Innovations

Assessment of Premenstrual Syndrome Relationship with Physical Activity, Mental Status and Perceived Stress Among College Going Females -A Cross- Sectional Study

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Abstract

Background: *Premenstrual syndrome (PMS) is a cyclic phenomenon which is associated with behavioral, psychological and physical symptoms. It is caused by dysregulation of hypothalamic-pituitary axis (HPA axis) which leads to impaired mental status, high level of stress level among females. Physical activity is beneficial to improve PMS symptoms, so present study was conducted to find out the relationship of PMS with mental status, physical activity, stress level among college going females.* ***Method:*** *A cross-sectional study was conducted among college going females. Data was collected with online google form. Total 216 students age between 18-25 participated in the study. To assess physical activity, stress, mental state, and premenstrual symptoms, we employed standard questionnaires, including the International Physical Activity Questionnaire-Short Form (IPAQ-SF), the Perceived Stress Scale (PSS), the General Health Questionnaire-12 (GHQ-12), and the Premenstrual syndrome scale questionnaire.* ***Result*** *: Results shows that PMS is significantly correlated with stress level with p value of 0.030 and with mental status it is showing weak correlation with p value of 0.963. PMS is significantly correlated with physical activity with p value of 0.023.* ***Conclusion****- PMS is correlated with physical activity, stress level and mental status of college going females.*

Keywords: *Premenstrual syndrome, physical activity, mental health ,females ,college students ,cross sectional study.*

Introduction

Premenstrual syndrome (PMS) is a cyclic phenomenon, which is defined as "A constellation of mood behavioral, psychological and/or physical symptoms that have a regular relationship with the late luteal phase of menstrual cycle among females" [1,2] PMS usually starts 6 to 12 days before menstrual cycle[3] and WHO's international classification of disease classified PMS under the heading disease of genitourinary tract, which is associated with substantial distress and functional impairment among females.[3] The prevalence of PMS in India ranged from 14.3% to 74.4%.[4]

According to literature premenstrual syndrome is caused by stress induced dysregulation of the hypothalamic-pituitary axis (HPA axis).[5] Findings suggested that the pathogenic cause of PMS may involve the persistent changes of the HPA axis and increase release of cortisol hormone, which increase stress level and leads to PMS. And this dynamic responsiveness of the HPA axis is crucial for both physical and mental health .[6,7]

Stress is defined as a condition that trouble individual's physical or mental well-being.[8] Both academic and non-academic factors are responsible for stress among students.[9]A prospective study from 1990 identifies prolonged psychological stress in college going students leads to decrease in stress tolerance level of students [10] and affects their physical and mental health.[11,12] However, extreme levels of these stressor can affect student's learning capacity, memory retrieval, academic output as well as their daily life and also threaten their physical and psychological, emotional well-being.[13,14,15]

The hypothalamic-pituitary adrenal (HPA) axis is the brain's main circuit that integrates a perceived stressful event into a pattern of autonomic, neuroendocrine changes which needed to regain physiological balance.[16]When a stressful stimulus perceived by the senses that ultimately induces the release of corticotrophin releasing hormone (CRH) , CRH stimulates the release of adrenocorticotropic hormone (ACTH) from the anterior pituitary and initiates the liberation of glucocorticoids from the adrenal cortex.[17]. This dynamic responsiveness of the HPA axis is crucial for both physical and mental health .[17,18,19]This shows the bidirectional relationship between the stress and PMS.

According to a survey study conducted in 1998 in America, changes in diet and physical activity are important aspects for the management of PMS symptoms and stress.[20] Any types of physical activity (walking, swimming, and jugging), exercise or relaxation technique reduces the HPA-axis mechanism and decrease the stress levels and helps to treat PMS symptoms. According, to ACSM's guidelines and evidence, a minimum of 30 minutes of moderate intensity exercise can reduce the cortisol response to stress and improve the quality of life of a sedentary individual.[21,22,23,24,25]

Physical activity is beneficial to slower down the symptoms of PMS and stress. According to present evidence not known study is conducted to evaluate the complex relationship of PMS with physical activity, stress level and mental status among college going females in India. So, present study was conducted to find out PMS relationship with physical activity, stress level and mental status of college going females.

2. Materials and methods

2.1 Ethical clearance and consent

Ethical clearance was obtained from institutional ethical committee of NIMS University, Jaipur, Rajasthan. Data was collected from the students of NIMS University through the online google form. A prior written consent was taken from all the participants through the google form to participate in the study.

2.2Study design and sample size-

The cross-sectional study was conducted to evaluate the relationship of premenstrual syndrome with physical activity, mental status and perceived stress level among college going girls. Sample size was calculated with G power software with two tail and Power of 95.0% , 0.3 of effect size and 5% of error) and total sample size was 134. A non -probability, convenience sampling method was used to recruit the participants in the study.

2.3 Selection criteria

College going female students age between 18-25 year were included in the study. Students with medical co-morbidity such as PCOD, PCOS and married and pregnant students, females not menstruated for more than 3 months and age above 25 years were excluded from the study.

2.4 Data collection and analysis

Data was collected with the help of online Google form ™, using four questionnaires. Premenstrual syndrome scale questionnaire was used to evaluate the premenstrual symptoms, to evaluate mental status General health questionnaire (GHQ) was used, determine the level of perceived stress Perceived stress scale (PSS) was used and to find out the physical activity level International physical activity questionnaire-short form (IPAQ-SF) was used all the questionnaire were self -administrative. A prior description was given to all the participants after circulating the google form. All the voluntary students were part of the study. The consent form was taken from all the subjects through the same Google form and then data was collected.

2.5 Statically analysis

Categorical variables were presented by frequency and percentages and continuous variables by mean and standard deviation. All data was first entered into an excel sheet followed by SPSS 20. Data was analysed for all the participants by converting all the responses into numerical values by assigning values in SPSS 20 version. Normality test was done to evaluate the distribution of data. As shown in table -Table 2,3

Result

The google form was circulated among 400 students out of them 216 students filled the google form, 75 students were excluded from the study on the basis of inclusion and exclusion criteria and finally data was calculated for 141 participants. As the sample size was 134 but according to response of participants the data was calculated for 141 students.

Total 141 females age between 18-35 year participated in the study with the mean value of 20.41± 2.23375 participants were not eligible for the study as they were married,pregnant, suffering from pelvic disorder and had had irregular menstrual cycle. As shown in table 1-

The population who was suffering from PMS had different types of symptoms which was mild moderate and severe in nature. The GHQ-12 was used to evaluate the general health of participates and out of 141 participants 68 participants were distress and 73 were not distress. To find out the stress level among participants perceived stress scale was used and subjects were mild, moderately and highly stressed. To evaluate physical activity level among participants IPAQ was used and major number of participants were engaged in mild physical activity in comparison of moderate and high-level activity. As shown in table 1 and figure 1,2 –

Normality test

Normality test was done for data and it was found that data was not normally distributed according to Kolmogorov-Smirnov Test as the p value for the data was <0.05 so non-parametric test was done to evaluate the data. Table 2 and figure 3-

Correlation test

Spearman's rank correlation test was done to evaluate the correlation between the components and it was found that PMS and general health of participants is weakly correlated with each other with coefficient value of 0.004 and p value of 0.963 which is showing the weak positive correlation between the variable. The relation of PMS with stress level is also showing the weak positive correlation with the coefficient value of 0.183 and p value of 0.030 which is showing significant correlation. Lastly, the PMS is showing positive correlation with physical activity with p value of 0.023 . As shown in table 4-

Table 1-Demographic data

	Frequency	Mean ±SD
Age (18-25)	141	20.41± 2.233
Gender (Females)	141	1.00±0.000
Married	1	1.00±0.000
Pregnant	19	1.00±0.000
Suffering from pelvic disorder	30	1.00±0.000
Irregularity of menstrual cycle	25	1.00±0.000
Total	216	20.75±2.21

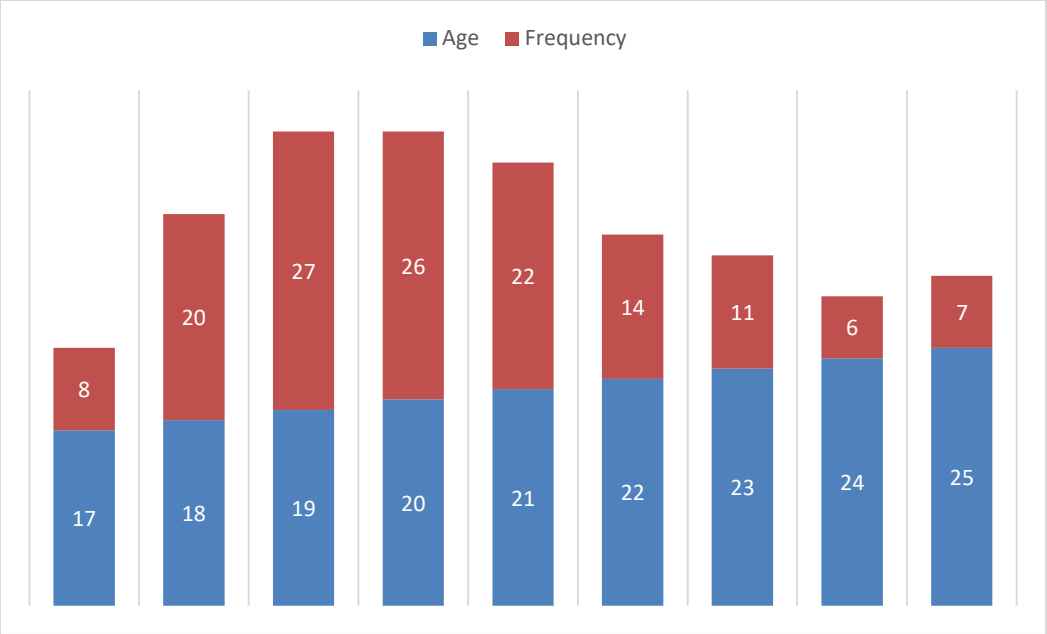

Figure 1 – Age distribution

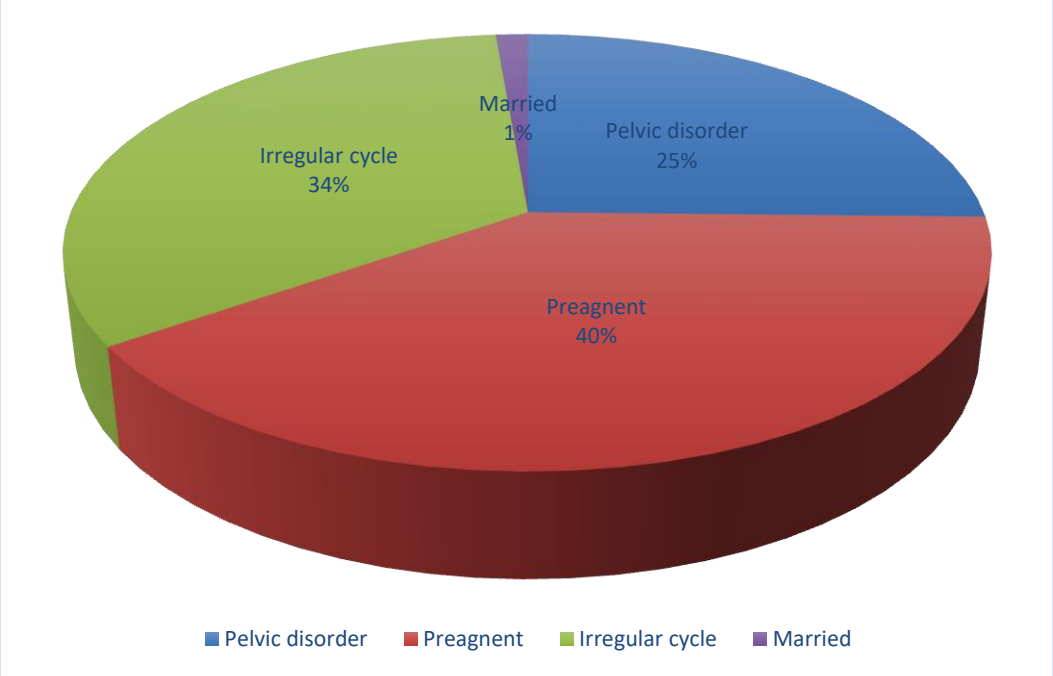

Figure 2 -Characteristic's of excluded population

Table 2- Characteristics of population

		Frequency	Mean ±SD
PMS	Mild	25	3.29±8.41
	Moderate	60	
	Severe	46	
	Very sever	10	
GHQ-12	Distress	68	1.52± 0.501
	Non- distress	73	
PSS	Low stress	12	2.01 ±0.423
	Moderate stress	116	
	High stress	13	
IPAQ	Mild	100	1.36±0.613
	Moderate	31	
	High intensity	10	
Total participants		141	

Table 3- Normality test

Kolmogorov-Smirnov Test			
	Statistic	df	p value
PMS	.238	141	0.00
GHQ-12	.350	141	0.00
PSS	.414	141	0.00
IPAQ	.432	141	0.00

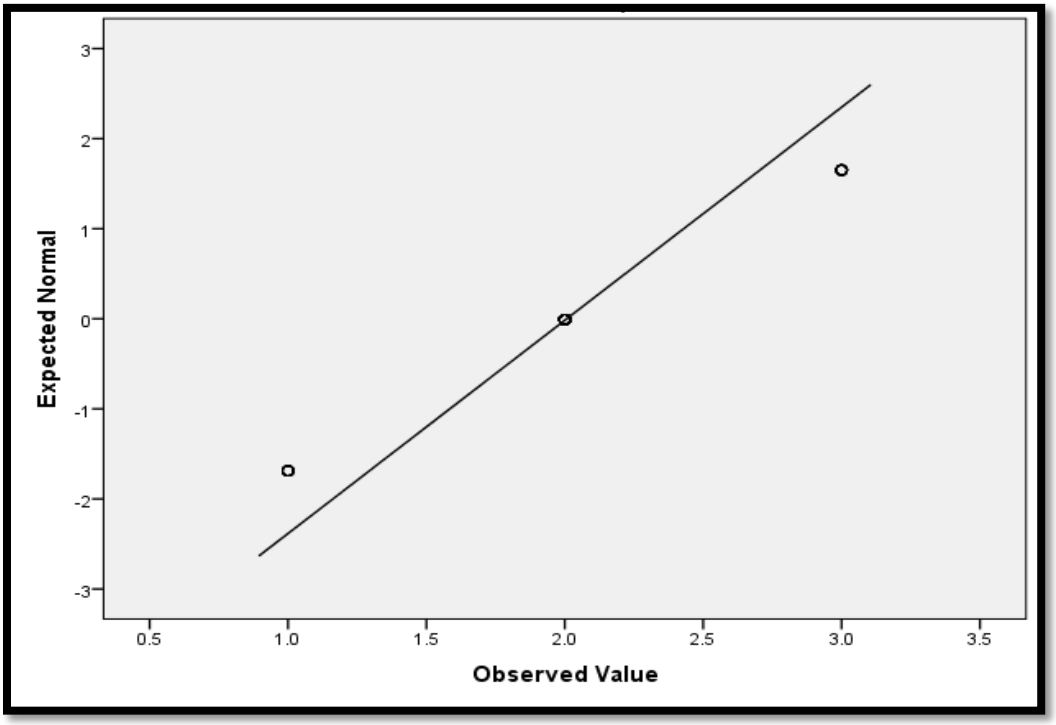

Figure 3 – Normality of data

Table 4-Correlation between variables

	Correlation coefficient	P- value
PMS with mental status	0.004	0.963
PMS with perceived stress level	0.183	0.030
PMS with physical activity	0.191	0.023

Discussion

The present study was conducted to evaluate the relationship of PMS with mental status, physical activity and perceived stress level among the female students of NIMS university, Jaipur, Rajasthan. And the results shows that PMS is correlated with physical activity, mental status and perceives stress level.

PMS and physical activity

In present study physical activity and PMS both are weakly correlated with each other with the p value of 0.023. Women's who were engaged in physical activity had mild to moderate PMS symptoms even the females who were engaged in high intensity physical activity had the PMS symptoms. The finding of present study is similar to a study conducted by Desrosiers et al 2017 [26] and findings suggest that subjects who were physically active they had some PMS symptoms and physical activity is not only the management for PMS pharmacological management is required to manage PMS symptoms.

Previously conducted study[20] conclude that 3 months of physical activity can improve the PMS symptoms but present study findings are contradictory to a study conducted by Zhuo Chen et al [27] according to study findings the females who were engaged in physical activity had less PMS symptoms in comparison to subjects who were not engaged in physical activity it can be interpretated in a way that exercise can help to reduce the PMS symptoms at some extent but exercise can't be a only management for the PMS symptoms.

According to evidence physical activity performed 2-3 days in a week or more is effective to reduce the PMS symptoms on the other hand while performing aerobic exercise or sports there will be increase in the beta endorphin level during the luteal phase and this will increase pain-tolerance in the individuals and it can be said that the physical symptoms are improved. According to evidence and present study findings physical activity can help to reduce PMS symptoms but not in all the conditions mild to moderate symptomatic management can be done.

PMS and stress level

According to present study finding PMS and stress level among the participants is significantly correlated with p value of 0.030 but the correlation is weak in nature. As the participants who had PMS symptoms had moderate level of stress out of 141 participants 116 participants had moderate stress, this is showing correlation between PMS and stress level.

Present study finding is similar to study which is conducted by Eman Alshdaifat 2022 [28] females' students are more prone to develop stress and PMS symptoms and it is hypothesised that the cause of premenstrual symptoms is due to abnormal function of the hypothalamus-pituitary adrenalaxis, aberrant hormonal fluctuations, dietary factors, and other lifestyle factors.Neuroendocrine fluctuations in these hormone levels can cause mood swings, anxiety, irritability and stress. Study findings shows that PMS is moderately correlated with stress level of female participants. High level of stress and PMS directly having impact on academic performance of students. Another study conducted by Mitchel Kappen et al. 2022 [29] showing that Participants with increased premenstrual syndrome (PMS) symptoms scored were prone to have stress, rumination, anxiety, and depressive symptoms. This study found that the more severe PMS symptoms are, the higher the scores on trait measures of anxiety, depressive symptoms, stress, and rumination as well as momentary stress and stress-related perseverative thinking. Findings of both study is associated with present study but in present study academic status of participants were not consider as the primary goal of study to find out PMS relationship with stress with females.

PMS and mental status

In present study PMS is correlated with general health status of female's participants but the correlation is weak and significant. As the result of PMS participants were suffering with associated physical and psychological symptoms and their symptoms are significantly affecting the general health status of participants. In present study 68 participants were distressed out of 141 participants. Findings is similar to a study conducted by panelSüreyya Gümüşsoy et al. in 2021[30] among Adolescents population, study findings shows that subjects who are suffering from PMS are more prone to have mental disturbance and impaired mental health. As the PMS stress level and mental status all are interrelated with each other.

Limitation and future recommendation

IPAQ scale was used to evaluate physical activity status as the outcome measure is not providing the accurate range of physical activity of participants. Further study can be done with other outcome measure to get more accurate results for physical activity

Conclusion

Present study concludes that PMS, physical activity, mental status and stress level are correlated with each other. PMS affect the HPA axis functioning which leads to impaired mental status and increase the stress level of participants.

Acknowledgement

The lead researcher would like to acknowledge the participants of study and the coauthors of study for the support through out the study. Special acknowledgement to NIMS university and management for constant motivation to complete this project.

Conflict of interest: Author is not having any conflict for the study.

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