



Knowledge of psychosocial problems related to menstrual abnormalities before and after a planned teaching program among adolescent girls in Bengaluru, India: A one-group pretest–posttest study

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Abstract

Background: Menstrual problems during adolescence may affect emotional well-being, social participation, and school functioning. This study assessed short-term change in knowledge of psychosocial problems related to menstrual abnormalities after a planned school-based teaching program.

Materials and Methods: A pre-experimental one-group pretest–posttest study was conducted among 60 adolescent girls selected by purposive sampling from an English-medium high school in Bengaluru, India, during May 1–28, 2024. Knowledge was assessed with a structured 30-item questionnaire. The investigator delivered a 60-minute lecture-cum-discussion session each day for seven consecutive days. The posttest was administered on day 7. Paired score change was analyzed using a paired t-test with a 95% confidence interval (CI) and Cohen's *dz*. Secondary demographic associations were examined using exact tests.

Results: Mean knowledge score increased from 13.45 (SD 4.28) at pretest to 24.20 (SD 2.31) at posttest. The mean paired increase was 10.75 points (95% CI 9.64–11.86), $t(59) = 19.40$, $p < 0.001$, with Cohen's $dz = 2.50$. At posttest, 44 participants (73.3%) had adequate knowledge, compared with none at baseline.

Conclusions: Knowledge was substantially higher at the end of the seven-day teaching program. Because there was no comparison group and follow-up were short, the findings indicate a short-term pre–post association rather than a causal effect. Controlled studies with longer follow-up are needed.

Keywords: Adolescent, health education, menstruation, psychosocial factors

Introduction

Menstrual health includes physical, mental, and social well-being in relation to the menstrual cycle. [□] Adolescents may experience menstrual symptoms, stigma, restrictions, school difficulties, and uncertainty about normal menstruation, while limited access to reliable information can delay help-seeking. [□] Bengaluru-based studies have documented gaps in menstrual awareness, care-seeking, and hygiene practices. [□] Educational interventions can improve menstrual-health knowledge, particularly when they include interactive discussion. [□] However, school-based teaching often emphasizes hygiene rather than psychosocial concerns. This study assessed short-term change in knowledge of psychosocial problems related to menstrual abnormalities after a planned school-based teaching program among adolescent girls in Bengaluru, India.

Materials and Methods

1. Study Design and Setting

An evaluative research approach with a pre-experimental one-group pretest–posttest design was used. The main study was conducted from May 1 to May 28, 2024, in an English-medium high school in Bengaluru, Karnataka, India. The study formed part of an approved Master's research protocol. The planned teaching program was the educational intervention evaluated in this study, and knowledge regarding psychosocial problems related to menstrual abnormalities was the primary outcome measured before and after the intervention.

2. Conceptual Framework

The study was conceptually informed by the nursing-research framework described by Polit and Hungler. The framework was used to identify and organize the principal study variables: the planned teaching program as the independent variable and knowledge regarding psychosocial problems related to menstrual abnormalities as the dependent variable. It also provided the organizational basis for the pretest–intervention–posttest sequence used in the study. The framework was used to structure the investigation rather than to imply a specific causal mechanism for knowledge change.

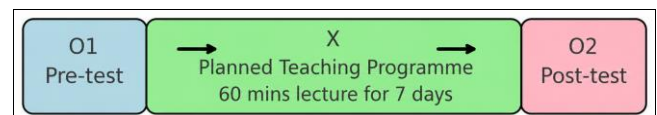


Fig 1: Study workflow: O1, pretest; X, planned teaching program (60 minutes daily for seven days); O2, posttest on day 7. Source: Author-created study workflow

3. Participants and Sampling

The target population comprised adolescent girls studying at the participating school. A total of 60 girls were selected by non-probability purposive sampling. A sample of 60 participants was prespecified in the Master's research protocol.

Participants were eligible if they were willing to participate, available during data collection, and able to understand the questionnaire and study instructions. Exclusion criteria were unwillingness to participate, previous participation in a

similar structured teaching module, a medical emergency, or absence during data-collection days. A separate demographic item recorded prior menstrual-health information obtained from books, parents, or other home sources; this was not considered previous exposure to the structured intervention.

4. Data Collection Tool

Data were collected using a structured questionnaire developed after literature review, expert consultation, and pilot testing. Part I contained five demographic items. Part II contained 30 multiple-choice knowledge items covering menstruation, menstrual hygiene, menstrual abnormalities, psychosocial problems, coping strategies, and health education and awareness. Correct responses were scored 1 and incorrect responses 0, producing a total score of 0–30. For descriptive reporting, knowledge was categorized as inadequate (<50% of the maximum score), moderate (50%–75%), or adequate (>75%).

The questionnaire was administered in English, the principal medium of instruction at the school. Instructions and item meanings were explained verbally in Kannada when needed. Seven experts from nursing, medicine, and statistics reviewed the questionnaire and teaching program for content validity. Split-half reliability, corrected using the Spearman–Brown formula, was 0.82. A one-week pilot study at a separate school in Bengaluru assessed feasibility and practicability.

5. Teaching Program and Study Procedure

The investigator delivered the program face-to-face in the school setting as a 60-minute lecture-cum-discussion session each day for seven consecutive days. Teaching aids included charts, flashcards, and flip charts. Content covered menstrual physiology, menstrual health and hygiene, common menstrual abnormalities, associated psychosocial problems, coping strategies, appropriate help-seeking, and health education. The pretest was completed before the first teaching session, and the same questionnaire was administered as the posttest on day 7 after completion of the planned teaching period.

6. Statistical Analysis

Categorical variables were summarized using frequencies and percentages; total knowledge scores were summarized using means and standard deviations. The primary analysis examined the change in each participant's total knowledge score from pretest to posttest. Normality of the difference

scores was assessed using the Shapiro–Wilk test. Mean change was evaluated using a paired t-test and reported with a 95% CI and Cohen's d_z .

Associations between baseline knowledge category and selected demographic variables were secondary exploratory analyses. Fisher's exact test was used for 2×2 tables, and the Fisher–Freeman–Halton exact test was used for larger contingency tables because of sparse cells. Cramer's V was reported descriptively. No multiplicity adjustment was made because these analyses were exploratory. Data were entered and summarized in Microsoft Excel (Microsoft Corporation, Redmond, WA, USA). The inferential analyses reported in the revised manuscript were independently verified using Python 3.13 with SciPy 1.17.

7. Reporting

The manuscript was prepared with reference to the Transparent Reporting of Evaluations with Nonrandomized Designs (TREND) statement.^[1] Description of the intervention was informed by the Template for Intervention Description and Replication (TIDieR) checklist.^[1]

8. Ethical Considerations

The study received ethical approval from the Institutional Ethical Committee of the Little Flower Group of Institutions / Little Flower College of Nursing, Bengaluru, India; Ref. No. LFCON/IEC/MS/06; April 12, 2024^[11]. Permission was also obtained from the participating school.

Written consent was obtained directly from participants using the approved study form. Under the approved protocol, separate parental or guardian consent for participants younger than 18 years was waived by the Institutional Ethical Committee. Confidentiality and anonymity were maintained throughout the study.

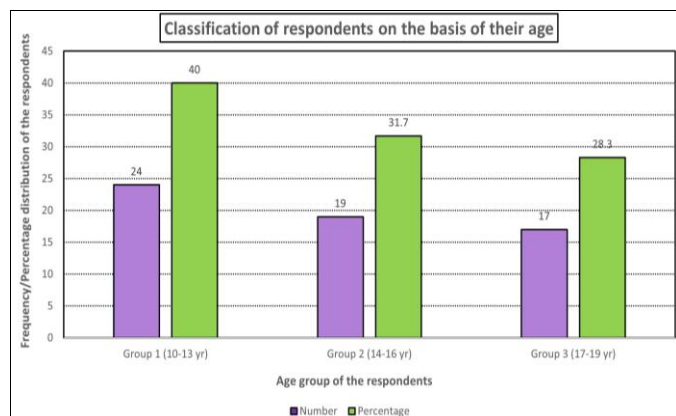
Results

Complete pretest and posttest data were available for all 60 participants.

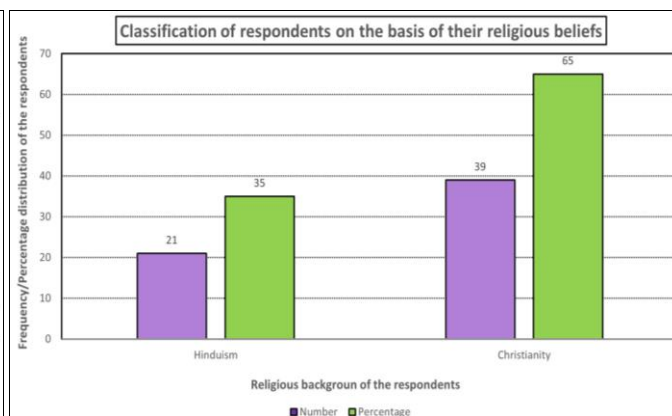
1. Participant Characteristics

The sample included girls from Grades 8–11. Half of the participants were in Grade 9, and 26 (43.3%) reported prior menstrual-health information from books, parents, or home sources. Figure 2 provides the full demographic distribution.

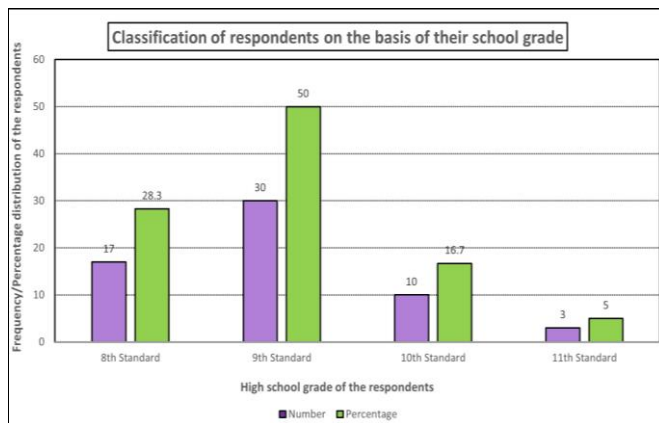
(a) Age group	(b) Religion
(c) School grade	(d) Parents' education
(e) Prior information exposure	



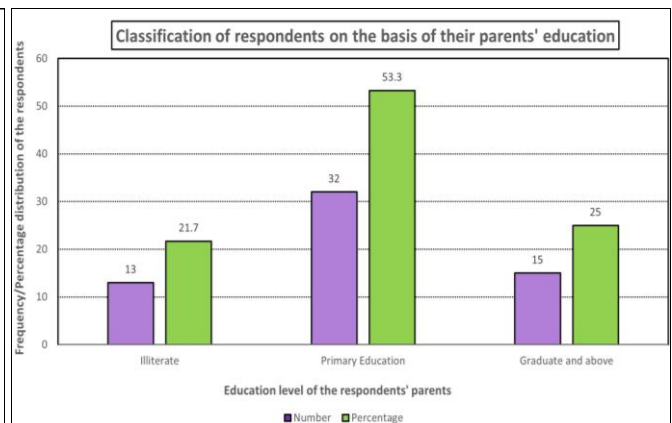
(a) Age group



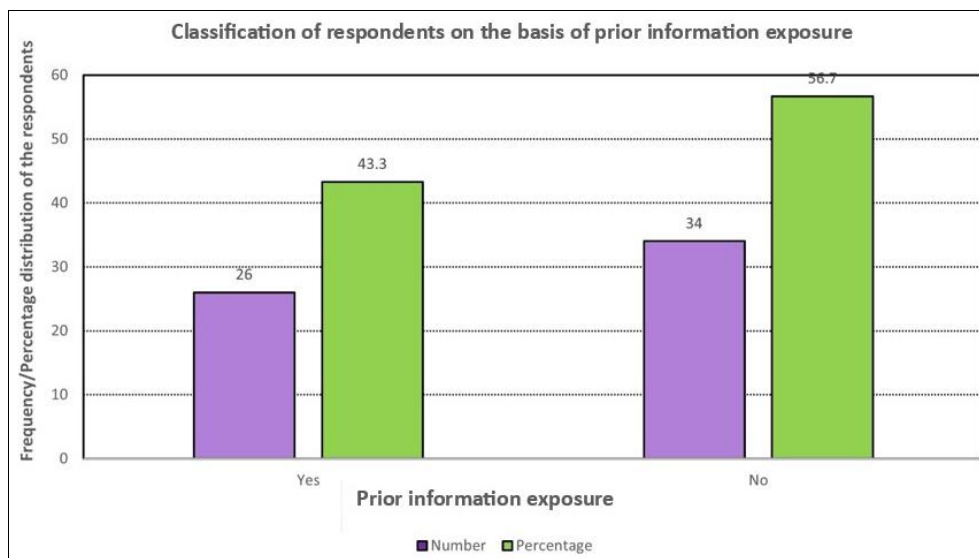
(b) Religion



(c) School grade



(d) Parents' education



(e) Prior information exposure

Fig 2: Demographic characteristics of the 60 participants. (a) Age group; (b) Religion; (c) School grade; (d) Parents' education; (e) Prior information exposure. Source: Original study data.

2. Knowledge Before and After the Program

At baseline, 38 participants (63.3%) had inadequate knowledge and none had adequate knowledge (Figure 3). At

posttest, 44 (73.3%) had adequate knowledge and none remained in the inadequate category (Figure 4).

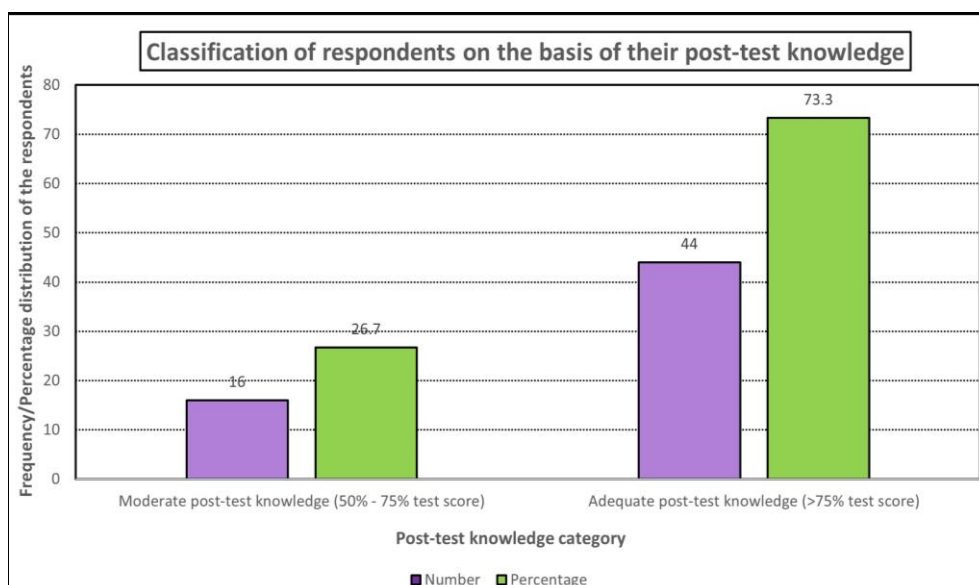


Fig 3: Pretest knowledge categories regarding psychosocial problems related to menstrual abnormalities. Source: Original study data.

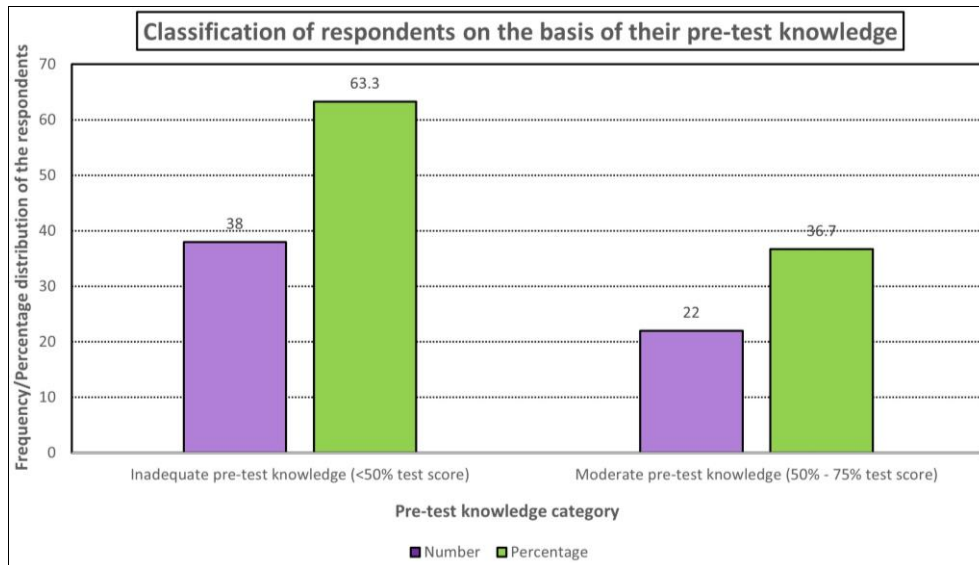


Fig 4: Posttest knowledge categories regarding psychosocial problems related to menstrual abnormalities. Source: Original study data.

Mean knowledge score increased from 13.45 (SD 4.28) to 24.20 (SD 2.31). The mean paired increase was 10.75 points (95% CI 9.64–11.86). Difference scores were compatible

with normality (Shapiro–Wilk $W=0.969$, $p=0.126$). The paired comparison was statistically significant, $t(59)=19.40$, $p<0.001$, with Cohen's $d_z=2.50$ (Table 1).

Table 1: Paired comparison of total knowledge scores

Measure	Pretest	Posttest	Mean change	Statistical result
Knowledge score, mean (SD)	13.45 (4.28)	24.20 (2.31)	10.75 (4.29)	95% CI 9.64–11.86
Paired t-test	—	—	—	$t(59)=19.40$, $p<0.001$
Effect size	—	—	—	Cohen's $d_z=2.50$

Note: Total knowledge-score range: 0–30. CI: confidence interval; SD: standard deviation. Source: Original study data.

3. Exploratory Demographic Associations

Prior menstrual-health information exposure was associated with baseline knowledge category (Fisher's exact $p=0.0294$, Cramer's $V=0.312$). The age-group association was borderline (Fisher–Freeman–Halton exact $p=0.0497$,

Cramer's $V=0.317$). Religion, school grade, and parents' education were not associated with baseline knowledge category (Table 2). These analyses were secondary and exploratory.

Table 2: Exploratory associations between demographic variables and baseline knowledge category

Variable	Category	n	Inadequate n (%)	Moderate n (%)	Exact p	Cramer's V
Age group (years)	10–13	24	11 (45.8)	13 (54.2)	0.0497	0.317
	14–16	19	13 (68.4)	6 (31.6)		
	17–19	17	14 (82.4)	3 (17.6)		
Religion	Hinduism	21	13 (61.9)	8 (38.1)	1.000	0.022
	Christianity	39	25 (64.1)	14 (35.9)		
School grade	8th standard	17	13 (76.5)	4 (23.5)	0.1712	0.302
	9th standard	30	15 (50.0)	15 (50.0)		
	10th standard	10	7 (70.0)	3 (30.0)		
	11th standard	3	3 (100.0)	0 (0.0)		
Parents' education	Graduate and above	15	11 (73.3)	4 (26.7)	0.5609	0.139
	Primary education	32	20 (62.5)	12 (37.5)		
	Illiterate	13	7 (53.8)	6 (46.2)		
Prior information exposure	Yes	26	12 (46.2)	14 (53.8)	0.0294	0.312
	No	34	26 (76.5)	8 (23.5)		

Source: Original study data.

Note: No participant had adequate knowledge at baseline. Fisher's exact test was used for 2×2 tables and the Fisher–Freeman–Halton exact test for larger tables. No multiplicity adjustment was made.

Discussion

Knowledge regarding psychosocial problems related to menstrual abnormalities was substantially higher at the end of the seven-day teaching program. The mean increase of 10.75 points on a 30-item questionnaire was large, and the distribution shifted from predominantly inadequate knowledge at baseline to predominantly adequate

knowledge at posttest. Because this was a one-group study, however, the observed change cannot be attributed to the teaching program alone.

The finding is consistent with evidence that menstrual-health education can improve knowledge among adolescent girls. A systematic review reported knowledge gains across educational interventions and suggested that discussion-

oriented approaches may produce larger improvements than written information alone. [□] Indian interventional studies have similarly reported improvement in menstrual-health knowledge and practices after structured or school-based health education. [□] These findings support the educational value of structured menstrual-health teaching while also indicating the importance of interactive and context-sensitive delivery.

The psychosocial emphasis is relevant because menstrual difficulties may affect mood, stress, participation, daily activities, and schooling. [□] In Bengaluru, menstruation-related school absenteeism has been associated with pain, shame, fear of leakage, and inadequate facilities. [□] Psychosocial stress and other mental-health problems have also been associated with abnormal or irregular menstrual patterns among adolescent girls. [□] Education that includes psychosocial concerns may therefore help students recognize misconceptions and identify when support or health care is appropriate. This study measured knowledge, however, not psychosocial well-being, behavior, or school attendance.

Prior menstrual-health information exposure was associated with higher baseline knowledge, while the age association was borderline. These findings are plausible but should be interpreted cautiously because subgroup sizes were small, several comparisons were examined, and the study was not powered for demographic predictors. The exact-test analyses are therefore best viewed as exploratory.

The study has limitations. There was no control group, and the same questionnaire was repeated after only seven days; testing effects and short-term recall therefore cannot be separated from the intervention. The sample was small, purposively selected, and drawn from one school. The researcher-developed questionnaire had expert content review and acceptable split-half reliability, but broader psychometric properties were not established. Follow-up was short, and no behavioral or psychosocial outcomes were measured. Future controlled studies should include larger and more diverse samples, longer follow-up, and outcomes assessing health-seeking, menstrual practices, coping, school participation, and psychosocial well-being.

Conclusion

Adolescent girls had substantially higher knowledge scores at the end of the seven-day planned teaching program. The findings support further evaluation of structured school-based menstrual-health education that addresses psychosocial concerns alongside hygiene and menstrual care. Controlled studies with longer follow-up are required before causal or sustained effects can be concluded.

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