

Original research article

## Premenstrual Syndrome among Rural Adolescents of Kancheepuram District – A Cross Sectional Study

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### Abstract

**Introduction** Premenstrual syndrome (PMS) is defined as set of physical and psychological symptoms regularly encountered during late luteal phase of menstrual cycle before the onset of next cycle of menstruation. Our study aims to assess the proportion of rural adolescents suffering from PMS, to identify the common premenstrual symptoms among rural adolescents and to correlate the association between the categorized PMS Symptoms among girls with PMS

### Material and Methods

This is a cross-sectional, observational, questionnaire-based study taken up after obtaining Institutional Ethical Clearance. This study was carried out from October 2021-December 2021. Adolescents from rural area were enrolled as participants (n=500) for the study. The respondents were clearly instructed to record the symptoms experienced for 3 consecutive cycles, prospectively.

**Results-** Our observation of presence of PMS among rural adolescents is 37%. Mean age of the study participants were  $16.14 \pm 0.78$  years, mean age at menarche is  $10.20 \pm 1.30$  years and average BMI were  $19.78 \pm 3.86$  respectively. PMS is categorized as PMS-A (43%), PMS C (20.5%), PMS D (23%) and PMS H (13.5%). Duration of cycle, age at menarche, BMI did not have any significant correlation with PMS. Around 47% had severe premenstrual syndrome followed by 44% had moderate premenstrual syndrome and 9.00% had mild premenstrual syndrome **Conclusion-** Premenstrual syndrome affects young rural adolescents which can interfere with their daily routine reducing their productivity in academic as well as social outcome thus impairing the quality of Life.

**Keywords:** Premenstrual syndrome, adolescents, rural area

## Introduction

Adolescent phase of reproductive life in young females is subjected to significant changes owing to interplay of hormones. This affects the physical, physiological and psychological development of young adolescent females. These symptoms that are cyclically encountered during Premenstrual phase comprises of a group of symptoms experienced by an individual during the late luteal phase of menstrual cycle which characteristically diminishes after onset of menstrual phase.<sup>1</sup> The symptoms are classified to be either affective type like, depressive behavior, angry outbursts, irritable behavior, anxiety, confusion and social withdrawal. Abdominal bloating, breast tenderness, headache, swelling of extremities and weight gain are somatic symptoms often reported during premenstrual phase. According to American Congress of Obstetrics and Gynecology diagnostic criteria, one or more of either the somatic or affective symptoms during the last 5 days before the onset of menstruation is to be present in each of 3 prior cycles for diagnosis of PMS.<sup>2</sup> The prevalence of PMS is reported to be 20% among Indian women, although there might be a sociocultural influence and demographic factors that predicts the prevalence of PMS.<sup>3,4,5</sup>

PMS symptoms are observed to be absent in women with anovulatory cycles or on treatment with ovulation inhibiting drugs, which indicates the role of gonadal steroids.<sup>6</sup> PMS results due to impaired serotonin levels as reported by recent research which has identified the platelet uptake and levels of 5-hydroxytryptamine (5-HT), platelet monoamine oxidase (MAO) activity to be altered.<sup>7</sup> Autonomic function varies with each phase of menstrual cycle and Heart Rate Variability analysis during premenstrual phase depicts decreased parasympathetic activity in terms of Total power and frequency power, which is associated with appearance of varied behavioral and psychosomatic symptoms.<sup>8</sup> Oxidative stress also plays a key role in some established cases of PMS as per research which identified the oxidant and antioxidant imbalance that is speculated to be a cause or consequence of different stress symptoms encountered.<sup>9</sup> Other hormones like Melatonin, TSH, Cortisol and Prolactin with their inappropriate secretion time have been implicated to play a key role in etiology of PMS, though their absolute levels remain unaltered.<sup>10</sup>

Reports on varied factors influencing etiopathogenesis of PMS, are well documented in females across the globe in urban areas across all reproductive age groups.<sup>11,12,13</sup> Very few studies report about PMS among adolescents in a rural setup. Hence, this study was designed to identify the common premenstrual symptoms among rural adolescents and to correlate the association between the categorized PMS Symptoms with varied severity of Premenstrual symptoms.

## Material and Methods

This is a cross-sectional, observational, questionnaire-based study taken up after obtaining Institutional Ethical Clearance. Questionnaire containing basic information about the physical parameters, menstrual history, educational status, sociodemographic profile was included in the modified pre validated PMS Questionnaire.<sup>14</sup>

This study was carried out from October 2021-December 2021. The investigator administered the questionnaire after obtaining informed consent and also assent was taken from them. Adolescents from rural area of Kancheepuram district were enrolled as participants (n=500) for the study. Estimated sample size was calculated using Epi info sample size calculator with 5% significance, 80% power at 2.8% confidence limits and 39.5% expected frequency. The respondents were clearly instructed to record the symptoms experienced for 3 consecutive

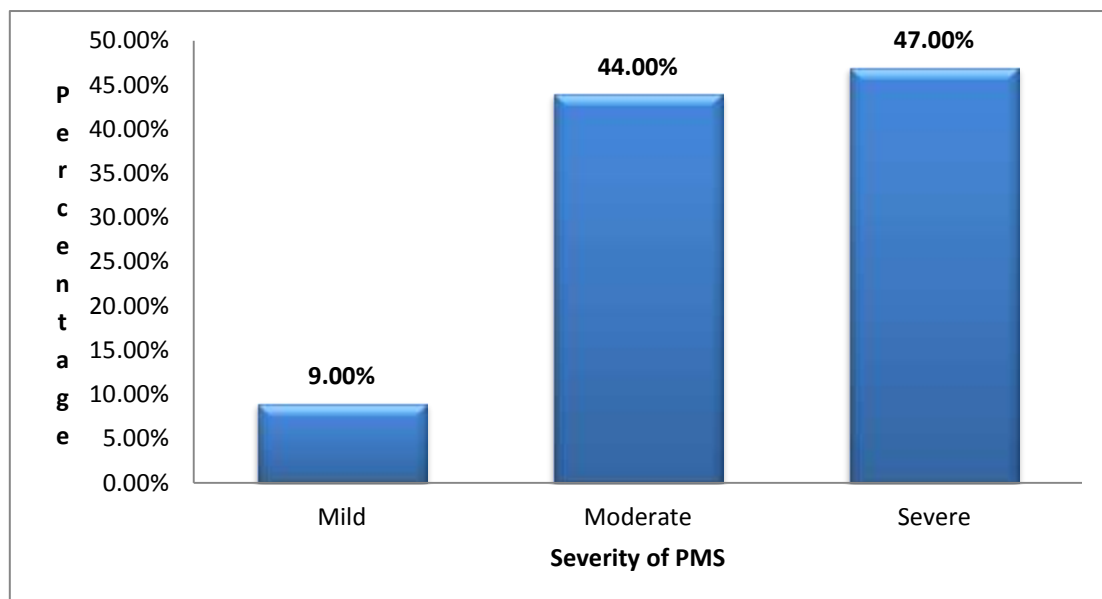
cycles, prospectively. Adolescents who reported to be under any medications or any specific systemic illness were excluded from the study.

The symptoms recorded were divisible into four groups. PMS A symptoms comprises of anxiety, irritability, mood swings and nervousness. Increase in appetite, headache, fatigue, dizziness and palpitation were grouped as PMS C. Symptoms such as depression, confusion, forgetfulness, crying and insomnia were included under PMS D. Other symptoms such as fluid retention, swelling of extremities, increase in weight, breast tenderness and abdominal bloating are included as PMS H. The participants had to classify as mild, moderate or severe by grading the perceived symptoms for the previous three cycles.

The collected data was statistically analysed using SPSS version 26. Data was presented as mean± Standard deviation or percentage for analyzing variables. The association between symptoms was analysed using  $\chi^2$  or Fisher's exact test. Pearson's correlation was used to find any significant correlation between premenstrual syndrome and demographic variables. Level of Statistical significance was set at  $P < 0.05$

## Results

Around 47% had severe premenstrual syndrome followed by 44% had moderate premenstrual syndrome and 9.00% had mild premenstrual syndrome (Figure 1). PMS is categorized as PMS-A (43%), PMS C (20.5%), PMS D (23%) and PMS H (13.5%).



**Figure 1: Distribution of study participants according to severity of premenstrual syndrome (n=185)**

**Table 1: Distribution of study group characteristics (N=500)**

Variables	Mean	SD
Age (in years)	16.14	0.78
Age at menarche (in years)	10.20	1.30
Weight	47.18	9.96
BMI	19.78	3.68

Total of 185 (37%) subjects had PMS. Mean age of the study participants were  $16.14 \pm 0.78$  years, mean age at menarche is  $10.20 \pm 1.30$  years and average BMI were  $19.78 \pm 3.86$  respectively. Baseline characteristics of study participants are presented in Table 1.

**Table 2: Association of PMS with PMS A (N=500)**

PMS A (Present)	PMS present* (n=185)	PMS absent* (n=315)	X <sup>2</sup> test, p value
Anxiety	101(54.59)	192(60.95)	1.94, 0.16
2. Irritability	83(44.86)	40(12.69)	65.01, <0.001
3. Mood swings	107(57.83)	63(20.0)	74.36, <0.001
Tension	80(43.24)	47(14.92)	49.34, <0.001

\*Frequency (Percentage)

About 37% of the girls reported to have PMS. Of the PMS A (Table 2) in ACOG criteria, 58% reported anxiety, of which 54% experienced frequently in the premenstrual period. Irritability was reported by 24% of girls, where 44% was mostly affected by premenstrual syndrome. Moody swings were reported by 34% girls, where 57% of them experienced in premenstrual period. Tension were reported by 25% of adolescent girls, where about half of them experienced in premenstrual period.

**Table 3: Association of PMS with PMS C (N=500)**

PMS C	PMS present* (n=185)	PMS absent* (n=315)	X <sup>2</sup> /Fischer's exact test, p value
Appetite increase	116(62.70)	138 (43.81)	16.64, <0.001
Headache	81(43.78)	85 (26.98)	14.83, <0.001
3. Fatigue	151(81.62)	78 (24.7)	151.79, <0.001
Dizziness	37(20.00)	50 (15.80)	1.38, 0.24
Fainting	37(20.00)	28 (8.88)	12.73, 0.001
Palpitation	9(4.86)	9 (2.86)	1.35, 0.24

\*Frequency (Percentage)

Of the PMS C (Table 3) in ACOG criteria, 51% reported increase in appetite, of which 62% experienced frequently in the premenstrual period. Headache was reported by 33% of girls, where 43% of them were mostly affected by premenstrual syndrome. Fatigue was reported by 46% girls, where 81% of them experienced in premenstrual period. Dizziness and fainting were reported by only 10% and 13% of adolescent girls, where about six-eighths of them experienced in premenstrual period. Only about 4% had palpitations out of which half of them had during premenstrual period.

**Table 4: Association of PMS with PMS D (N=500)**

PMS D	PMS present* (n=185)	PMS absent* (n=315)	X <sup>2</sup> /Fischer's exact test, p value
Depression	74 (40)	72 (22.85)	15.56, <0.001
Crying	101 (54.59)	50 (15.87)	82.90, <0.001
Forgetfulness	43 (23.24)	91 (28.88)	1.89, 0.17
Confusion	44 (23.78)	73 (23.17)	0.024, 0.88
Insomnia	77 (41.62)	69 (21.90)	21.09, 0.001

\*Frequency (Percentage)

Of the PMS D (Table 4) in ACOG criteria, 30% reported depression, of which 40% experienced frequently in the premenstrual period. Crying was reported by 30% of girls, where 54.6% was mostly affected by premenstrual syndrome. Forgetfulness was reported by 27% girls, where 23.24% of them experienced in premenstrual period. Confusion was reported by 23% of adolescent girls, where about 23% of them experienced in premenstrual period. Insomnia was reported by 29% of the study participants where about half of them experienced in premenstrual period.

**Table 5: Association of PMS with PMS H (N=500)**

PMS H	PMS present* (n=185)	PMS absent* (n=315)	$\chi^2$ /Fischer's exact test, p value
1. Fluid retention	53 (28.6)	9 (2.9)	71.34, <0.001
2. Weight gain	24 (12.9)	6 (1.9)	25.31, <0.001
3. Swollen legs	29 (15.6)	20 (6.5)	11.46, <0.001
4. Breast tenderness	11 (5.9)	30 (9.7)	1.98, 0.16
5. Abdominal bloating	7 (3.8)	14 (4.5)	0.12, 0.72
6. Oily skin	160 (86.5)	111 (35.2)	123.31, <0.001
7. Acne	153 (82.7)	150 (47.6)	60.08, <0.001
8. Constipation	68 (36.5)	45 (14.3)	33.64, <0.001
9. Diarrhoea	46 (24.8)	45 (14.3)	8.76, 0.003
10. Backache	135 (73)	160 (50.8)	23.70, <0.001
11. Hives	32 (17.3)	25 (7.9)	10.11, 0.0014
12. Weakness	103 (55.7)	81 (37.7)	44.98, <0.001
13. Pain radiates down the thigh	136 (73.5)	150 (47.6)	31.93, <0.001
14. Menstrual cramps	151 (81.62)	220 (69.8)	8.44, 0.003

\*Frequency (Percentage)

Of the PMS H (Table 5) in ACOG criteria, 13.1% reported fluid retention, of which 28.6% experienced frequently in the premenstrual period. Weight gain was reported by only 0.6% of girls, 10% reported swollen legs, breast tenderness reported by 8.5%, of adolescent girls respectively. Similarly abdominal bloating reported by 4.5%, oily skin reported by 55%, acne, reported by 61%, constipation reported by 23%, diarrhea reported by 18%, backache reported by 59%, hives by 12.1%, weakness by 37%, pain radiates down the thigh by 57% and menstrual cramps reported by 74%. Duration of cycle, age at menarche, BMI did not have any significant correlation with PMS.

## Discussion

The mean age of menarche was found to be similar to that of West Bengal study<sup>15</sup> and Nagpur study<sup>16</sup>. In Iranian teenagers, lower abdominal and back pain were the most recorded physical symptoms, and lethargy was the respondents' main psychological complaint,<sup>17</sup> while irritability was the most common psychological symptom and abdominal distension were the most common physical symptoms in this research. Owing to PMS, more than half of the female students had to face social rejection. This could be attributed to poor literacy and knowledge rate.

It is estimated that approximately 30 percent of women of reproductive age suffer from premenstrual syndrome. One survey of almost 400 teenage females showed that the prevalence of PMS was 14%. In our research group, the PMS level was 37.4 percent.<sup>18</sup> In contrast to prior studies, this is on the lower side.

Around 47% had severe premenstrual syndrome followed by 44% had moderate premenstrual syndrome and 9.00% had mild premenstrual syndrome. While premenstrual symptoms and signs were largely classified as mild or ignored, parents and health care workers frequently found the symptoms and signs of dysmenorrhea to be serious. Therefore, we would assume that dysmenorrhea was the most common gynaecological issue in teenage girls if we weren't trying to find out PMS. In a study similar data were observed which concluded that 67 percent of the overall variation was accounted for by these variables.<sup>18</sup> Bad results were the most common issue in girls in our sample, among the major classes with symptoms and signs of PMS. In this category, depression and nervousness were more common than mood swings. In the other three classes of symptoms, dry skin, acne and constipation were the most prevalent issues.

Although premenstrual symptoms and signs were largely categorised as mild or ignored, the symptoms and signs of dysmenorrhea were often taken to be severe by parents and health care staff. Therefore, if we did not try to figure out PMS, we would think that dysmenorrhea was the commonest gynecologic problem among adolescent girls. Four groups of symptoms and signs representing negative affect, water retention, food, and pain were found to account for 63.64% of the total variance in the data. Alvir and ThysJacobs<sup>18</sup> used similar data in their study and they found that these factors accounted for 67% of the total variance. Among the major groups of symptoms and signs of PMS, negative affect was the most common problem in the girls in our study. Stress and nervousness were more common than mood swings in this group. Oily skin, acne and constipation were the commonest problems among the other three groups of symptoms.

Similarly, Fisher et al.'s<sup>19</sup> study pointed out that water retention symptoms were reported significantly more often, but impaired social function and impulsive behaviour were significantly more often reported in adolescents. Conversely, Bloch et al.<sup>20</sup> identified three mood symptoms (anxiety, irritability and mood lability) as the most common symptoms, with goes similar to our study findings. There were similarities with 47 symptoms and signs in Moos's study.<sup>21</sup> Muse et al.<sup>22</sup> formed a physical and behavioural subscale from their 15 symptoms and signs. The main difference between our study and Moos's and Muse's studies was the use of four groups of symptoms and signs, which is specific to our study.

### **Limitation**

Cross-sectional studies have a limited time frame and do not provide information about the long-term effects of an intervention. Due to the limited population size and characteristics of the participants, cross-sectional studies often lack the ability to generalize findings to other populations. Since data collection is done at one point in time, measurement errors can occur due to changes in the variables of interest.

### **Conclusion**

Premenstrual syndrome is experienced by school going rural adolescent girls which can have a profound effect on their academics and social outcome. Awareness about common

symptoms experienced as PMS among rural adolescents to induce health seeking behavior should be advocated which can improve the quality of life.

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