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Original Article

Comparative Study of the Prevalence of Psychological and Physiological Symptoms of Pre-Menstrual Syndrome between Rural and Urban Adolescent School-Going Girls

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ABSTRACT

Objectives: Premenstrual Syndrome (PMS) is the most common and significant public health issue among younger adults. The main purpose of the study was to compare the prevalence of physiological and psychological symptoms of PMS among adolescent girls in urban and rural areas of Tripura. **Materials and Methods:** A descriptive cross-sectional survey-based study was carried out in urban and rural schools at Teliamura, Khowai Tripura. 12-18 years old adolescent school-going girls were asked to complete a self-developed questionnaire made according to the ACOG diagnostic criteria for PMS. The questionnaire consisted of information regarding the socio-demographic profile and details of psychological and physiological symptoms. All the data were recorded prospectively. **Results:** Among 217 girls, 60.8% were diagnosed with PMS as per the ACOG diagnostic criteria of which 66 students belonged to urban areas and the other 66 students were from rural areas. The most common physical and psychological symptoms found in urban and rural area girls were abdominal pain/muscle cramps (100% and 84.8%) and fatigue (92.4% and 65.2%) respectively. **Conclusion:** The prevalence of both psychological and physical symptoms of PMS in urban area school girls was found to be higher than the rural area girls.

Keywords: Premenstrual Syndrome, Prevalence, Adolescent girls, Physical symptoms, Psychological symptoms.

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INTRODUCTION

American College of Obstetricians and Gynecologists (ACOG) defines Pre-Menstrual Syndrome (PMS) as a spectrum of somatic and emotional symptoms that may happen in the luteal phase of the menstrual cycle i.e. PMS symptoms begin around day 14 and continue until 7 days afterward the start of menstruation.[1] ACOG defines PMS by focusing on the psychological and physiological symptoms equally, in which they stipulate at least 1 out of 6 psychological symptoms and 1 out of 4 physical symptoms in menstruating girls or women that hampers day-by-day work, interpersonal relationships, absenteeism from school, professional workplace, etc.[2,3] The consensus group of the International Society for Pre-menstrual Disorders (ISPMD) further encompasses the symptoms of PMS or Pre-menstrual Disorder (PMD) into three subgroups equivalent to predominantly physical symptoms, predominantly psychological symptoms, and mixed symptoms.[4,5] More than 150 symptoms have been ascribed to PMS, and 33% of symptoms have been identified as psychological. These symptoms encompass anxiety, anger/irritability, fatigue, crying, depression, mood swings, etc., in which most common behavioral symptoms include hypersomnia or insomnia, food cravings, and decreased concentration. Meanwhile, the somatic symptoms entail breast tenderness, muscle spasm/ joint pain, headache, abdominal cramps, and white fluid discharge.[6,7] A systematic meta-analysis reported that the pooled prevalence of PMS is 47.8% globally.[8] The prevalence of severe PMS among menstruating women varies from 2-6% based on the inhabitants and diagnostic criteria used.[9]

As there has been still no descriptive cross-sectional study done on the symptoms of PMS among the adolescent girls of urban and rural areas of Tripura (one of the seven sisters in North-East India), the main purpose of the study was to compare the prevalence of physiological and psychological symptoms of PMS among the adolescent girls of urban and rural area in one sub-division (Teliamura) of Tripura and identifying the factors that impact girls before menstruation.

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MATERIALS AND METHODS

Study Design

A descriptive, survey-based, cross-sectional study was conducted in the urban and rural schools of Teliamura sub-division, Khowai Tripura (North-East India) over a period of four months. The study protocol was approved by the Institutional Ethics Committee under the Helsinki Declaration revised version in 2013 (Ref. No.: NIMSUR/IEC/2020/068).

Study Participants

12-18 years old adolescent school-going girls who have regular menstrual cycles of 21-35 days, willingly participated and responded to the questionnaire, were included in the study. The students were excluded if they had histories of medical illnesses such as thyroid disorders, autoimmune diseases, epilepsy, asthma, untreated depression, or psychiatric disorders.

Collection of the Data

We used a convenient sampling technique, in which sample size depended on the participants' availability and accessibility to the researcher during the stipulated study period. The estimated sample size of our study was 217 adolescent school-going girls based on 95% CI (Confidence Interval) and statistical significance $p<0.05$. The study eligibility criteria was illustrated in Figure 1. The diagnosis of both affective and somatic symptoms of PMS was made of the proposed criteria by ACOG. Interview of girls aged between 12-18 years through a questionnaire, which had been developed with the help of existing literature on Pre-Menstrual Syndrome (PMS) and ACOG (American College of Obstetricians and Gynecologists) diagnostic criteria for PMS. The questionnaire was obtained with information regarding the socio-demographic profile and details of psychological and physiological symptoms among rural and urban adolescent girls, which they have gone through every month.

Questionnaires were designed in such a way that the severity of PMS symptoms was ticked by the participants ranging from Never, Sometimes, Often, and Always. 'Never' denoted that the girls were not facing any discomfort during PMS. 'Sometimes' referred to the symptoms that did not affect their daily activities, whereas 'Often' was considered as moderate symptoms that marked limitations in daily activities, and 'Always' signified severe symptoms for that girls were unable to carry out their daily activities without uneasiness and were gone through every month before menstruation.

Statistical Analysis of Data

The data were analyzed by IBM SPSSv22 (Chicago, Illinois, USA). We checked SPSS Cronbach's alpha to measure the validity, internal consistency, and scale reliability of the questionnaire, which was 0.83 (a very good reliability value).

Mean with Standard Error was calculated for descriptive analysis, and number with percentage was calculated for categorical values to determine the prevalence of PMS, demographical data, and age groups among the included participants.

We carried out the testing of normality to decide on parametric/non-parametric tests for the continuous data. The normality test had shown that the data have a significant p-value. So, the physical and psychological symptoms were compared by school area (Urban, Rural) with Non-parametric tests as appropriate. Mann-Whitney test was used to compare the differences between two independent groups (Urban school girls and rural area school girls). Statistical significance was set at $p<0.05$.

RESULTS

Among two hundred seventeen (217) girls, we enrolled as per our inclusion criteria, 132 girls ages between 12-18 years were diagnosed with PMS and filled out the questionnaire willingly,

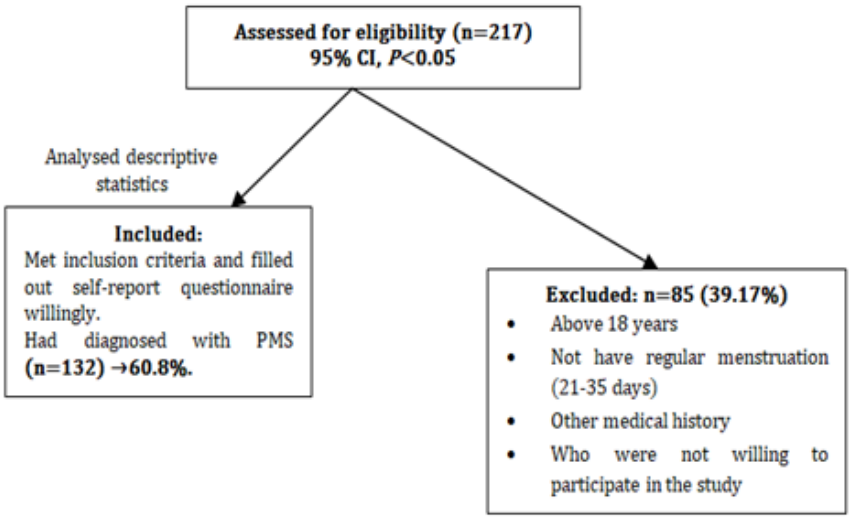

Figure 1: Schematic Diagram of Study Design.

amounting to a response rate of 60.8%. Among 132 adolescent girls, 66 girl students participated from urban school areas and the remaining 66 students were from the rural area. The demographic details of the respondent have been given in Table 1.

The psychological symptoms were anger/irritability, anxiety, tearfulness, depressed mood, decreased interest in work activities, home activities, and school activities or absenteeism, difficulty in concentrating, fatigue, insomnia, hypersomnia, overeating, and out of control. Among these symptoms, the most prevalent psychological symptoms found in both urban and rural area girls were decreased interest in daily work activities, 87.9% and 65.2% respectively. Decreased interest in school activities/absenteeism from school was also prevalent in urban area girls (89.4%) and rural area girls (59.1%). Fatigue was also common in both areas of girls with 92.4% and 65.2% (Table 2).

The most common physical symptoms found in both urban and rural school girls were joint/abdominal pain/muscle cramps (100% and 84.8%) followed by bloating (98.5% and 72.7%), white fluid discharge (98.5% and 78.8%), breast tenderness (87.9% and 54.5%) (Table 3). Total prevalence of symptoms has been given in Table 4.

Results of the study showed that urban area girls had faced both the somatic and psychological symptoms more prevalently than rural area girls (Figures 2A and 2B) where all of the participants included in the study have at least one pre-menstrual symptom. The result revealed 1.5% of Urban area girls had 1-5 both physical and psychological symptoms, 9.1% of girls had 6-10 symptoms, and 89.4% of girls had more than 10 symptoms. On the other hand, 15.2% of rural girls were having 1-5 both physical and psychological symptoms, 34.8% of girls had 6-10 symptoms, and 50% of girls had more than 10 symptoms.

DISCUSSION

PMS is a multi-factorial syndrome; its etiology is idiosyncratic that frequently occurs among women with high-stress levels. Researchers think that many women get PMS after ovulation to 1-2 days after the onset of menstrual bleeding due to decreased estrogen and progesterone levels in the luteal phase.[10] Prolonged stress can throw hormonal levels out of whack, leading to changes in the frequency and duration of a menstrual period. One NIH study found that women (18-44 years aged) with high-stress levels in both cycles were 25 times more prone to report moderate to severe PMS symptoms compared to women with a low-stress levels in both cycles.[11] In the present study, urban girls had found more in psychological stress than rural girls. In the adolescent period, students are undergoing through severe physical and psychological changes in their adulthood. As per DSM-IV criteria for premenstrual dysphoric disorders, over 150 symptoms have been attributed to PMS.[12] The most common symptoms include breast tenderness, headache, mood swings, fatigue, clumsiness, irritability, bloating, food cravings, and changes in libido. Although surveys suggest that more than 80% of women report PMS after applying strict diagnostic criteria, where about 2-6% of women of reproductive age have severe PMS.[13] The study by Delara M *et al.,* 2013 had done among Iranian adolescents, where the most reported physical symptoms were lower abdominal and back pain and lethargy/fatigue was the major psychological

Table 1: Demographic Details of Respondents.

Characteristics	Total score	
	Urban (66)	Rural (66)
Age (12-18 years)	15.63±0.18	15.40±0.14
Education		
Grade 6	4 (6.06)	0
Grade 7	6 (9.09)	4 (6.06)
Grade 8	6 (9.09)	25 (37.87)
Grade 9	13 (19.69)	13 (19.69)
Grade 10	17 (25.75)	14 (21.21)
Grade 11	9 (13.63)	5 (7.57)
Grade 12	11 (16.66)	5 (7.57)
Marital Status Single Married	63 (95.5) 03 (4.5)	62 (93.9) 04 (6.1)
Types of Family Nuclear Joint	38 (57.6) 28 (42.4)	36 (54.5) 30 (45.5)
Symptoms		
Psychological Symptoms	9.25±0.37	5.98±0.36
Physical Symptoms	5.90±0.12	4.33±0.19

Table 2: Severity of Psychological Symptoms.

Symptoms	Severity of symptoms					
Psychological Symptoms	Mild		Moderate		Severe	
	Urban	Rural	Urban	Rural	Urban	Rural
Anger/Irritability	25 (37.9%)	18 (27.3%)	12 (18.2%)	13 (19.7%)	11 (16.7%)	6 (9.1%)
Anxiety	21 (31.8%)	18 (27.3%)	19 (28.8%)	11 (16.7%)	3 (4.5%)	1 (1.5%)
Tearful	25 (37.9%)	20 (30.3%)	11 (16.7%)	5 (7.6%)	1 (1.5%)	2 (3.0%)
Depressed Mood	26 (39.4%)	18 (27.3%)	19 (28.8%)	8 (12.1%)	2 (3.0%)	1 (1.5%)
Decreased interest in work activities	19 (28.8%)	23 (34.8%)	17 (25.8%)	13 (19.7%)	22 (33.3%)	7 (10.6%)
Decreased interest in home activities	25 (37.9%)	14 (21.2%)	13 (19.7%)	13 (19.7%)	19 (28.8%)	9 (13.6%)
Decreased interest in social activities	11 (16.7%)	16 (24.2%)	22 (33.3%)	12 (18.2%)	26 (39.4%)	11 (16.7%)
Difficulty in Concentrating	24 (36.4%)	15 (22.7%)	18 (27.3%)	11 (16.7%)	9 (13.6%)	7 (10.6%)
Fatigue	12 (18.2%)	27 (40.9%)	28 (42.4%)	11 (16.7%)	21 (31.8%)	5 (7.6%)
Insomnia	17 (25.8%)	10 (15.2%)	9 (13.6%)	5 (7.6%)	2 (3.0%)	2 (3.0%)
Hypersomia	15 (22.7%)	5 (7.6%)	7 (10.6%)	5 (7.6%)	9 (13.6%)	1 (1.5%)
Overeating	17 (25.8%)	8 (12.1%)	18 (27.3%)	5 (7.6%)	4 (6.1%)	2 (3.0%)
Feeling overwhelmed/ Out of Control	23 (34.8%)	18 (27.3%)	24 (36.4%)	13 (19.7%)	5 (7.6%)	6 (9.1%)

Table 3: Severity of Physical Symptoms.

Symptoms	Severity of symptoms					
Physical Symptoms	Mild		Moderate		Severe	
	Urban	Rural	Urban	Rural	Urban	Rural
Breast Tenderness	12 (18.2%)	16 (24.2%)	23 (34.8%)	10 (15.2%)	23 (34.8%)	10 (15.2%)
Headache	27 (40.9%)	21 (31.8%)	14 (21.2%)	11 (16.7%)	3 (4.5%)	4 (6.1%)
Joint/Muscle/ Abdominal pain	22 (33.3%)	22 (33.3%)	38 (57.6%)	12 (18.2%)	38 (57.6%)	22 (33.3%)
Bloating	26 (39.4%)	31 (47.0%)	27 (40.9%)	13 (19.7%)	12 (18.2%)	4 (6.1%)
Weight gain	20 (30.3%)	12 (18.2%)	12 (18.2%)	7 (10.6%)	10 (15.2%)	6 (9.1%)
Swelling of extremities	15 (22.7%)	19 (28.8%)	23 (34.8%)	10 (15.2%)	12 (18.2%)	4 (6.1%)
White fluid discharge	8 (12.1%)	15 (22.7%)	26 (39.4%)	11 (16.7%)	31 (47.0%)	26 (39.4%)

complaint of the respondents.[14] Similarly, in our study abdominal pain/ muscle cramps and fatigue were the most common physical and psychological complaints of both urban and rural respondents. Valvaikar KS *et al.,* 2016 revealed that a significantly higher number of urban girls began menstruating at lower ages of 10-12 years, but PMS was more significant in rural girls. The study also reported that dysmenorrhea and its associated school absenteeism were mostly encountered in urban areas.[15] Mohamed EM, 2012 study also supported that irregular menstruation among adolescent school-going girls creates a limitation in work activities, home activities, and school absenteeism.[16] In our study,

Table 4: Total Prevalence of Symptoms.

Symptoms	Total prevalence		*p*-Value
Psychological Symptoms	**Urban**	**Rural**	
Anger/Irritability	48 (72.7%)	37 (56.1%)	0.079
Anxiety	43 (65.2%)	30 (45.5%)	0.013
Tearful	37 (56.1%)	27 (40.9%)	0.076
Depressed Mood	47 (71.2%)	27 (40.9%)	0.000
Decreased interest in work activities	58 (87.9%)	43 (65.2%)	0.000
Decreased interest in home activities	57 (86.4%)	36 (54.5%)	0.001
Decreased interest in school activities/Absenteeism	59 (89.4%)	39 (59.1%)	0.000
Difficulty in Concentrating	51 (77.3%)	33 (50.0%)	0.007
Fatigue	61 (92.4%)	43 (65.2%)	0.000
Insomnia	28 (42.4%)	17 (25.8%)	0.054
Hypersomia	31 (47.0%)	11 (16.7%)	0.000
Overeating	39 (59.1%)	15 (22.7%)	0.000
Feeling overwhelmed/ Out of Control	52 (78.8%)	37 (56.1%)	0.018
Physical Symptoms			
Breast Tenderness	58 (87.9%)	36 (54.5%)	0.000
Headache	44 (66.7%)	36 (54.5%)	0.269
Joint/Muscle cramps / Abdominal pain	66 (100%)	56 (84.8%)	0.000
Bloating	65 (98.5%)	48 (72.7%)	0.000
Weight gain	42 (63.6%)	25 (37.9%)	0.006
Swelling of extremities	50 (75.8%)	33 (50%)	0.000
White fluid discharge	65 (98.5%)	52 (78.8%)	0.004

Note: The bold values represent significant values where statistical significance is set at $p<0.05$.

these limitations are found to be more prevalent in Urban girls as compared to rural area girls.

As menstruation is full of myths and taboos in many countries including India and inadequate knowledge, and awareness of menstrual hygiene, customs, and restrictions related to periods is at its wits' end. Apart from these myths, menstrual hygiene management is nil as these things can cause serious reproductive tract infections.[17,18] In the present study, we found that most of the urban area girls were grown up in a nuclear family, so more than half of the girl students had faced social rejection owing to PMS. A similar study by Sarkar *et al.,* 2016 done in rural schools supported our finding.[19] Most of the girls were rarely concerned about these symptoms and few proportions of girls consulted their parents and friends due to the low level of severity of symptoms.[2,20] Menstruation is a natural phenomenon and it should not be a subject of mental discomfort or embarrassment. In a developing country like India, menstruation and PMS is a taboo and such stigma needs to be addressed. Since only few such studies have been conducted among the adolescent school going girls, therefore it is a pressing priority of the hour to build around them a healthy environment of open discussions in their domestic and academic context to create awareness, busting myths in order to improve their knowledge and management concerning menstruation and PMS.[17]

The study had some limitations. First, somehow self-rating symptoms may be difficult for adolescents. Second, most of the girls, especially in rural areas were hesitant and embarrassed to discuss menstruation and fill out the self-rated questionnaire on PMS. Third, no psychiatric diagnosis was carried out to prevent psychological symptoms in the study. However, the study's strength is that this is the first comparative study between the urban and rural areas in North-East India to evaluate the impact of PMS in urban and rural areas on their quality of life and daily activities.

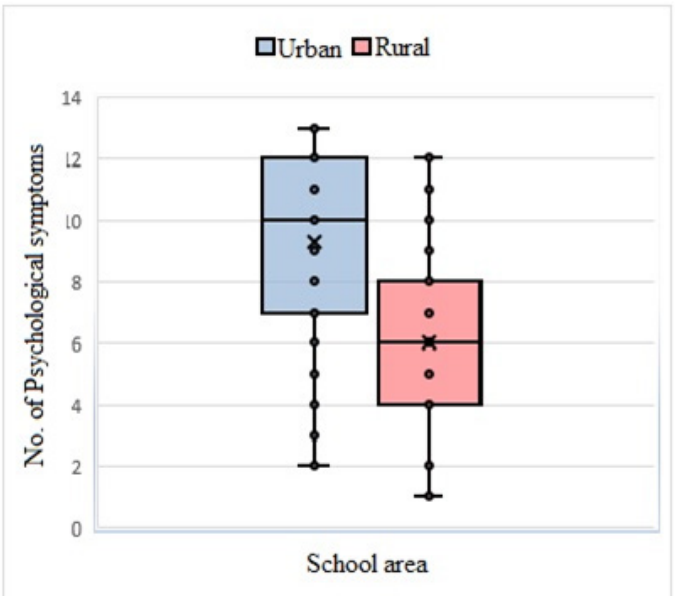

Figure 2(A)

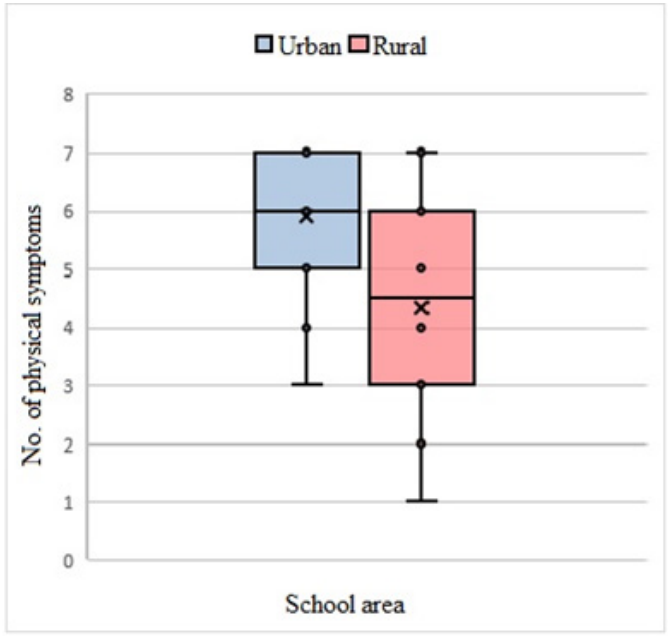

Figure 2(B)

Figure 2: PMS Symptoms among Urban and Rural Areas (A) No. of Psychological Symptoms (B) No. of Physical Symptoms.

CONCLUSION

The prevalence of both psychological and physical symptoms of PMS in urban area school girls (65.3%) was higher than the rural area school girls (56.8%). The most common physical symptoms included muscle cramps/abdominal pain and bloating whereas decreased interest in school activities/absenteeism from school and decrease interest in daily work activities are more prevalent psychological symptoms found in both urban and rural area girls. Although PMS is not related to difficulty in work or absenteeism from school so it had no association with educational activities.

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CONFLICT OF INTEREST

The authors have no conflicts of interest regarding this investigation.

ABBREVIATIONS

ACOG: American College of Obstetricians and Gynecologists; **PMS**: Pre-menstrual Syndrome; **ISPMD:** International Society for Pre-menstrual Disorders; **PMD:** Pre-menstrual Disorders.

ETHICS APPROVAL

The study protocol was approved by the Institutional Ethics Committee under the Helsinki Declaration revised version in 2013 (Ref. No.: NIMSUR/IEC/2020/068).

SUMMARY

The main objective of this descriptive and comparative cross-sectional study is to highlight the ubiquity of physical and psychological symptoms of PMS among urban and rural girls of 12-18 year of age group of Tripura. The study involved convenience sampling technique and based upon randomized selection of respondents from the interested population pool. The survey was performed by self-developed questionnaire. A high percentage of girls (60.8%) among total respondents of 217 reported with significant PMS symptoms conjointly urban school going girls had a higher ratio of physiological and psychological symptoms compared to rural girls.

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