

Exploring the Interplay of Stress, Pain Efficacy and Socio-Economic Status in Menstruating Women

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Abstract: *This study examined the relationship between perceived stress, pain efficacy, and menstrual regularity among menstruating females in India, with attention to psychosocial and socioeconomic influences shaping menstrual health. Using a quantitative correlational design, data from 108 participants were analyzed through Pearson correlation, point-biserial correlation, and t-tests to explore associations among stress levels, confidence in pain management, menstrual regularity, and income groups. Results showed a significant negative relationship between perceived stress and pain efficacy, indicating reduced pain coping confidence at higher stress levels. Menstrual regularity showed a weak negative association with stress, while income-based differences revealed higher stress and greater menstrual irregularity among lower income participants. The findings also point to broader structural influences, including social restrictions, health inequalities, and access-related barriers, as factors shaping menstrual experiences. The study contributes to ongoing discussions linking menstrual well-being with mental health and socioeconomic conditions, while highlighting the need for integrated support strategies in education and public health settings. Despite limitations related to self-reported data and cross-sectional design, the study offers useful evidence for strengthening menstrual health awareness and psychosocial interventions among adolescent and adult females.*

Keywords: Menstrual health, Perceived stress, Pain efficacy, Menstrual irregularity, Adolescent wellbeing

1. Research background

Menstrual health is a crucial aspect of the overall well-being of adolescent girls, and its impact extends beyond just the physical realm to encompass various psychosocial dimensions. In India, where cultural norms and societal expectations often intersect with the experiences of teenagers, understanding the relationship between menstrual regularity and perceived stress becomes particularly pertinent. Menstrual irregularities can be a common occurrence during adolescence, with potential implications for both physical health and psychological well-being.

In India, social taboos about menstruation limit girls' and women's lives, including restrictions on eating, cooking, visiting places of worship, participating in social events, and sleeping arrangements on menstruation days. In Maharashtra, a study by researchers at the Tata Institute of Social Sciences, Mumbai, found that the practice of segregating menstruating girls and women to 'kurmaghars', or "period huts", with no sanitation and other basic facilities poses a significant barrier to conducive sexual and reproductive health outcomes among females.

In the Maya Health Survey published by The Economic Times in 2017, it was reported that 50% of women in India have irregular menstrual cycles. (add more)

Understanding how menstrual regularity relates to perceived stress among teenagers can provide valuable insights into the holistic well-being of this demographic.

2. Literature Review

Maurya et al., (2022) examined the prevalence of self-reported menstrual irregularities during adolescence and explored the association of depressive symptoms with self-reported menstrual irregularities in adolescents in two major states of Uttar Pradesh and Bihar in India. A proportion of 11.22% of adolescent girls reported menstrual irregularity and 11.40% of the participants had mild depressive symptoms. Adolescent girls with mild, moderate and severe depressive symptoms were more likely to have menstrual irregularity as compared to those who had minimal depressive symptoms.

Taneja et al. (2022) found prevalence of irregular menstrual cycle in a sample of 508 girls to be 29.1%. Further analysis revealed that a significant percentage of girls with irregular menstrual cycle suffer from depression (14.9%) and are often staying stressed (40.5%) in comparison to the girls having regular menstrual cycle.

A school-based case-control study was carried out in urban India from May to December 2019 (Jha et al., 2020). Urban locality and schools were randomly selected, and data were collected in two phases. Adolescent girls in the age group of 10-19 years studying in government and private schools of urban India were screened for the abnormal menstrual pattern.

Findings revealed more stress, improper sleep levels, and low education status of mothers among school-going adolescent girls were strongly associated with abnormal menstrual patterns with more symptoms during menstruation.

Research Hypotheses/Questions

Hypothesis A: Perceived stress will be significantly related to regularity of menstrual cycles.

Hypothesis B: Pain Efficacy will be significantly related to Perceived Stress

Relevance of the study:

The study's findings may have implications for policy development related to menstrual hygiene and mental health support in educational institutions. Policymakers can use this information to design programs that create supportive environments for adolescent girls, addressing both the biological and psychosocial aspects of their development.

By understanding the factors contributing to irregular periods, the study can contribute to empowering teenage girls to manage their mental and menstrual health effectively.

Research Design

The study employed a quantitative correlational design to investigate the relationship between pain efficacy, perceived stress levels, and menstrual regularity among females in India.

Participants

The sample comprised females residing in India, recruited through both offline and online channels. Participants were menstruating females of all ages. A total of 108 females volunteered to participate in the study.

3. Data Collection

Participants were asked to complete a questionnaire consisting of three sections:

- 1) The Pain Self-Efficacy Questionnaire (PSEQ), a 10-item instrument assessing individuals' confidence in performing activities while experiencing pain.
- 2) The Perceived Stress Scale (PSS), a 10-item questionnaire measuring feelings and thoughts related to stress experienced during the last month.
- 3) Questions regarding menstrual regularity, distinguishing between regular and irregular periods.

Data collection took place between February and March 2024. Questionnaires were distributed to participants, both physically and electronically, and responses were collected.

4. Data Analysis

Statistical analyses were conducted using Jamovi software. The following analyses were performed:

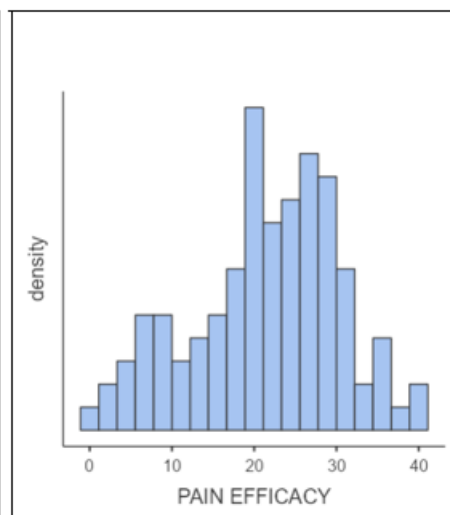
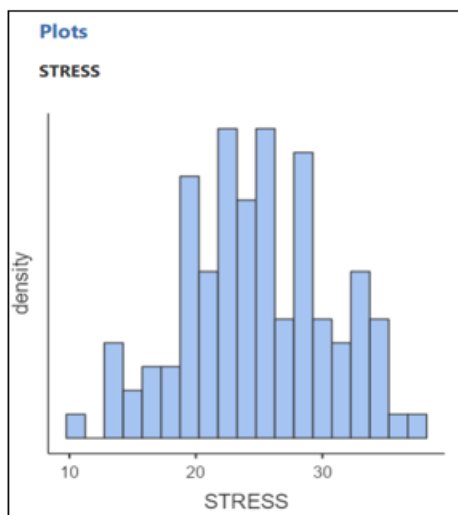
- 1) Pearson's correlation coefficient (r) was computed to examine the relationship between pain efficacy and perceived stress levels.
- 2) Point-biserial correlation was calculated to investigate the association between menstrual regularity (a binary variable) and perceived stress levels (a continuous variable).
- 3) T-tests were utilized to identify differences in means between participants grouped by income level.

Ethical Considerations: Ethical considerations were adhered to throughout the study. Participants provided informed consent before participating, and confidentiality of responses was ensured.

5. Results & Analysis

The normality of the data was checked. The data for both Pain Efficacy and Perceived Stress was found to be normally distributed as shown in the figures.

Results Descriptives		
Descriptives		
	STRESS	PAIN EFFICACY
N	107	107
Mean	24.8	21.5
Standard deviation	5.69	9.05
Shapiro-Wilk W	0.987	0.978
Shapiro-Wilk p	0.396	0.071

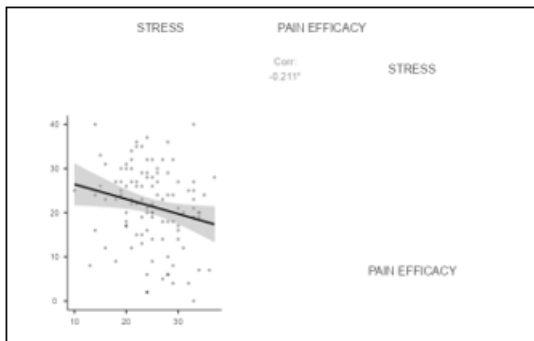


Correlation Matrix

Correlation Matrix

		STRESS	PAIN EFFICACY
STRESS	Pearson's r	—	
	p-value	—	
PAIN EFFICACY	Pearson's r	-0.211 *	—
	p-value	0.029	—

Note. * p < .05, ** p < .01, *** p < .001



There was a significant negative correlation between perceived stress and pain efficacy, with a Pearson's r of -0.211 and a p-value of 0.029. This indicates that as stress levels increase, pain efficacy tends to decrease. The negative correlation suggests that higher stress levels are associated with lower pain efficacy. The significance of the correlation is indicated by the p-value being less than 0.05.

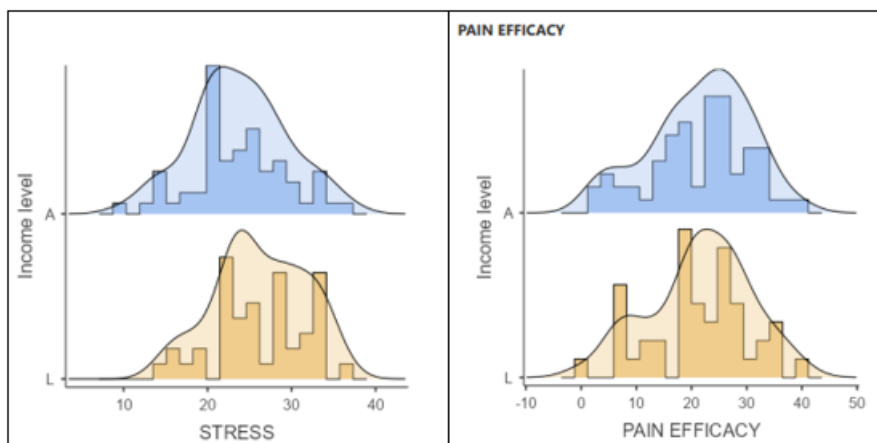
Further analysis was conducted between the Above average (A) and Below Average (L) Income levels. For A, the mean stress level was 23.7 (SD = 5.72), indicating a moderate level

of stress among the participants. The mean Pain Efficacy score in A was 21.5 (SD = 9.03), **suggesting a moderate level of perceived pain management efficacy within this group.** On the other hand, in L, the mean stress level was higher at 26.3 (SD = 5.38), **indicating a slightly elevated level of stress compared to group A.** The mean pain efficacy score in group L was the same as in group A at 21.5 (SD = 9.18), suggesting a similar perception of pain management efficacy between the two sub-groups. These findings highlight potential differences in stress levels between higher and lower income levels, with those falling under low- income bracket showing slightly higher stress levels on average.

Descriptives

Descriptives

	Income level	STRESS	PAIN EFFICACY
N	A	63	63
	L	44	44
Missing	A	0	0
	L	0	0
Mean	A	23.7	21.5
	L	26.3	21.5
Median	A	24.0	23.0
	L	25.0	22.0
Standard deviation	A	5.72	9.03
	L	5.38	9.18
Minimum	A	10.0	2.00
	L	15.0	0.00
Maximum	A	37.0	40.0
	L	36.0	40.0



Independent Samples T-Test

Independent Samples T-Test

		Statistic	df	p
STRESS	Student's t	-2.3123	105	0.023
PAIN EFFICACY	Student's t	-0.0133	105	0.989
regularity	Student's t	2.4330 *	105	0.017

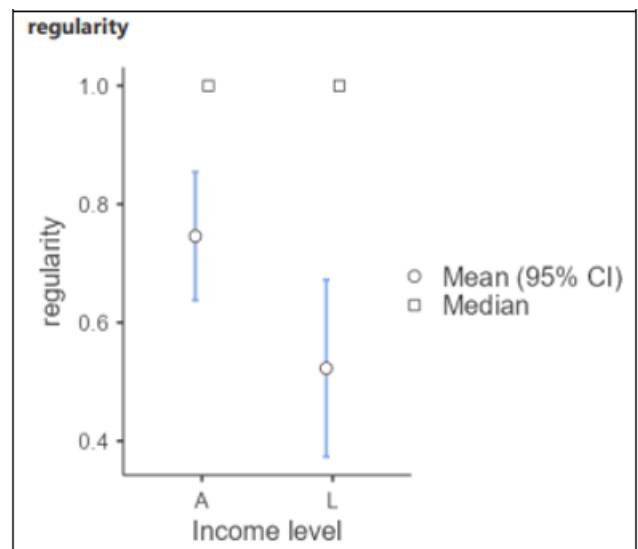
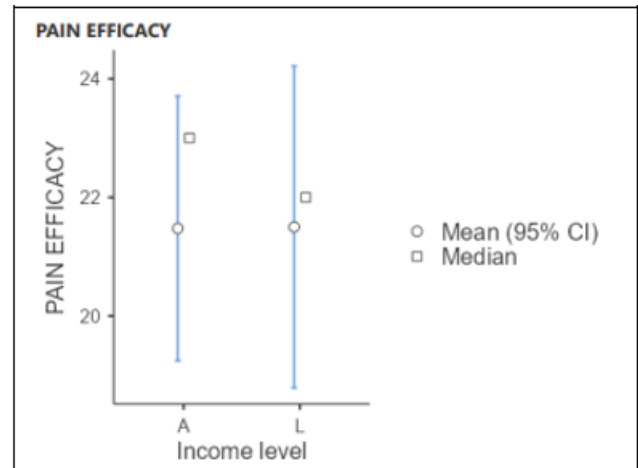
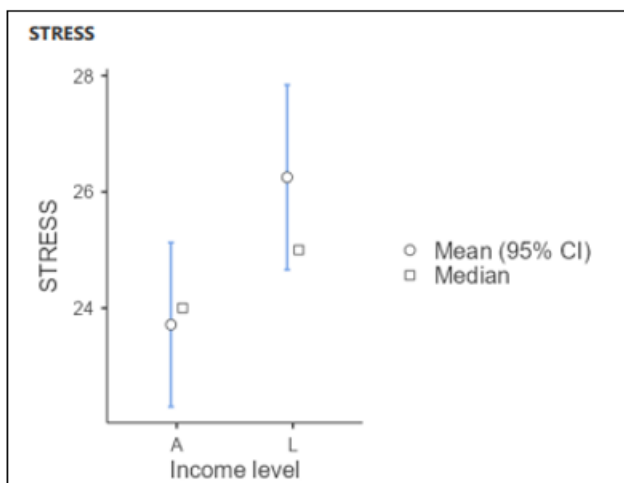
Note. H₀: μ_A = μ_L

* Levene's test is significant (p < .05), suggesting a violation of the assumption of equal variances

In the study, the independent t-test results showed that there was a significant difference in regularity between groups A and L ($t = 2.4330, p = 0.017$), suggesting that the regularity patterns differed between the two groups. The plot diagram for regularity shows that most higher income level individuals reported regular periods and it is mostly the lower income level individuals who reported irregular periods.

There is also a significant difference in perceived stress ($t = -2.3123, p = 0.023$) between the two groups. The plot diagram shows higher stress levels were perceived by the group L. However, there was found to be no significant difference on pain efficacy ($t = -0.0133, p = 0.989$) between groups A and L.

Furthermore, the significant difference in regularity between groups A and L could indicate that there are underlying factors or characteristics specific to each group that influence their regularity behaviors. This finding highlights the importance of considering group differences when analyzing regularity and suggests that interventions or strategies targeting regularity may need to be tailored to the specific characteristics of each group.



Point Biserial Correlation

Since one scale used was continuous (Stress) and the other binary (regularity), Point Biserial Correlation was used. Regularity of periods was scored 1 and irregularity 0. Based on the following descriptives, the value of Point Biserial was computed using the

The point-biserial correlation coefficient, r_{pb} , is calculated using the following formula:

$$r_{pb} = \frac{M_1 - M_0}{\sigma} \sqrt{\frac{n_1 n_0}{n(n-1)}}$$

Where

- M_1 is the mean of the continuous variable for the group with the binary variable being 1.
- M_0 is the mean of the continuous variable for the group with the binary variable being 0.
- σ is the standard deviation of the continuous variable.
- n_1 is the number of observations in the group with the binary variable being 1.
- n_0 is the number of observations in the group with the binary variable being 0.
- n is the total number of observations.

Plugging the values

M1= 24.51
 M0= 25.21
 n1= 70
 n0=37
 n=107
 S.D=5.69

$$r_{pb} = \frac{M_1 - M_0}{\sigma} \sqrt{\frac{n_1 n_0}{n(n-1)}}$$

$$r_{pb} = \frac{24.51 - 25.21}{5.69} \sqrt{\frac{70 \times 37}{107 \times (107 - 1)}}$$

$$r_{pb} = \frac{-0.70}{5.69} \sqrt{\frac{2590}{11249}}$$

$$r_{pb} = -0.1236 \times 0.6009$$

$$r_{pb} = -0.0744$$

The absolute value of the coefficient indicates the strength of the association. The closer the absolute value of r_{pb} is to 1, the stronger the association between the continuous variable and the binary variable.

Values close to 0 indicate a weak association, while values closer to ± 1 indicate a stronger association.

Since the point-biserial correlation coefficient is negative, it indicates a negative association between the stress and regularity of periods. However, the magnitude of the correlation is relatively small, suggesting a weak association.

Interpretation and discussion

The analysis revealed a significant negative correlation between perceived stress and pain efficacy ($r = -0.211$, $p = 0.029$). This indicates that as stress levels increase, perceived ability to manage pain decreases. This finding is consistent with prior research like in a study, students who reported higher levels of self-efficacy had lower levels of perceived stress (Coffman and Gilligan, 2002). This suggests that interventions targeting stress reduction may positively impact pain management outcomes.

The study observed a significant difference in stress levels between high and low-income groups ($t = -2.3123$, $p = 0.023$), with lower income individuals experiencing slightly higher stress levels on average. This aligns with existing literature highlighting the impact of socioeconomic factors on stress. For instance, research by Santiago et al (2011) demonstrated that individuals from lower socioeconomic backgrounds often face more stressors related to poverty, disadvantaged neighbourhoods, financial strain, job insecurity, and limited access to resources, all of which contribute to higher perceived stress levels.

Association between Income Level and Menstrual Regularity:

The independent t-test revealed a significant difference in menstrual regularity between high and low-income groups ($t = 2.4330$, $p = 0.017$), with higher income individuals reporting more regular periods. This finding is supported by previous studies. For instance, research by Brown et al. (2019) found that socioeconomic status was associated with menstrual regularity, with individuals from higher income households demonstrating more consistent menstrual patterns. This suggests that socioeconomic disparities may play a role in menstrual health outcomes.

This is because, it has been widely accepted that irregular menstruation in young adolescents is partially caused by an inadequate nutritional state indicating that BMI is an important factor affecting menstrual regularities. The chance of likely to have irregular menstrual cycle is more with the girls having higher BMI, longer cycle length and mothers' higher educational status (Samanta et al., 2019)

Weak Association between Stress and Menstrual Regularity:

The Point Biserial Correlation analysis indicated a weak negative association between perceived stress and menstrual regularity ($r_{pb} = -0.127$). Thus, it indicates that those with irregular periods experience high perceived stress and those with regular periods have low levels of perceived stress. This corroborates with other studies like Nagma et al., 2015 and Rafique & AlSheikh., 2018 that underlines the role of stress in determining period regularity.

6. Limitations

Potential limitations of the study include the reliance on self-reported data, which may be subject to bias or inaccuracies. Additionally, the cross-sectional nature of the study design limits the ability to establish causality between variables.