early onset of menarche and PMS. Quality of life of childbearing age can be improved by modifying the factors affecting the onset of puberty and PMS. Thus, this study emphasizes the importance of maintaining a healthy lifestyle, average body weight and incorporating adequate physical activities in childhood through adolescence, menopausal and postmenopausal age.

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