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Correlation of sleep quality with premenstrual syndrome among urban nulliparous women

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Abstract
Background: Premenstrual Syndrome (PMS) is a common condition affecting women of reproductive age and is characterized by a variety of physical, psychological, and behavioral symptoms occurring during the luteal phase of the menstrual cycle. Sleep disturbances are frequently reported among women with PMS and may contribute to reduced quality of life and daily functioning. This study aimed to determine the correlation between sleep quality and PMS among urban nulliparous women.
Methods: A cross-sectional correlational study was conducted among 124 urban nulliparous women aged 16–30 years in Ahmedabad, India. Participants were recruited through convenient sampling after obtaining informed consent. PMS severity was assessed using the Premenstrual Syndrome Scale (PMSS), while sleep quality was evaluated using the Pittsburgh Sleep Quality Index (PSQI). Data were analyzed using SPSS version 26. Descriptive statistics were calculated, and Spearman's correlation test was used to examine the relationship between PMS severity and sleep quality.
Results: The mean age of participants was 23.13 ± 2.78 years. The mean PMSS score was 113.66 ± 26.06, indicating moderate-to-severe PMS, while the mean PSQI score was 6.77 ± 2.58, reflecting poor sleep quality. Among participants, 46.0% reported moderate PMS symptoms, 40.3% severe symptoms, and 1.6% very severe symptoms. Poor sleep quality (PSQI > 5) was observed in 84.7% of women. Spearman's correlation analysis revealed a statistically significant positive correlation between PMSS and PSQI scores ($r = 0.201$, $p = 0.025$).
Conclusion: Urban nulliparous women with greater PMS severity tend to experience poorer sleep quality. Early identification and management of PMS may help improve sleep quality and overall well-being in this population.

Keywords: Premenstrual syndrome, sleep quality, pmss, nulliparous women

Introduction

Premenstrual symptoms may cause many problems like mental health, physical and severe functional disorders occurring in women's social lives and work lives. PMS occurs approximately 90% of women in childbearing age [1]. It's a significant public health problem in young girls. Previous studies reported that worldwide estimated prevalence of PMS changes between 5–76%.3 The reported prevalence estimates of PMS in India have ranged from 14.3% to 74.4% [2].

Sleep quality is an individual's self-satisfaction with all aspects of the sleep experience [3]. Hormonal fluctuations associated with menstruation disrupt sleep, causing insomnia, hypersomnia, fatigue, and difficulty concentrating all of which are heightened in women with PMS [4, 5]. Sleep is a rapidly reversible state of reduced responsiveness, motor activity, and metabolism. It is a phenomenon observed in all animals in some form; this universality suggests that the act of sleeping likely has some evolutionary relevance. Humans spend approximately one-third of their life, or about eight hours per night, sleeping. Normal sleep is essential for an individual's physical and mental wellbeing [6]. Sleep quality is defined as an individual's self-satisfaction with all aspects of the sleep experience [3]. Women have more disturbed sleep than men. Menstrual-related hormonal fluctuations may be responsible for this sleep disturbance [5]. Women with PMS frequently complain about poor sleep quality because PMS is one of the physiological disorders that may change the sleep quality by causing sleep problems such as insomnia, hypersomnia, exhaustion, fatigue, difficulty of concentration, and nightmares. Especially women with severe PMS have greater sleep problems [4].

Despite the clinical significance, few studies have examined these inter-relationships in Indian urban populations, forming the rationale for this study.

Need of the Study

There are more than 200 PMS symptoms women experiences during luteal phase. PMS is an important problem which decreases women's self-confidence, impairs physical, mental and social health, causes the labor loss, negatively affects the daily life, sleep quality, social activities, family relations, attitude, attendance on lessons and academic achievement and consequently decreases the quality of life [4].

The common sleep problems associated with PMS are sleep onset insomnia, frequent night time awakenings, and non-restoration of sleep. These sleep related problems also have daytime consequences in the form of poor concentration, daytime sleepiness, decreased alertness and poor performance at work [5].

The poor sleep quality during premenstrual phase related to menstrual hormonal fluctuations which effect the sleep

onset latency, bed time, sleep maintenance and wake time and negative attitude toward menstrual lead to more sever premenstrual syndrome [7].

Aims and Objectives

Objectives

- To find out the premenstrual syndrome among urban nulliparous women by using premenstrual syndrome scale (PMSS).
- To find out the sleep quality among urban nulliparous women by using Pittsburgh sleep quality index (PSQI).
- To find out the correlation between sleep quality (PSQI) with premenstrual syndrome (PMSS) among urban nulliparous women.

Hypotheses

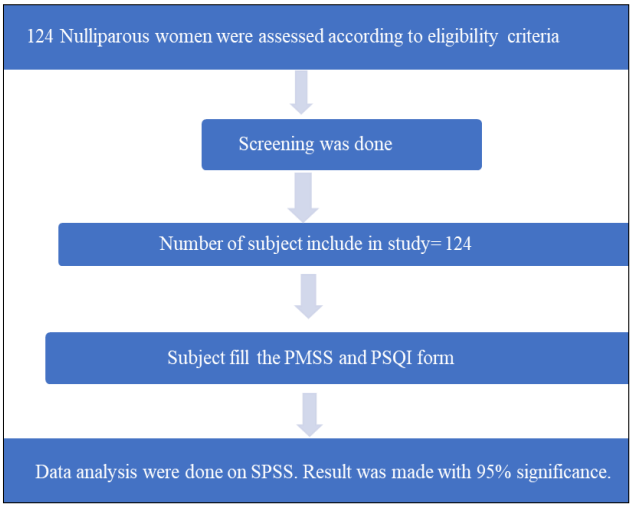
Null (H_0): No significant correlation of sleep quality with PMS among urban nulliparous women.

Alternative (H_1): Significant correlation exists between PMS and sleep quality.

Materials and Methods

1. Study Design, Setting & Ethics

After obtaining ethical approval from ethical committee. The subjects were evaluating according to the inclusion and exclusion criteria and total 124 nulliparous women selected for the study. Written consent form was taken from all the subjects and brief explanation of process was given. All subjects were filled PMSS (premenstrual syndrome scale) and PSQI (Pittsburgh sleep quality index) survey questionnaire. All the subject completed a questionnaire through paper-based format. The study was done in different offices, colleges and society of Ahmedabad. After collecting data analysis of study was done in SPSS.26. A correlation between 2 variables with PMSS done.



Flow chart of procedure

2. Sample Size & Sampling

n = 124 urban nulliparous women, calculated using n = 4×SD [2]/d [2] (d = 5%). Convenient sampling was used.

Inclusion

Age 16–30 years, urban, nulliparous, menarche at 12–18 years, willing to participate.

Exclusion

Irregular menses, sedative medication use, tobacco/alcohol consumption, anemia, severe medical/psychiatric illness, malignancy.

Statistical Analysis

The mean and standard deviation was used as Descriptive statistics to study and explain demographic data and variables. Microsoft office excel was used to tabulated the data. Statistical Package for Social Science (SPSS) version 26 was used to analyze the data by creating SPSS files first followed by data entry into these files. All quantitative data of this study not follow the normal distribution (p>0.05) Kolmogorov-Smirnov test used. Spearmen's correlation was used to analyze variables. Data collected was entered into an excel spreadsheet using coding system.

Results

Table 1: Socio-Demographic Profile

Characteristic	Category	N	%
Age	16–18 yrs	8	6.5%
	19–21 yrs	22	17.7%
	22–24 yrs	65	52.4%
	25–27 yrs	18	14.5%
	28–30 yrs	11	8.9%
Marital Status	Married	20	16.1%
	Unmarried	104	83.9%
Education	Student	40	32.3%
	Graduate	59	47.6%
	Post-Graduate	25	20.2%
Employment	Full-Time	44	35.5%
	Part-Time	23	18.5%
	Student	57	46.0%
Gynaec Condition	Normal	102	82.3%
	PCOD	5	4.0%
	PCOS	3	2.4%
	Irregular Menses	10	8.1%
	Fibroadenoma	4	3.2%

Socio-demographic characteristics of urban nulliparous women (N=124)

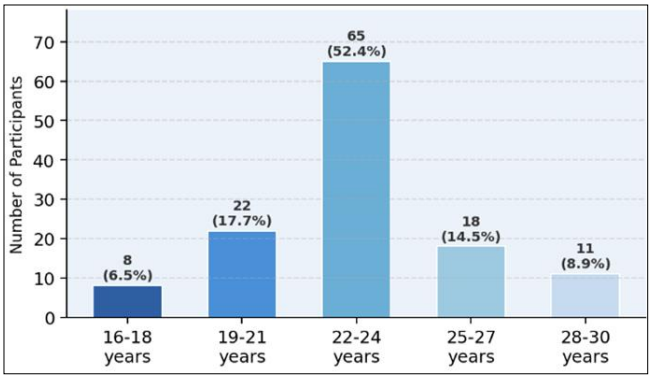


Fig 1: Age distribution of participants

The majority of participants were aged 22–24 years (52.4%), unmarried (83.9%), and had normal gynecological conditions (82.3%). employment status of urban nulliparous women 46% of women in study are students, 35% doing full-time job, 19% are doing part time job.

Table 2: Gynec condition

Gynec condition		
Normal	102	82.26%
Abnormal:		
PCOD	5	4.03%
PCOS	3	2.42%
Irregular Menses	10	8.06%
Fibroedenoma	4	3.23%

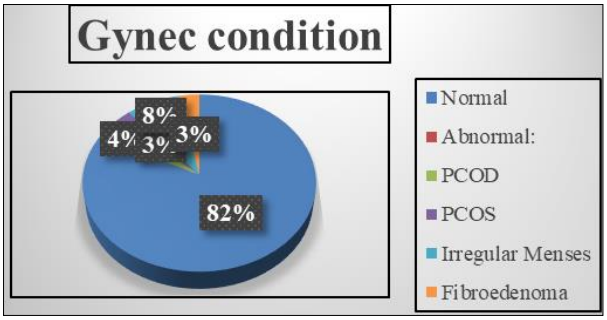


Fig 1.1: Gynec condition

Table 2 & figure 1.1 saws in 124 women 82% women not having any gynec condition, 8.06% women having irregular menses, 4.03% women having PCOD, 3.23% having fibroedenoma of breast, 2.42% having PCOS.

Table 3: Descriptive Statistics of Outcome Variables

Variable	Mean	SD	Min–Max	Interpretation
Age (years)	23.13	2.78	16–30	—
BMI (kg/m^2)	21.52	4.41	—	Normal range
PMSS Score	113.66	26.06	40–200	Moderate-to-severe PMS
PSQI Score	6.77	2.58	0–21	Poor sleep quality

Table 4: Outcome measurement tools

Scale	Items	Scoring	Interpretation
PMSS	40 items	1–5 Likert; Range 40–200	≥80 = PMS; higher = more severe
PSQI	19 items	Global score 0–21	>5 = Poor sleep quality

Table 5: PMSS score interpretation

PMSS Score	Interpretation
1–40	No symptoms
41–80	Mild symptoms
81–120	Moderate symptoms
121–160	Severe symptoms
161–200	Very severe symptoms

Table 6: Prevalence of PMS severity based on PMSS

PMS Level	N	%
No Symptoms	0	0%
Mild Symptoms	15	12.1%
Moderate Symptoms	57	46.0%
Severe Symptoms	50	40.3%
Very Severe Symptoms	2	1.6%

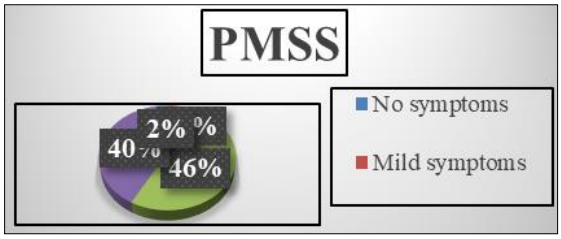


Fig 2: PMS symptom severity distribution

Table 6 and figure 2 saws prevalence of premenstrual syndrome among urban nulliparous women 46% having moderate symptoms, 40% having sever symptoms, 12% mild syndrome, 2% suffer from very severe symptoms. The mean PMSS score of 113.66 ± 26.06 indicates moderate-to-severe PMS. No participant was symptom-free; 46.0% had moderate and 40.3% had severe symptoms.

Prevalence of Sleep Quality

Table 7: Sleep quality distribution

PSQI Score	Interpretation	N	%
0–4	Good sleep quality	19	15.3%
5–21	Poor sleep quality	105	84.7%
Total	—	124	100%

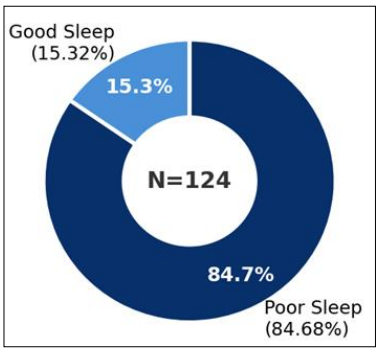
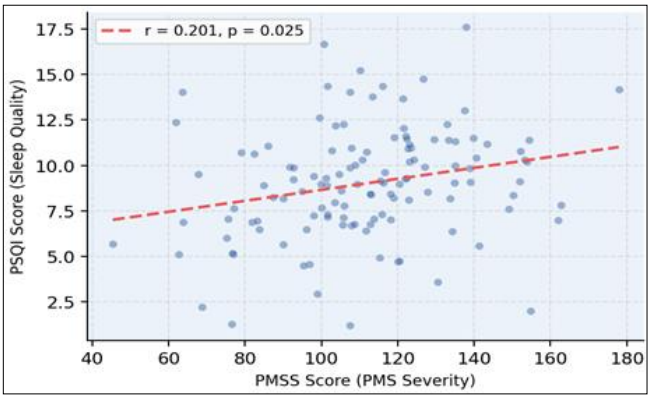


Fig 3: Sleep quality distribution (PSQI)

Table 7 and figure 3 in total 124 women only 19 (15%) women having good sleep quality and 105 (85%) women having poor sleep quality. 84.7% of participants demonstrated poor sleep quality (PSQI > 5). Mean PSQI score was 6.77 ± 2.58.

Correlation Analysis

Fig 4: Sleep quality



(PMSS) vs (PSQI); r = 0.201, p = 0.025

Fig 5: Correlation - PMS severity vs Sleep quality

Table 8: Spearman's correlation between PMS and outcome variables

Correlation Pair	Spearman r	p-value	N	Result
PMSS vs PSQI (Sleep Quality)	0.201	0.025	124	Significant ($p<0.05$) — H_1[2] accepted

Correlation between premenstrual syndrome and sleep quality was analyzed by spearman test as the data was not normally distributed, r =0.2 shows weak positive and statically significant (P<0.05) correlation. Thus, result of this study Accept Alternative hypothesis.

Discussion

This study, conducted in order to determine the relationship between the PMS symptoms and sleep quality among urban nulliparous women and It ended with 124 urban nulliparous women age group of 16-30 year and mean age was 23.13± 2.78. In total 124 participants were taken in organized sub group of different Age and Employment status. An observation from data analyzed was the outcome of PMSS with the amount of urban nulliparous women respondent who reported level of premenstrual syndrome being mild symptoms 12.10% (n=15), moderate symptoms 45.97%(n=57), severe symptoms 40.32% (n=50) and very severe 1.61% (n=2). The mean score of PMSS was 113.66±26.06. Which indicated most of the urban nulliparous women suffer from severe premenstrual syndrome.

Study done by Aleena Mohib, *et al*. 2018, found that A total of 448 female students participated in the study. The majority (96.4%) of female students were aware of PMS, while only 19% females knew about premenstrual dysphoric disorder. The self-reported prevalence of PMS was 79.5%. Common symptoms were irritability, angry outbursts, depression, breast tenderness, and gastrointestinal problems [8]. Which partially supports finding of our study. Younger women have more severe physical symptoms of premenstrual and education towards PMS can bring down the severity.

The study was found to be statistically significant (P<0.05) weak positive (r=0.2) correlation between Pre-Menstrual Syndrome and Sleep quality. The mean score of PSQI 6.77±2.58. Study done by Fiona C. Bakera, *et al*. 2008, Found that women having PMS Symptoms had decreased sleep [9]. That is relatable from findings from this study. In data set of study, women's facing higher PMS Symptoms had reduced sleep.

Another Study done by Habibolah KHAZAIE, *et al*. 2016, found Female university students who experience PMDD are deeply affected by sleep problems. Lower sleep quality, daytime dysfunction, and sleep disturbance are common sleep problems among female university students which highly support finding of our study. Women below age of 25yrs or Students have reported to face sleep problems during PMS [10].

Conclusion

Significant correlations presented in this study may be guiding in planning educational interventions aimed at coping with PMS symptoms, decreasing the complaints about poor sleep quality caused by PMS. Determining the methods of coping with PMS and strengthening the women on this subject may enhance their quality of future life

Limitations

- Small, population-specific convenient sample; findings may not generalize to rural or other populations.
- Cross-sectional design precludes causal inference.

Clinical Implications

- Yoga, relaxation techniques, and aerobic exercise as non-pharmacological PMS interventions.
- Patient education programs on PMS physiology to empower women and reduce symptom severity.

Acknowledgement

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