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Systematic Review

Prevalence and knowledge of premenstrual syndrome among adolescent girls in India

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ABSTRACT

Monthly premenstrual syndrome (PMS) lasts for 6 days up until menopause. During women's reproductive years they experience an estimated amount of severe symptoms for 3000 days. The present study is aimed to assess the prevalence and knowledge on PMS among adolescents and effectiveness of teaching tools in improving the knowledge of PMS among adolescents using systematic review method. Prevalence and knowledge of PMS were systematically reviewed. A search was conducted using keywords premenstrual syndrome, PMS in adolescents/teenagers in reliable English articles. The initial search 874 articles on PubMed were available. In all 18 articles from the year 2008-2019 that were reviewed has shown there are more than 50% of adolescent girls suffering from PMS in each study and pertaining to the knowledge result shows that girls have a lack/little knowledge on what PMS is, and during an intervention of any sort results show that there was an improvement in the knowledge of the girls after the intervention was implemented, displaying the effectiveness of educational programs regarding PMS and how it increase knowledge regarding PMS. PMS is highly prevalent among female students. Every adolescent girl must be aware of premenstrual syndrome and its effect and how it can be managed, also health education programs regarding PMS and other menstrual problems are very important and secondary schools should include them in the school curriculum to reduce the prevalence of such problems and more teaching methods to be used by future researchers in regards to PMS.

Keywords: Prevalence, Knowledge, Premenstrual syndrome, Adolescent girls

INTRODUCTION

Premenstrual syndrome (PMS) is defined by international statistical classification of diseases and related health problem 10th revision as occurrence of at least one premenstrual symptom amongst countless symptoms. Mild psychological discomfort, abdominal bloating and weight gain, breast tenderness, swelling of hands and feet, various aches and pains, poor attentiveness, sleep disorders, and changes in appetite are usually the symptoms of PMS. The symptoms should be present during the luteal phase and should usually terminate following the menstrual blood flow.[1]

Monthly PMS lasts for 6 days up until menopause. During a women's reproductive years they experience an estimated amount of severe symptoms for 3000 days.[2] Epidemiological surveys report 80% of women reproductive age group report some symptoms attributed to premenstrual phase of menstrual cycle. Though it affects such a vast majority of women in reproductive age group, the degree of distress varies with each individual. About 80% of women report mild degree of distress, 20-40% report moderate degree of distress and in 10% of women distress is severe enough subsequent in poor quality of life. [3]

PMS affects not only women but also families and societies, as it causes purposeful impairment in efficiency at school/work, impaired relations with friends, colleagues and family members, poor social life activities and home responsibilities. This syndrome in young women is a significant public health problem, as increased incidence of depression and anxiety disorders were found in women suffering with PMS, which could economically burden the society indirectly in the form absenteeism at work, frequent hospitalization and suicides when it is severe.[4] Moderate to severe symptoms are present often in adolescents, 14-88% of adolescent girls are affected, with younger adolescents less likely to have PMS symptoms than the older adolescents.[5]

India has about (27.7%) of the female population in the 15-29 years age-group. This age is a transition phase of life associated with spurt of physical, mental, emotional, and social development.[6] In one's life adolescence is one of the most sensitive and vital period. A large variety of illnesses, such as nutritional deficiency disorders, menstrual disorders, etc. triumph among adolescents. Components like that of mother and childcare which are essential have due to their long existence gained familiarity. However importance of adolescent health care is still unrecognized and its significance is undetermined presumably due to benign nature of their health problems and relatively less contribution to total death.[7]

There is very little attentiveness about sexual education among girls and what they experience as they are growing up. Social prohibitions and negative attitude of elders in discussing the related issues openly has blocked the access of adolescent girls to right kind of information especially in rural, urban and tribal community. In India the adolescent girls institute a vulnerable group where the neglected one is a female child. Sexual education is still regarded as taboo in Indian society.[7] Due to the lack of focus on PMS among adolescent girls and lack of sufficient studies on prevalence and knowledge of PMs among adolescent girls this present study is aimed to evaluate the prevalence and knowledge of PMS among this group of girls.

Objectives

Adolescence hood is a very delicate transition for every girl and there is a change in hormones too, thus the categories from 10-19 is chosen. There is also very few articles on adolescent girls regarding PMS and it is important to educated the girls at a young age so they are prepared to endure through the cyclic symptoms that comes with PMS and how as health professionals and experts can increase the knowledge on this overlooked topic the following are the objectives: to assess the prevalence of PMS among adolescent girls age 10-19, to assess the knowledge of PMS among adolescent girls and to assess the effectiveness of teaching methods in the knowledge of PMS among adolescent girls.

METHODS

Search strategy

Search strategy was designed to identify published studies on prevalence and knowledge of PMS among adolescents in India. The intent of the study was to assess the extensive prevalence and knowledge of PMS displayed by adolescents and effectiveness of teaching methods with regards to PMS. The searches were conducted in April 2020 using one form of search engine, "PubMed". No date limit was set on the search to certify as wide a series of articles were identified as possible.

Inclusion and exclusion criteria

Type of study

Papers that were qualified are school cross-sectional studies, interventional studies, surveys and mixed method studies published in English from India. System reviews, and policy analysis were excluded from review. Studies primary concentration was to assess prevalence and knowledge of PMS among adolescents, and lastly evaluate effectiveness of interventional studies with regards to PMS. Other women of reproductive age were excluded and only adolescents were chosen whether in urban or rural areas and whether in school or not. Participants: The papers included were limited to only adolescents 10-19 in India, and not focusing on all women of reproductive age as this is the age where all the transition starts.

Ethical approval

Ethical approval was obtained from Noida International University.

Statistical analysis

The study was a systematic review.

RESULTS

This study is aimed to assess the prevalence of PMS among adolescent girls, to assess the knowledge of PMS among adolescent girls and asses the effectiveness of teaching methods on the knowledge of PMS among adolescent girls. The PRISMA checklist was used for writing of 18 articles. During the search of resources a total of 874 articles were found from the year 2008-2019 the most recent studies. After exclusion of duplicate, finally 18 papers were selected for analysis. The studies mostly involved adolescent girls only and studies were divided into prevalence, knowledge and teaching methods. Studies derived from search engine are cross sectional, quasi experimental, prospective, descriptive analytic and observational studies. Table 1 shows the descriptive analysis of prevalences and knowledge of PMS among adolescent girls.

Figure 1 shows the PRISMA flow chart has been tabulated showing 874 articles derived from the engine of PubMed. The duplicate articles were removed. Remaining abstracts were thoroughly reviewed and the excluded were absence of sampling design, population out of the range of adolescence, and PMS disorders. The remaining articles were reviewed studies included early adulthood and thus were excluded and since there are insufficient articles in India on PMS in adolescents other Asian countries were included too in the end 18 articles were used to be reviewed in this study.

Table 2 showed that prevalence of PMS in adolescent girls is relatively high and most of the studies show prevalence above 50% except in the study done by Kalsoom et al.[15] Other studies shows a significantly high prevalence among adolescent girls.[5,8,11,16-18] Some of the studies divided PMS in 2-4 categories, low PMS and severe PMS, then mild PMS, moderate PMS and severe experienced by different girls.[8,14,18] And only one studies showed the different prevalence in urban and rural girls.[12]

Table 3 shows the few studies on the assessment of knowledge regarding PMS among adolescent girls, the studies assessed the knowledge of adolescents regarding PMS and scores were directed to the girls.[1,2,4,6,7,10,13] The knowledge was categorized in poor, average and good, according to the scores obtained by the girls.

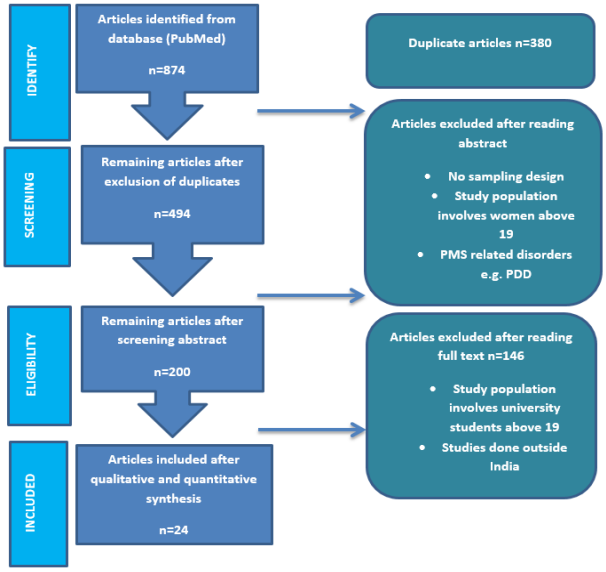

Figure 1: Prisma flow chart.

Table 1: Descriptive analysis of prevalences and knowledge of PMS among adolescent girls.

No	Topic	Objectives	Method design and sampling	Results	Conclusion
1	The effect of PMS on quality of life in adolescent girls. Taghizadeh Z, et al, 2008	To determine the correlation between PMS and quality of life (QOL) in adolescent girls.	A descriptive-analytic study. 360 adolescent girls (180 in each group), studying in the second year of high school. The participants were selected in a multistage randomly-clustered design. Respondents completed the demographic questionnaire, PMS symptom daily record scale, and the medical study short form-36	Compared with healthy adolescents, those with PMS had a lower score of SF-36 in all the scales ($p<0.001$). Except for mental health and vitality, no significant difference was observed between other scales of QOL according to SF-36 in various severities of PMS ($p>0.05$). However, a statistically meaningful difference was observed in mental health and vitality of SF-36 in severe form of PMS in compare to mild and moderate PMS ($p=0.002$)	PMS is associated with substantial burden on QOL in adolescents. In addition, increasing severity in PMS symptoms results in decreased quality of mental health and vitality
2	A study to assess the prevalence and knowledge of PMS among the adolescent girls in selected school of	To assess the prevalence and knowledge of PMS among the adolescent girls in selected school of Guwahati, Assam	Approach adopted for the study was quantitative approach a non-experimental descriptive research design was used Convenient sampling technique was used The sample size was 109 adolescent girls	Out of 109 respondents, majority i.e. 73 (66.97%) respondents had moderately adequate knowledge, 33 (30.27%) respondents had adequate knowledge and three (2.75%) respondents had inadequate knowledge level. Out of 109 respondents, majority i.e. 85 (78%) had irritability, 51 (47%)	It was concluded that out of 109 respondents, respondents had moderately adequate knowledge. As to the association of prevalence and knowledge no association were found, in the

Continued.

No	Topic	Objectives	Method design and sampling	Results	Conclusion
	Guwahati, Assam Paul S, et al, 2019		tools used for the study were semi structured questionnaire	had headache, 49 (45%) had abdominal bloating, 45 (41%) had anger, 38 (35%) had social withdrawal, 35 (32%) had breast tenderness, 33 (30%) had depression, 26 (24%) had confusion, 23 (21%) anxiety and 3 only 21 (19%) had swelling of hands and feet	association of prevalence and demographic variables, physical symptom (breast tenderness) was associated with PMS problems faced. Emotional symptoms (anger, anxiety and social withdrawal) were associated with restriction of activity during PMS. In the association of knowledge and demographic variables significant association was found with previous knowledge of PMS and educational activities affected during PMS
3	Premenstrual syndrome among adolescent girl students in a rural school of West Bengal, India. Sarkar, et al, 2015	To study the sociodemographic characteristics of adolescent rural school girls, assess the prevalence of PMS among them, and find out the factors associated with PMS	This was a descriptive study with cross-sectional design, conducted in Purba Medinipur district of West Bengal from July to August 2014. Multistage random sampling method was used. Totally, 244 students were included in the study	PMS was reported by 61.5% of girls. Of the affective symptoms in ACOG criteria, 62.7% girls reported depression and 70.5% girls anger. Irritability was reported to be as high as 84.8%. Anxiety and confusion were reported by 76.0% and 66.8% adolescent girls, respectively. Around one-third of girls experienced breast pain, and 55.3% of girls have also faced social rejection during that period. Headache and abdominal distension were reported by around 55% students. Only 14.7% of them reported limb swelling in premenstrual period. PMS was found to be associated with mother's occupation, amount of blood flow during menstruation, and presence of dysmenorrhea ($p<0.05$)	PMS was found to be an important health problem of adolescent girl students in rural areas
4	A study to assess the effectiveness of structured teaching programme on	assessed the effectiveness of structured teaching program on knowledge regarding pre-menstrual	The design was adopted by the investigator in this study was pretest and post-test quasi experimental design. A total of 30	The study found that adolescent girls had inadequate knowledge regarding PMS in pretest. After the STP on pre-menstrual syndrome there	Concluded that the STP was effective in improving the knowledge of the adolescent girls regarding

Continued.

No	Topic	Objectives	Method design and sampling	Results	Conclusion
	knowledge regarding PMS among the adolescent girls at selected school in rural area. Subramanian N, 2019	syndrome among the adolescent girls at selected school in rural area	adolescent girls were selected from the school by using convenient sampling technique	was a significant improvement in knowledge of the adolescent girls regarding PMS	PMS. The formulated hypothesis was supported
5	PMS in Anand District, Gujarat: A cross-sectional survey. Kamat SV, et al 2019	Assessed the prevalence and severity of PMS in adolescents and identified probable associations of PMS and premenstrual dysphoric disorder (PMDD) with age, locality, food habits, obesity, stress, genetic influence, menorrhagia and dysmenorrhoea.	Cross-sectional study in schools of Anand District in State of Gujarat, India. We conducted the study in 1702 girls in the age group of 8–23 years who had achieved menarche. Prevalence of PMS and PMDD using the self-administered Premenstrual Symptoms Screening Tool for Adolescents (PSST-A).	The prevalence of moderate to severe PMS was 19.3% and PMDD was 4.6%. Almost all (94.8%) girls had at least one PMS symptom with 65.7% having moderate to severe symptoms. We found dysmenorrhoea in 71.2% girls and menorrhagia in 15.2%. Physical symptoms were reported by 53.5%, disruption of daily activities by 41.7%, while 25.1% had to miss school/college. Majority (81.3%) felt that PMS was a normal part of menstruation and 53.0% reported moderate to severe stress. Multivariate logistic regression model revealed older age, dysmenorrhoea, menorrhagia, high levels of stress and PMS in mother to be significantly associated with PMS. In addition to these, lower age at menarche and junk food significantly contributed to PMDD	Prevalence of moderate to severe PMS and PMDD in this population falls within the range reported elsewhere. PMS/PMDD affects the lives of many, significantly reducing their efficiency and worsening the quality of life.
6	A study to assess the effectiveness of planned teaching programme on knowledge regarding menstrual hygiene among adolescent girls in selected School. Gaikwad, 2018	To assess the pre-test knowledge on menstrual hygiene among adolescent girls in selected school. To evaluate the effectiveness of planned teaching programme on menstrual hygiene among adolescent girls in a selected school. To find out the association between the pre-test and post-test knowledge score	The research design selected for the present study was quasi-experimental design. A total of 100 adolescents girls who fulfilled the inclusion and exclusion criteria for the following study by using simple random sampling technique. The data collected using with structured knowledge questionnaire.	The study findings revealed that majority of adolescents girls 72% had inadequate knowledge, 28% had moderate level of knowledge and 0% had adequate level of knowledge regarding menstrual hygiene. Significance of difference at 5% level tested with chi-square test and also calculated 'P' value i.e. 0.05. In all demographic factors the test statistic < table value with non-significant at 0.05 level. The result shows that there is no relationship between any of the demographic variable with	It was inferred that there was significant enhancement in knowledge score after planned teaching program

Continued.

No	Topic	Objectives	Method design and sampling	Results	Conclusion
		with selected demographic variable.		their pre-test and post-test knowledge score. . The present statistically shows the enhancement of 11.07 in mean, 0.7 in standard deviation with the 'z' value of 27.55 at 0.05 level of significance.	
7	Assessment of adolescent student's knowledge toward PMS in nursing secondary schools at Al-Diwanyia Governorate. Ali, 2014	To assess adolescent student's knowledge toward PMS	A descriptive analytic study was carried out to assess adolescent student's knowledge toward PMS. Purposive sample consist of (282) adolescent student. A questionnaire was constructed for the purpose of the study	The result revealed that the majority of the study sample 44.6% had insufficient knowledge toward PMS. The assessment of knowledge is not affected by demographic characteristics and menstrual cycle characteristics, that mean the studied questionnaire can be amend for all individuals of the studied population	The study recommended to development of school health services for better detection and management of PMS in the adolescent population. Curriculum of nursing secondary schools should contain efficient knowledge about menstrual cycle disorders especially PMS. Encouraged affected girls to seek medical advice from the medical staff. Enhance adolescent students' knowledge regarding PMS as well as adapt healthy life style through booklet, educating programs, mass media, articles
8	Assess the prevalence of premenstrual syndrome among adolescent girls at SRM college of nursing, SRM University, Kattankulathur. Abirami, 2017	The aim of this study was to determine the prevalence of PMS among adolescent girls and to associate the PMS with demographic variables	Quantitative approach and non-experimental descriptive research design was used. The data collection included three parts. Part A: demographic variables, part B: clinical variables, and part C: a structured questionnaire to assess the prevalence of PMS among adolescent girls. A total of 100 students who fulfilled the inclusion criteria were chosen as samples using non-probability	The data were analyzed and interpreted based on the objectives using descriptive and inferential statistics. The study concluded that 26 (26%) of adolescent girls have mild level of PMS; 55 (55%) have moderate level of PMS; and 19 (19%) have severe level of PMS and there is no association between the "demographic variables" and the "levels of PMS"	PMS is an issue that every girl and woman has to deal with in her life. There is a lack of information on the process of menstruation and the physical and psychological changes associated with this and proper requirements for managing PMS. The current study proved that most of the adolescent girls were suffering from PMS

Continued.

No	Topic	Objectives	Method design and sampling	Results	Conclusion
			convenient sampling technique		
9	A study on PMS among adolescent girl students in an urban area of West Bengal. Mandal et al, 2015	To study the socio-demographic characteristics of adolescent school girls, to estimate the proportion of PMS among them and to find out factors associated with PMS	It was a cross-sectional descriptive study conducted at a Kolkata city. Data were collected from the students of class IX to XII in the classroom using pre-tested pre-designed self-administered questionnaire. Total 278 students were included in the study	The mean age of the students was 15.61 years±1.3. 54% of girls reported to have PMS. Out of the affective symptoms in ACOG criteria depression was by 45.7%, anger by 61.2%, irritability by 88.1%, anxiety by 51.8%, confusion by 46.4%, rejection by 24.8, breast pain by 22.7, abdominal distension by 37.5%, headache by 40.6% and swelling of limbs by 5% of girls	Proper medical care and psychological counselling should be sought earlier for increased blood flow during menstruation and dysmenorrhoea to get rid of PMS in adolescent girls
10	Effects of health education programme on teenagers with PMS. Ather, 2013	To assess the knowledge regarding premenstrual syndrome among teenagers in terms of pre-test score and to evaluate the effectiveness of structured teaching programme by comparing pre-test and post-test score along with it to find out the association between score of knowledge, attitude and practice and the selected demographic variables	Subjects consisted of students (experimental group: 2134, control group: 2134). The experimental group participated in a PMS nutritional education program for 8 weeks (including group and individual involvement). Data was collected before and after the education, and measurement tools were premenstrual symptoms, PMS knowledge, and self-health behaviour	After the intervention, the experimental group showed a significant increase in PMS knowledge (Z=6.32, p=0.000) and self-health behavior (t=3.00, p=0.004) compared to the control group. After the intervention the experimental group showed a significant increase in PMS knowledge (Z=-4.64, p=.000) and self-health behavior (t=-3.04, p=0.005) than before the intervention	These results suggest that the short term effects of a PMS nutritional education programme for teenagers (studying in Bangalore district) was proven useful and the program should be applied to PMS nutrition education for PMS clients as well as health professionals
11	Prevalance of PMS and knowledge assessment regarding it's prevention among medical students of a private medical college of Islamabad. Kalsoom et al, 2018	To assess prevalence of premenstrual syndrome (PMS) in medical students and to determine their knowledge regarding its prevention	A cross sectional study. A purposive sample of 359 female medical students was taken after applying selection criteria. data was collected through self-administered structured questionnaire	PMS was found in 280 (80%) students. Out of them, 266 (95%) experienced physical changes and breast tenderness was the most common 159 (60%). While 210 (75%) had psychological changes and depression was found in 76 (36%). Behavioral changes were present in 120 (43%) and most prevalent was effect on academic performance which was 88 (76%). About 250 (71.5%) were ignorant about its prevention while only 100 (28.5%) knew about	PMS was found in majority of the students while knowledge about its prevention was low. Its effect on academic performance was agreed by majority of students. Awareness activities should be undertaken about the syndrome and its prevention. The subject should be

Continued.

No	Topic	Objectives	Method design and sampling	Results	Conclusion
				its prevention. Statistically significant association was found between knowledge regarding prevention of PMS and presence of PMS, as p-value 0.00 of Pearson Chi-square 35 at df1 was less than 0.05. On application of Cochran test of conditional independence, significant conditional association was found between these variables as p value of 0.00 was <0.05	given importance especially in the curriculum of medical education
12	Effect of educational program on PMS in adolescent school girls. Ramya et al, 2014	To assess the prevalence of PMS and to assess the symptom severity before conducting the educational program (pre-test) and three months following the program how effective an educational program is in decreasing the symptom severity in these girls	An educational program was conducted in two rural and two urban secondary schools of Pondicherry in girls suffering from PMS. We (post-test) by using a self-administered semi structured questionnaire. Sample size was 955, rural 244 and urban 711	40.9% of the urban girls and 51.6% of the rural girls were suffering from PMS. We noted a significant decrease in the total PMS scores and all the subscale scores (PMS - A, C, D, H and others) of the students three months after the educational program when compared to the scores before the program	Women with PMS commonly present to their doctor with a self-diagnosis, only when the symptoms severely hamper their day to day activities. We suggest that health education programs regarding PMS and other menstrual problems must be included in the curriculum of secondary schools to bring down the prevalence of such problems
13	Effectiveness of video assisted teaching module (V.A.T.M.) of adolescent girls' menstrual problems in a girl's high school. Mishra, 2018	To evaluate the effectiveness of video assisted teaching module on knowledge of the adolescent girls regarding menstrual problems and their remedial measures	A quasi–experimental design where pre and post-test without control group with experimental approach systematic random sampling technique was used for the present study. A structured questionnaire schedule was prepared consisting of 30 items on knowledge of adolescent girls on menstrual problems and their remedial measures. Total no. Of adolescent girls=155 was the sample size	Most noteworthy rates (68%) of juvenile young ladies were had a place with the age gathering of 13 to 14 years. Larger part of (88%) immature young ladies were had a place with Hindu religion. Most elevated rate (72%) of juvenile had Nuclear family. Dominant part of pre-adult young ladies (80%) were had a place with urban network. Most elevated rate (72%) of immature young ladies got their menarche at the age of 11-12 years. Prior to execution of video helped showing module the pre-adult young ladies had normal learning (44.73%) on Menstrual issues and their healing measures. The all out mean score amid post-test was 23.46±2.12 which is 78.20% of the all-out score	No huge affiliation was found between pre-test KS when contrasted with age, religion, sort of family, kind of network and time of menarche.

Continued.

No	Topic	Objectives	Method design and sampling	Results	Conclusion
				uncovering great information and adequacy was observed to be 33.47%. Most elevated post-test mean score was 83.50% of the greatest score was acquired by the pre-adult young ladies for the region "menstrual cleanliness". Most reduced mean KS (75.33%) was acquired for the region Menstrual issues. Very critical distinction was found among pre and post-test learning score ($p<0.01$)	
14	A study on the prevalence of PMS among adolescent girls in a selected school at Erode. Padmavathi et al, 2012.	To estimate the prevalence of PMS among adolescent girls to rank the common symptoms associated with PMS among adolescent girls To find out the association between prevalence of premenstrual syndrome among adolescent girls with their selected demographic variables.	A cross-sectional descriptive design was adopted for the study, 200 adolescent girls fulfilling the inclusion criteria were selected by stratified sampling technique. All participants were given a questionnaire to complete	The findings revealed that the majority (54%) of the samples had mild PMS, 28% as moderate and 18% of them had severe PMS. There was a significant association between the prevalence of PMS scores and variables like age ($2=4.51$, $p>0.05$) and school absenteeism ($2=6.62$, $p>0.05$). But there was no significant association with prevalence of PMS among adolescent girls and other variables like age at menarche, duration of cycle, type of flow, family history of PMS, academic performance and source of information	PMS is highly prevalent among female students. Maximum participants do not seek medical advice and taking self-treatment
15	A study on impact of PMS on scholastic performance of school going adolescent girls in Vizianagaram district, Andhra Pradesh. Satyanaraya et al, 2017.	To study the prevalence of premenstrual syndrome among adolescent girls in one rural and one urban school. To study the impact of premenstrual syndrome on school attendance of the girls. To study the impact of premenstrual syndrome on scholastic performance of the girls	Observational study adolescent girl students of 8th, 9th and 10th classes of one rural girls' high school and one urban girls' high school. All of them belonged to the age group of 13-16 years. 125 girl students from the rural school and 140 girl students from the urban school were included in the study. Although the schools taken up for the study have been selected randomly included from 8th, 9th and 10th classes as convenient sample	Overall prevalence of PMS is 42.6%. About 51.9% of girls in the rural school and 35% of girls in the urban school are experiencing backache before and during menstrual period. Missing classes during menstruation is very high i.e. 33.6% in rural school girls and 24.4% in urban school girls	Every adolescent girl must be aware of premenstrual syndrome and its effect on their scholastic performance may be due to attaching less importance to study and school activities among rural girls than the urban girls. It might have been guided by the influence of socio-cultural background prevalent in the rural areas
16	PMS among high school	To assess the prevalence of	This was a prospective study	Of the 399 participants, 289 (72.4%) completed the self-	PMS is a common menstrual disorder

Continued.

No	Topic	Objectives	Method design and sampling	Results	Conclusion
	students. Buddhabunya kanet al, 2017	PMS in high school students	conducted among menstruating high school students from September to December, 2015. Participants were asked to prospectively complete an anonymous questionnaire, 399 participants was the samples size.	report questionnaire. Eighty-six participants (29.8%; 95% CI, 24.5%–35.4%) reported having PMS. The most common somatic and affective symptoms among participants with PMS were breast tenderness (74.4%) and angry outbursts (97.7%). There were significant differences between the PMS and non-PMS groups, and PMS was associated with various problems related to educational activities, including lack of concentration and motivation, poor individual work performance, poor collaborative work performance, and low scores. However, there were no significant differences regarding interpersonal relationships between the PMS and non-PMS groups.	among high school students. The most common symptoms reported in this study were angry outbursts and breast tenderness
17	A study on the prevalence of PMS and its relationship with anthropometric indices. Kavitha et al, 2015	To determine the prevalence of PMS, and its relationship with anthropometric indices like body mass index, waist hip ratio, waist height ratio	A cross sectional study was conducted on first year students of a college after obtaining oral consent. Study period was February to April 2015.90 female students having regular menstrual cycle were included. Irregular menstrual cycle, diabetes, heart disease, psychiatric disease, any drug intake were excluded. Data was collected using self-administered structured questionnaire along with weight, height, waist circumference, hip circumference	The present study shows prevalence of PMS was about 74.4%. Statistical analysis was done using Fischer exact test. There was no significant relation between PMS and BMI, PMS and WHR, PMS and WHTR.	In this study it was found that there is no significant relationship between PMS and obesity. Reason for the PMS in these cases may be the levels of oestradiol and progesterone in the luteal phase which affect the neurotransmitters serotonin and GABA. This high prevalence of PMS requires attention. Reproductive health education should be introduced into school and college health education curriculum which will help the young students in getting information, education and support regarding reproductive health
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Continued.

No	Topic	Objectives	Method design and sampling	Results	Conclusion
	Prevalence of PMS among adolescent girls. Joseph et al, 2016	Assess the level of prevalence of PMS among adolescent girls. Associate the selected demographic variables with the prevalence of PMS among adolescent girls. To rank the common the symptoms associated with PMS among adolescent girls	A non-experimental descriptive survey design was used in this study as research approach and tool adopted for this study was a modified standardized PMS scale. Cluster sampling technique was adopted for this study	The results showed that, out of 60 samples, 10% has PMS, 75% were having mild PMS, 15% were having moderate PMS and no one is experiencing severe PMS. According to the ranking of the common symptoms associated with PMS are, 73% were experiencing back ache, 65% were having tiredness and 60% were having irritability. In addition, 48% having tension, 42% having mood swings and 22% suffering from muscle stiffness before the appearance of menstruation. About the other symptoms, 20% had sleeping problems and finally 18% having dizziness, painful breast, feeling of suffocation and nausea or vomiting	In conclusion, the incidence of PMS is increasing rapidly among girls due to various factors and lifestyle changes

Table 2: Prevalence's of PMS among adolescent girls.

Articles	Prevalences (%)
2	51
3	61.5
5	94.8
8	26 (mild), 55 (moderate), 19 (severe)
9	54
11	80
12	40.9 (urban), 51.6 (rural)
14	54 (mild), 28 (moderate), 18 (severe)
15	42.6
16	86
17	74.4
18	10 (PMS), 75 (mild), 15 (moderate)

Table 3: Pre and post knowledge of adolescent girls regarding PMS.

Study	Pre knowledge (%)	Post knowledge (%)
1	62.2 moderate, 8.89 mild, 28.89 severe	none
2	66.7 moderate, 33 adequate, 22.7 inadequate	none
4	50 poor, 33.3 average, 16.6 good	16.6 poor, 16.6 average, 66.6 good
6	72 poor, 28 average, 0 good	0 poor, 38 average, 62 good
7	7.4 too low, 49.3 low, 40.4 intermediate	none
10	2.5 high inadequate	increased significantly
13	46 poor, 50 average, 4good	4 average, 58 good, 38 very good

DISCUSSION

A total of 9 956 girls participated in this systematic review. According to the data, in the articles, revealed that all the girls experienced symptoms of PMS and the symptoms were categorized in mild, moderate and severe symptoms; in the article by Taghizadeh et al the results displayed the severity of PMS in most of the participants (62.22%) was

moderate, in 8.89% was mild, and in 28.89% had severe symptoms.[8,14,18] In a prevalent study by Abirami it showed that (26%) of adolescent girls have mild level of PMS; (55%) have moderate level of PMS; and 19 (19%) have severe level of PMS, revealing that all girls experiences somewhat the symptoms of PMS.[9] Finally Joseph revealed that 10% had PMS, 75% were having mild PMS, 15% were having moderate PMS and no one is experiencing severe PMS, this above studies shows that all the girls who participated in the study had PMS which result in 360 girls with PMS.[10] Padmavathi findings revealed that the prevalence of premenstrual syndrome based on shortened premenstrual assessment scale the majority (54%) of the samples had mild PMS, 28% as moderate and 18% of them had severe PMS. There was a significant association between the prevalence of PMS scores and variables like age and school absenteeism.[11]

In a comparative prevalent study by Ramya et al, it explained that in urban area 291 (40.9%) reported to have premenstrual symptoms which were less than those girls in rural schools who showed that 126 (51.6%) reported to have premenstrual symptoms, this study revealed that more girls in rural experience PMS and it could also be that there is a lack of knowledge on what PMS is among them and have very little skills on how to manage PMS compared to those in urban.[12,18] Similarly in a study by Satyanaraya revealed that overall prevalence of premenstrual syndrome is 42.6%. About 51.9% of girls in the rural school and 35% of girls in the urban school are experiencing backache before and during menstrual period. Class absenteeism during menstruation was very high i.e. 33.6% in rural school girls and 24.4% in urban school girls. All of the above prevalent studies have shown that the number of girls affected by PMS is significantly high, the girls complain more about physical symptoms which can affect their normal daily life routine if not managed effectively.[19]

In the studies regarding the knowledge of girls on PMS articles revealed that the number of girls with knowledge of PMS are very minimal and all of the studies done showed that some did also not have the slightest idea what PMS is.[1,2,4,6,7,10,13] In a study by Paul et al, results showed that there was a level of exposure and majority of the girls i.e. (60%) respondents had previous knowledge of PMS whereas; (40%) respondents did not have previous knowledge.20 Subramanian expressed that the study results were as follow: before structural teaching program, 50% of them poor knowledge score, 33.33% of them are having average knowledge, 16.67% of them are having good knowledge score and then post structural teaching program, 16.67% of them poor knowledge score, 16.67% of them are having average knowledge, 66.67% of them are having good knowledge.[21]

Thus the structured teaching program was significantly effective in increasing the knowledge of adolescent girls regarding premenstrual syndrome. Gaikwad showed that even girls did not have proper knowledge on menstrual issues like (72%) of respondent had inadequate knowledge and (28%) respondent had moderate knowledge and none of the adolescent girls had adequate knowledge regarding menstrual issues before planned teaching program and shows that (62%) of respondent had adequate knowledge; and (38%) respondent have gained satisfactory knowledge after planned teaching program.[22] In Mishra study a video assisted teaching program was administered to the girls on menstrual disorders and there was a slight improvement in the knowledge of girls and it observed that, there was a difference between the pre and post-test area wise mean score values vary from 30 % to 39.6%. Hence, it can be interpreted that, VATM was effective both area wise and overall.[23]

Ather also stated that post the intervention, the experimental group showed a significant increase in PMS knowledge and self-health behavior on how to manage PMS compared to the control group. This shows how effective teaching modules are in increasing the knowledge of girls not only in PMS but also in other menstrual disorders that girls may face.[24] Hussein assessed the knowledge of adolescents regarding PMS without an intervention and results showed that (i.e. low and intermediate scores), and they are accounted (49.6%) and (40.4%) respectively, while the others remaining were reported "too low, and high", and they are accounted (7.4%) and (2.5%) respectively, showing a very low percentage of those who know what PMS is.[25]

CONCLUSION

According to literature review done above PMS is highly prevalent among female students. Every adolescent girl must be aware of premenstrual syndrome and its effect and how it can be managed. It is vital that health education programs regarding PMS and other menstrual problems must be included in the curriculum of secondary schools to bring down the prevalence of such problems and more teaching methods to be used by future researchers in regards to PMS. Teaching methods has been effective in improving the knowledge of PMS among girls (STP and VATM), and more of such should be done to educate the girls. There are no studies on VATM on PMS which can be done by future researcher or comparative studies on different teaching methods. Future studies can be done by assessing PMS in rural areas because according to the above reviewed most rural girls have little or no knowledge about PMS and the prevalence are as well high in their population.

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REFERENCES

1. World Health Organization. International statistical classification of diseases and related health problems: 10th revision (ICD-10). 1992. Available at: http://www.who.int/classifications/apps/icd/icd. Accessed on: 29 September 2020.
2. Zaka M, Mahmood KT. Premenstrual syndrome a review. J Pharm Sci Res. 2012;4(1):1684-91.
3. Joshi JV, Pandey SN, Galvankar P, Gogate JA. Prevalence of premenstrual symptoms: preliminary analysis and brief review of management strategies. J Midlife Health. 2010;1:30-4.
4. American College of Obstetricians and Gynecologists, ACOG. Premenstrual Syndrome (PMS). Washington, DC: ACOG. 2015. Available at: https://www.acog.org/Patients/ FAQs/Premenstrual-Syndrome-PMS. Accessed on: 27 July 2018.
5. United Nations, Department of Economic and Social Affairs, Population Division. World Population Prospects: The 2010 Revision, Vol. I. Comprehensive Tables. ST/ESA/SER.A/313. 2011.
6. Fernandez J. A Study on awareness regarding safe and hygienic Practices amongst school going adolescent girls, Wardha district, India. October 2010;2.
7. Dasgupta A, Sarkar M. A study on menstrual hygiene among adolescent girls. Ind J Comm Med. 2008;33:77-80.
8. Taghizadeh Z, Shirmohammadi M, Arbabi M. The Effect of Premenstrual Syndrome on Quality of Life in Adolescent Girls. Iran J Psychiatr. 2008;3:105-9.
9. Abirami P. Assess the prevalence of premenstrual syndrome among adolescent girls at srm college of nursing, SRM University, Kattankulathur. Asian J Pharm Clin Res. 2017;10(5).
10. Joseph T, Nandini M, Sabira KA. Prevalence of Premenstrual Syndrome (PMS) Among Adolescent Girls. IOSR J Nurs Health Sci. 2016;5(1):24-7.
11. Padmavathi P, Sankar R, Kokilavani N. A Study on the Prevalence of Premenstrual Syndrome among Adolescent Girls in a Selected School at Erode. Asian J Nurs Edu Res. 2012;2(3).
12. Sarkar AP, Mandal R, Ghorai S. Premenstrual syndrome among adolescent girl students in a rural school of West Bengal, India. Int J Med Sci Public Health. 2016; 5(3).
13. Kamat SV, Nimbalkar A, Phatak AG, Nimbalkar SM. Premenstrual syndrome in Anand District, Gujarat: A cross-sectional survey. J Family Med Prim Care. 2019;8:640-7.
14. Mandal R, Sarkar AP, Ghorai S. A study on premenstrual syndrome among adolescent girl students in an urban area of West Bengal. Int J Reprod Contracept Obstetr Gynecol. 2015;4(4):1012-5.
15. Kalsoom U, Sultana A, Amjad T, Bairam S. Prevalance of premenstrual syndrome and knowledge assessment regarding it's prevention among medical students of a private medical college of Islamabad. Pak Armed Forces Med J. 2018;68(1):159-64.
16. Buddhabunyakan N, Kaewrudee S, Chongsomchai C, Soontrapa S, Somboonporn W, Sothornwit J. Premenstrual syndrome (PMS) among high school students. Int J Women's Health. 2017;9:501-5.
17. Kavitha P. A study on the prevalence of premenstrual syndrome and its relationship with anthropometric indices. Int J Pharmacol Physiol. 2015;1(1):27-32.
18. Ramya S, Rupavani K, Bupathy A. Effect of educational program on premenstrual syndrome in adolescent school girls. Int J Reprod Contracept Obstet Gynecol. 2014;3:168-71.
19. Satyanaraya N. A study on impact of premenstrual syndrome on scholastic performance of school going adolescent girls in Vizianagaram district, Andhra Pradesh 2017. Ind J Appl Res. 2017;7(5):2249-555.
20. Paul S. A study to assess the prevalence and knowledge of pre menstrual syndrome among the adolescent girls in selected school of Guwahati, Assam. Int J Curr Adv Res. 2019;8(8B).
21. Subramanian N. A Study to assess the Effectiveness of Structured Teaching Programme on Knowledge Regarding Pre-Menstrual Syndrome among the Adolescent Girls at Selected School in Rural Area. J Med Sci Clin Res. 2019;7(5).
22. Gaikwad JK. A Study to Assess The Effectiveness of Planned Teaching Programme On Knowledge Regarding Menstrual Hygiene Among Adolescent Girls In Selected School. 2009.
23. Mishra L. Effectiveness of video assisted teaching module (V.A.T.M.) of adolescent girls menstrual problems in a girl's high school. Int J Adv Res Med Surg Nurs. 2019;1(1):54-8.
24. Ather A. Effects of health education programme on teenagers with premenstrual syndrome. EPMA J. 2014;5(1):A158.
25. Ali FH, Al-Saffar FAA. Assessment Of Adolescent Student's Knowledge Toward Premenstrual Syndrome In Nursing Secondary Schools At Al-Diwanyia Governorate. J Kufa Nurs Sci.2014;4(1).

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