

A Study to Assess the Effectiveness of Information Booklet on Knowledge Regarding the Usage of Menstrual Cups and Their Benefits Among Teenage Girls in Selected Pre-University (PU) Colleges, Tumkur

Hemalatha B.¹, Mahaboobsaheb Ganjal^{2,*}

Abstract

Menstruation is a natural and essential biological process experienced by millions of women worldwide every month. However, despite its universality, menstruation continues to be surrounded by social stigma, myths, and inadequate awareness, particularly in low- and middle-income countries like India. The lack of proper menstrual education often leads to fear, embarrassment, and discomfort among adolescent girls as they begin to experience their menstrual cycles. These challenges hinder their ability to manage menstruation safely and hygienically, often resulting in poor health outcomes and absenteeism from school. In recent years, the menstrual cup has emerged as a sustainable, cost-effective, and eco-friendly alternative to conventional sanitary pads. However, awareness and acceptance of menstrual cups remain limited due to misconceptions and inadequate knowledge. The present study was undertaken to evaluate the effectiveness of an informational booklet in improving awareness and understanding of the use, benefits, and maintenance of menstrual cups among adolescent girls studying in selected pre-university (PU) colleges in Tumkur. A structured informational booklet was developed and distributed to the participants, focusing on menstrual hygiene, menstrual cup usage, advantages, and care practices. The effectiveness of the intervention was assessed through pretest and posttest evaluations of knowledge levels. The study findings revealed a significant improvement in participants' awareness and positive attitudes toward menstrual cups following exposure to the booklet. The study concludes that structured educational materials, such as informational booklets, can play a vital role in enhancing menstrual hygiene knowledge and promoting sustainable menstrual practices among adolescent girls.

Keywords: Effectiveness, knowledge, information booklet, teenage girls, menstrual cup

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INTRODUCTION

Worldwide, menstruation is a natural biological function that millions of women and girls experience each month. The onset of menstruation, known as menarche, marks the beginning of a female's reproductive phase and often signifies her transition into adulthood within her cultural context. While the average age of menarche tends to be higher in low-income regions than in wealthier countries, a general decline in the age of menarche has been observed globally in recent decades [1].

A significant challenge associated with menstruation is the effective management of menstrual flow. The inability to do so can lead to physical discomfort and social embarrassment.

According to the United Nations, proper menstrual hygiene management includes the use of clean materials to absorb or collect menstrual blood, the ability to change them privately as needed, access to soap and water for personal hygiene, and facilities for the safe disposal of used products. However, girls and women in economically disadvantaged regions often face serious limitations in accessing these essential resources [2].

Adolescent girls make up approximately 20% of the global population. Of the 1.2 billion adolescent girls worldwide, around 85% reside in developing nations. In India alone, there are approximately 190 million adolescents, comprising 21% of the population. Girls aged 10 to 17 years represent 4.5%, while those aged 15 and 19 years make up 4.3% of the population [2].

Educating girls and women has been a central goal of global development efforts, notably featured in the United Nations Millennium Development Goals and more recent Sustainable Development Goals. Despite progress since the early 2000s, many girls—especially in regions such as South Asia and sub-Saharan Africa—either never attended school or dropped out after only a few years of basic education [3].

Due to both the earlier onset of menstruation and increased school enrollment, many adolescent girls now attend classes while menstruating. With a menstrual cycle occurring every 25 to 30 days and lasting approximately 4 to 6 days, menstruation will inevitably overlap with school days, presenting challenges for managing hygiene and comfort during school hours [4].

A descriptive research study was conducted to evaluate young women's knowledge and attitudes toward the use of menstrual cups. A sample of 200 participants was selected using a non-probability convenience sampling technique. The findings showed that 49% of the women had good knowledge of menstrual cups, 43.5% had moderate knowledge, and 7.5% had poor understanding. In terms of attitude, 64.5% held a neutral view, 31% had a positive attitude, and 4.5% viewed menstrual cups negatively [5].

This article aims to provide comprehensive information on the use of menstrual cups among teenage girls, which can help reduce common issues and misconceptions related to menstruation. Enhancing awareness and education on menstrual hygiene is essential for younger generations. Menstrual cups made from reusable, non-toxic, and hypoallergenic silicone are safe and suitable for females of all age groups, offering a sustainable alternative to traditional menstrual products [6, 7].

LITERATURE REVIEW

The investigator organized the literature as follows:

A descriptive cross-sectional study was conducted at the A.J. Institute, Mangalore, Karnataka, India, to assess and analyze the level of awareness regarding menstrual cups among women of reproductive age. The findings revealed that while 82% of participants had heard about menstrual cups, only 2.6% had actually used them. In many high-income countries, managing menstrual flow is often viewed as a straightforward issue. However, in less-affluent settings, this basic necessity is a major challenge. When women and girls are unable to manage menstruation effectively, it can lead to significant social and health-related difficulties. Menstrual hygiene management (MHM) is an increasingly important topic that is closely linked to education, empowerment, and social progress for girls and women, although it remains under-recognized [8].

A systematic review and meta-analysis were conducted to assess menstrual hygiene practices among adolescent girls in India and to highlight the existing gaps and unmet needs in this domain. Researchers searched databases including PubMed, the Global Health Database, Google Scholar, and references for relevant studies published between 2000 and September 2015. Data were gathered from 138 studies, encompassing 193 subpopulations and 97,070 adolescent girls. The results showed that in 88 of these studies, only approximately half of the girls were informed about menstruation before menarche. The

use of commercial sanitary pads was more common among urban girls and showed an upward trend over time ($p < 0.0001$). However, improper disposal practices have also been widely reported. Many girls face restrictions during menstruation, particularly those related to religious activities. About 25% of girls reported missing school during their periods, with higher commercial pad usage being significantly associated with reduced absenteeism ($p = 0.023$). Additionally, only around one-third of the girls were able to change menstrual products at school, and only half had access to toilets at home [9].

This study was conducted to assess the awareness of menstrual cups among female undergraduate medical students. Data were collected from 400 participants using a structured questionnaire survey. The findings indicated that 28 students (7%) were completely unaware of what the menstrual cup was. Of the total, 262 students (70.4%) believed menstrual cups could be used by virgins. However, many students lacked a clear understanding of the materials used to make menstrual cups, the recommended frequency for emptying them, and the proper sterilization methods. Notably, none of the 372 students reported having ever used a menstrual cup. Sanitary pads remain the most commonly used product because of their widespread availability and promotion. The study concluded that menstrual cups are not well known among students and require greater awareness and promotion in India [10].

Another cross-sectional study explored knowledge, attitudes, and practices concerning menstrual cups among adult women living in rural areas. The study included 120 women aged between 18 and 45 years who were willing to participate and completed a pre-designed questionnaire. Results showed that 80% of participants were aware of menstrual cups. Sources of information included media (36.7%), family (26.7%), friends (20.8%), and healthcare personnel (14.2%). The largest group of participants (58.33%) was between 21 and 30 years of age. Educational backgrounds were predominantly undergraduate (35%) and postgraduate (25.8%). The main concerns regarding menstrual cups were fear of leakage (51.7%) and discomfort (26.7%). Despite these concerns, 65% of the women indicated that they would be willing to use menstrual cups if they were readily accessible.

An exploratory study in Thokarpa, Sindupalchowk, Nepal, was conducted to assess the acceptability and feasibility of menstrual cup use among adolescent schoolgirls. The study involved four focus group discussions with 28 girls aged 13–19 who were given menstrual cups. Most participants viewed the cups positively, describing them as easy to use and convenient. They also noted the economic and environmental benefits. The participants did not report any difficulties in cleaning the cups. However, some discomfort was noted, such as pain during insertion, sensation of the cup protruding from the vagina, frequent urges to urinate, and occasional leakage. Concerns included the size, shape, and feel of the cup and the fear that it might become stuck. Some participants mentioned that their families worried that the use of menstrual cups could affect fertility or virginity [11].

In another quantitative study among nursing students, purposive sampling was used to collect data, which were analyzed using both descriptive and inferential statistical methods. Results demonstrated a significant improvement in knowledge following the intervention: the average post-test score was 76.87% compared to a pre-test score of 49.6%. The study concluded that prior to exposure to the video-assisted teaching module, students had limited knowledge of menstrual hygiene, but the module was effective in increasing awareness, particularly regarding menstrual cup use.

Additionally, a national study was conducted to evaluate knowledge, attitude, practice, and behavior (KAPB) related to menstrual cup usage. Responses were collected from 397 individuals from different regions of the country. The respondents had an average age of 24 years, and the majority were students living in urban regions. Among menstrual cup users, 79% found the cup comfortable, 82% considered it more economical, and 61% reported it was easy to adapt to. In terms of monthly spending, menstrual cup users typically spent between Rs.0 and Rs.100, while users of other sanitary products reported spending Rs.100 and Rs.300. Disposable pads remain the most commonly used product among non-users. Approximately 29.6% of non-users showed interest in switching to menstrual cups. Common

reasons for nonuse included discomfort (32%), lack of information (25%), and limited availability (15%).

A cross-sectional study was carried out to assess the acceptability and safety of menstrual cups among Iranian women aged 18 to 50 years who had regular menstrual cycles and had been using the menstrual cup for a minimum of three months. Participants were recruited through continuous sampling and completed an online questionnaire shared via social media platforms. The results indicated an average overall satisfaction score of 6.54 ± 0.76 , with leakage receiving the lowest satisfaction score at 5.25 ± 1.63 . Notably, 83% of participants reported experiencing leakage while using their menstrual cup. Among the health concerns, vaginal pain during removal had the highest reported score (23.9%). A large proportion (83.9%) learned about menstrual cups through social networks, and 98.6% of users stated they would recommend the product to others [12].

Another study evaluated women's awareness and attitudes toward eco-friendly menstrual products based on their consumer lifestyle. Both expert interviews and participant surveys were conducted for qualitative and quantitative analyses. The findings revealed that women generally held positive views toward sustainability, demonstrated a strong understanding of their bodies, and showed interest in the functionality and efficiency of menstrual products. The study also found that purchasing decisions are influenced by lifestyle preferences. Many women thoroughly researched products before buying and made efforts to adapt to environmental challenges, placing high value on factors such as comfort, absorbency, and product capacity [13].

A cross-sectional study based on the community was conducted to assess the awareness and practices related to menstrual hygiene among women of reproductive age. Over four months, from March to June 2019, interviews were conducted with 200 women. The findings revealed that 81% (162 participants) experienced regular menstrual cycles. However, 7%—primarily from rural backgrounds—mistakenly perceived menstruation as a disease. For 70% (140 women), their mothers served as the main source of menstrual knowledge. While 94% were aware of sanitary pads, only 75% (150 women) reported using them. Most participants (86.5%) changed their sanitary pads two to three times per day. All women reported bathing regularly during menstruation, and 98.5% (197 participants) practiced regular cleaning of the external genitalia. Additionally, 76.5% (153 women) disposed of used sanitary products in a dustbin [14].

Objectives of the Study

- To evaluate the baseline knowledge of teenage girls regarding the use and benefits of menstrual cups using a structured questionnaire.
- To assess the level of knowledge among teenage girls after administering a structured questionnaire post-intervention.
- To determine the effectiveness of an informational booklet in enhancing teenage girls' knowledge of the use and advantages of menstrual cups.
- To examine the relationship between the knowledge scores of teenage girls and selected demographic factors.

Hypothesis

H1: There will be a significant difference between the pre-test and post-test knowledge scores of teenage girls regarding the usage of menstrual cups and their benefits.

H2: A significant association is expected between pre-test knowledge scores and selected demographic variables related to the use and benefits of menstrual cups.

Assumptions

1. Teenage girls may have limited knowledge regarding the use and benefits of menstrual cups.

2. The information booklet is expected to improve teenage girls' knowledge about the usage and advantages of menstrual cups.

RESEARCH METHODOLOGY

- *Research approach:* An evaluative research approach will be adopted for this study.
- *Research design:* A pre-experimental design, specifically a one-group pre-test and post-test design, will be used.
- *Research setting:* The study was conducted in selected PU colleges located in Tumkur.

Population

Population comparison of teenage girls from selected PU College, Tumkur.

Sample Size

The total sample of the study will consist of 60 teenage girls in selected colleges in Tumkur.

Sampling Techniques

Simple sampling techniques were adapted.

Variables

Independent variable: The informational booklet focuses on the use and advantages of menstrual cups.

Dependent variable: Level of knowledge among teenage girls enrolled in selected pre-university (PU) colleges.

Demographic variables: These include age, age at the onset of menarche, mother's educational background, mother's occupation, religion, type of family, household income, and primary source of information related to menstrual hygiene.

Sampling Criteria

Inclusion Criteria

The study includes teenage girls:

- Those who are studying in selected PU colleges.
- Those who are willing to participate.
- Those who are available at the time of data collection.

Exclusion Criteria

The study excludes the teenage girls:

1. Those who are sick at the time of data collection.
2. Those who are already using menstrual cup.

Tool for Data Collection

Tools for data collection are divided into the following categories:

Part I. Items on demographic variables will be listed under structured questionnaires.

Part II. Structured knowledge questionnaires regarding the use of menstrual cups and their benefits.

Data Collection Tool

The tool chosen for this research should effectively serve as a means to gather relevant data that supports drawing meaningful conclusions aligned with the objectives of the study. Additionally, it contributes to the existing body of knowledge within the discipline. In accordance with the research problem and study objectives, specific steps were followed to select and develop the data collection instrument.

Selection of Tool

A Structured knowledge questionnaire was selected based on the objectives of the study, as it was considered to be the most appropriate instrument to elicit responses from the subjects.

Development of the Tool

A structured questionnaire was prepared to assess the knowledge of teenage girls studying in selected PU colleges regarding the use of menstrual cups and their benefits.

The tool was developed:

- After reviewing related literature.
- Based on the experience of the investigator.
- Through guidance and consultation with subject experts.
- In consultation with the statistician.

Description of the Tool

Structured knowledge questionnaires, which contain items on the following aspects.

Part I: Demographic Data

This section consisted of eight items seeking personal information, such as age, age at menarche, education status of mother, occupation of mother, religion, type of family, family income, and source of information.

Part II: Knowledge Questionnaires

The knowledge questionnaire consisted of 30 items on General Information on menstruation and the usage of menstrual cups and their benefits.

Each question had four responses, with one correct response and three distractors. Score '1' was given for a correct response in a single question, and score '0' was given for wrong responses. The total number of items was 30, giving a maximum score of 30.

The resulting scores were ranged as follows:

- *Adequate knowledge*: more than 75% (23–30 marks)
- *Moderate knowledge*: 50–75% (16–22 marks)
- *Inadequate knowledge*: less than 50% (less than 15 marks)

PRE-TESTING OF THE TOOL

Content Validity

Content validity refers to the extent to which the items in an instrument adequately represent the entire domain of the content being measured.

Content validity of the tool was established by five experts from the Department of Obstetrics and Gynecology Nursing. The prepared instruments, scoring key, and criteria checklist for validation were submitted to experts, and they were requested to provide their opinions and suggestions regarding the relevance of the tool for further modification to improve the clarity and content of the items. For content validity, a criterion checklist was prepared, with each criterion consisting of 1–4 response columns for ratings such as very relevant, relevant, needs modification, and not relevant. Suggestions were incorporated into the tool, and recommendations were considered accordingly.

Reliability

The reliability of an instrument refers to the degree of consistency with which it measures the intended attributes. It indicates the extent to which similar results are obtained upon repeated administration of the instrument.

The split-half method was used to establish the reliability of the tool. The tool was administered to ten samples from the Sree Siddaganga Pre-University College for Women, and the test was first divided into two halves. The correlation of the half test was found by using Spearman Brown's formula, and the significance of the correlation was tested using probable error. The reliability of the entire test was then estimated by:

$$\text{Pearson correlation coefficient } r = \frac{n \sum xy - (\sum x)(\sum y)}{\sqrt{[n \sum x^2 - (\sum x)^2][n \sum y^2 - (\sum y)^2]}}$$

Spearman's brown prophecy formula r_{total}

$$r_{total} \Rightarrow \frac{2r}{1+r}$$

Reliability of the Interview Schedule

The reliability coefficient of the interview schedule designed to assess the knowledge of teenage girls attending selected PU colleges was 0.88, indicating that the tool is reliable for use in this study.

Development of the Information Booklet

An information booklet was developed based on the identified learning needs of students in the selected PU colleges. The process involved the following steps.

1. *Review of relevant literature:* Literature related to the usage and benefits of menstrual cups was reviewed to inform the content of the booklet. The references used are included in the Appendix.
2. *Content preparation:* The booklet's contents were structured into five key lessons:
 - Meaning of menstruation
 - Factors influencing menstrual hygiene
 - Various menstrual hygiene management methods
 - Usage of menstrual cups in menstrual hygiene
3. *Content validation:* Experts in related fields were consulted to establish content validity. Their suggestions were incorporated to ensure that the material was simple, clear, and appropriate for the target audience.
4. *Editing and translation:* The booklet was professionally edited and translated as necessary to enhance clarity and understanding.

Pilot Study

A pilot study, which served as a preliminary trial, was conducted to assess the feasibility and refine the research process before the main study. The study was carried out with ten participants from the Sree Siddaganga Pre-University College for Women, Tumkur, between June 1 and June 8, 2024. Permission was obtained from college authorities. Participants were selected through simple random sampling, and informed consent was obtained after explaining the purpose of the study.

A structured interview schedule, including demographic questions and 30 items on knowledge of menstrual cup usage and benefits, was administered. The pilot study helped estimate the time required for data collection, ensured the practicality of the methods, and determined the appropriate duration for conducting the interviews.

Data Collection Procedure

Data collection was conducted over a period of four weeks at Sree Siddaganga Pre-University College for Women, Tumkur, from June 15 to July 15, 2024. Formal written permission was obtained from the principal, and sixty adolescent girls who met the inclusion criteria participated in the study.

During interviews, the following steps were taken:

- Creating a comfortable and relaxed environment for participants.
- Establishing rapport and obtaining informed consent.
- We started with demographic questions, followed by knowledge-related questions on menstrual cup usage and benefits.
- Recording responses accurately.
- Clarifying any participant's questions at the conclusion of the interview.

Plan for Data Analysis

The collected data were organized and analyzed using statistical methods. The information was entered into a master sheet for systematic analysis.

- *Descriptive statistics*: Frequencies and percentages will describe the participants' demographic characteristics, while mean, mean percentage, and standard deviation will summarize their knowledge levels about menstrual cup usage and benefits.
- *Inferential statistics*: Paired t-tests were used to compare pre-test and post-test knowledge scores. The Chi-square (χ^2) test was used to examine the association between selected demographic variables and participants' knowledge levels.

RESULTS

Descriptive and inferential statistics were used to analyze the data. The findings were finalized and organized in accordance with the plan for data analysis. This is presented in the following sections.

1. *Section I*: Description of the demographic characteristics of teenage girls studying in selected PU colleges.
2. *Section II*: Knowledge level of teenage girls regarding the use of menstrual cups and their benefits
3. *Section III*: Comparison of pre-test and post-test knowledge scores of teenage girls studying in selected PU colleges.
4. *Section IV*: Association between knowledge scores and selected demographic variables.

Section I: Demographic Characteristics of Teenage Girls in Selected PU Colleges

Table 1 and Figure 1 show that the majority, 30% of subjects, were in the age group of 18 years, 25% of subjects were in the age group of 17 years, 23.3% of them were aged about 16 years, and the remaining 21.7% were aged about 19 years.

Table 1. Frequency and percentage distribution of teenage girls according to age (n = 60).

Age	Frequency	Percentage
16 years	14	23.3
17 years	15	25.0
18 years	18	30.0
19 years	13	21.7
Total	60	100

Table 2. Frequency and percentage distribution of teenage girls according to age at menarche (n = 60).

Age at menarche	Frequency	Percentage
9–11 years	23	38.3
12–14 years	19	31.7
15–17 years	14	23.3
18–20 years	4	6.7
Total	60	100

Table 2 and Figure 2 show that the majority, 38.3% of subjects, attained menarche at the age of 9–11 years, 31.7% of subjects attained menarche at the age of 12–14 years, 23.3% of them at 15–17 years, and the remaining 6.7% attained menarche at the age of 18–20 years.

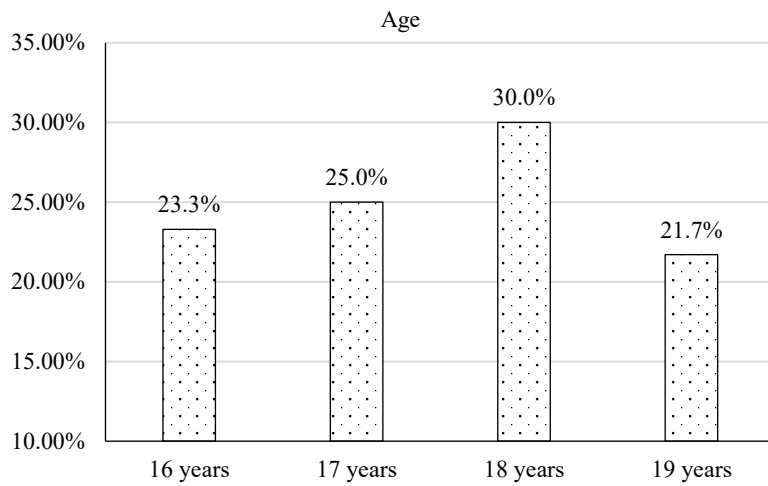


Figure 1. Distribution of subjects by age.

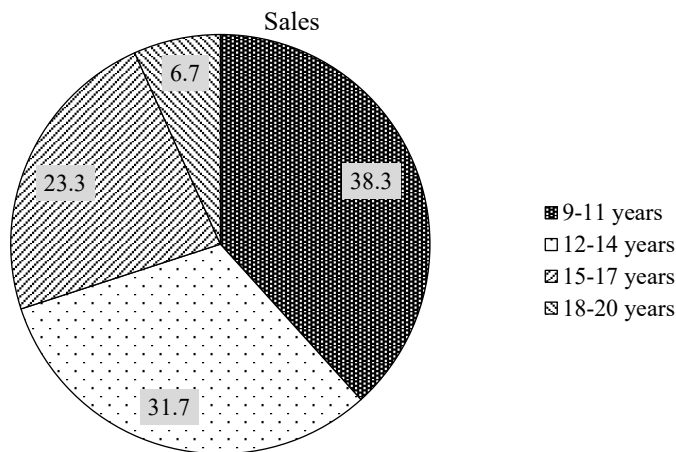


Figure 2. Distribution of subjects by age at menarche.

Table 3. Frequency and percentage distribution of teenage girls according to the educational status of their mother (n=60).

Educational status of the mother	Frequency	Percentage
Primary education	16	26.7
Secondary education	11	18.3
PU colleges	21	35.0
Degree and above	12	20.0
<i>Total</i>	<i>60</i>	<i>100</i>

Table 3 and Figure 3 show that 35% of the subjects' mothers had pre-university education, 26.7% had primary education, 18.3% of them had secondary education, and the remaining 20% were graduates and above.

Table 4. Frequency and percentage distribution of teenage girls by occupation of mother (n = 60).

Occupation of the mother	Frequency	Percentage
Housewife	38	63.3
Coolie	6	10.0
Private employee	11	18.3
Government employee	5	8.3
<i>Total</i>	<i>60</i>	<i>100</i>

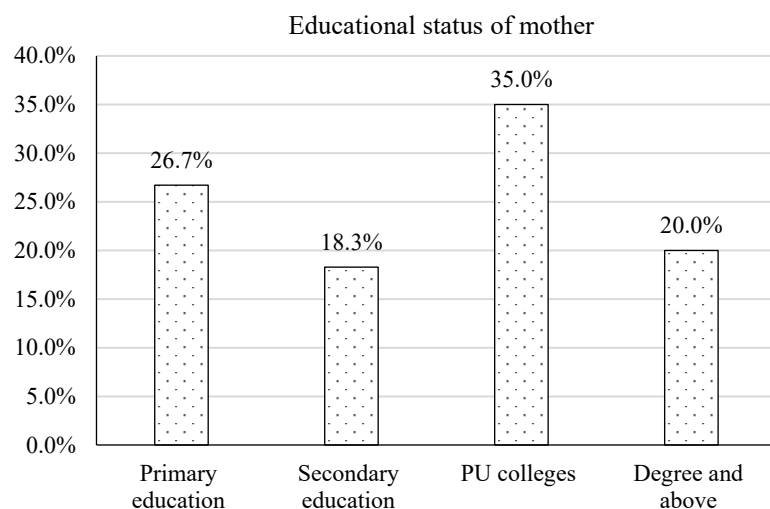


Figure 3. Distribution of subjects by the educational status of the mother.

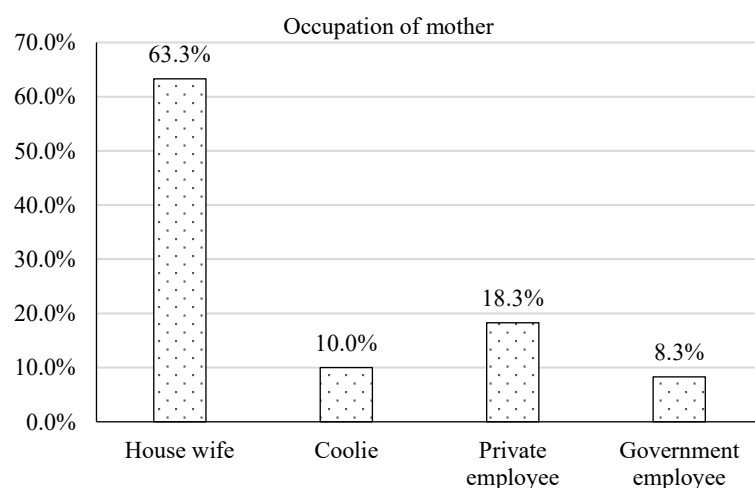


Figure 4. Distribution of subjects by occupation of the mother.

Table 4 and Figure 4 show that among mothers, 63.3% were housewives, 18.3% were private employees, 10% were coolie workers, and the remaining 8.3% were government employees.

Table 5. Frequency and percentage distribution of teenage girls according to religion (n = 60).

Religion	Frequency	Percentage
Hindu	44	73.3
Muslim	5	8.3
Christian	6	10.0
Others	5	8.3
<i>Total</i>	<i>60</i>	<i>100</i>

Table 5 and Figure 5 show that the majority, 73.3% of subjects, belonged to the Hindu religion, 8.3% were Muslims, 10% were Christians, and the remaining 8.3% belonged to other religions.

Table 6 and Figure 6 reveal that 76.7% of subjects were living in a nuclear family, 13.3% lived in a joint family, and the remaining 10% of them lived in an extended family.

Table 7 and Figure 7 indicate that the largest proportion of participants (48.3%) reported a family income ranging from Rs. 10,001 to 15,000. Additionally, 30% of participants had an income between

Rs. 5,001 and 10,000, 8.3% earned less than Rs. 5,000, and only 13.3% had an income exceeding Rs. 15,001.

Table 6. Frequency and percentage distribution of teenage girls by family type (n = 60).

Family type	Frequency	Percentage
Single	0	0.0
Nuclear family	46	76.7
Joint family	8	13.3
Extended family	6	10.0
<i>Total</i>	<i>60</i>	<i>100</i>

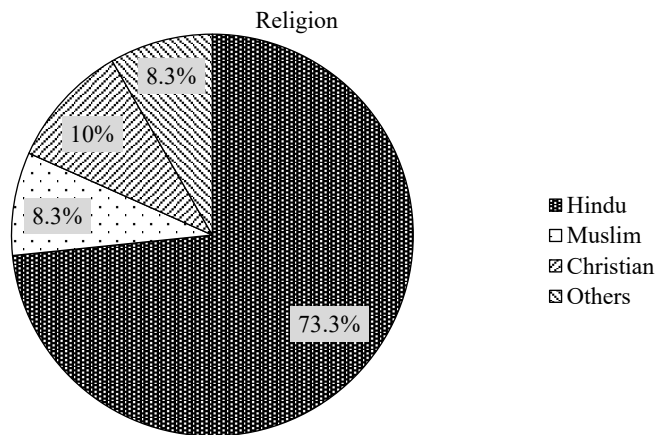


Figure 5. Distribution of subjects by religion.

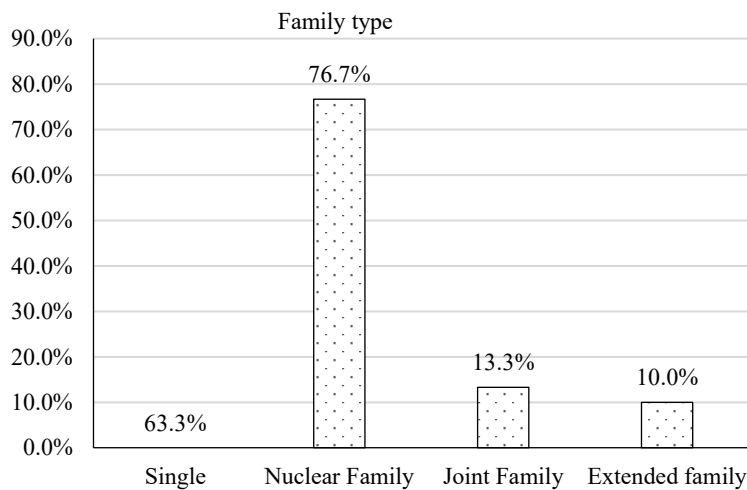


Figure 6. Distribution of subjects by their family type.

Table 7. Frequency and percentage distribution of teenage girls according to family income (n = 60).

Family income	Frequency	Percentage
Less than Rs.5000	5	8.3
Rs.5001–10000	18	30.0
Rs.10001–15000	29	48.3
More than Rs.15001	8	13.3
<i>Total</i>	<i>60</i>	<i>100</i>

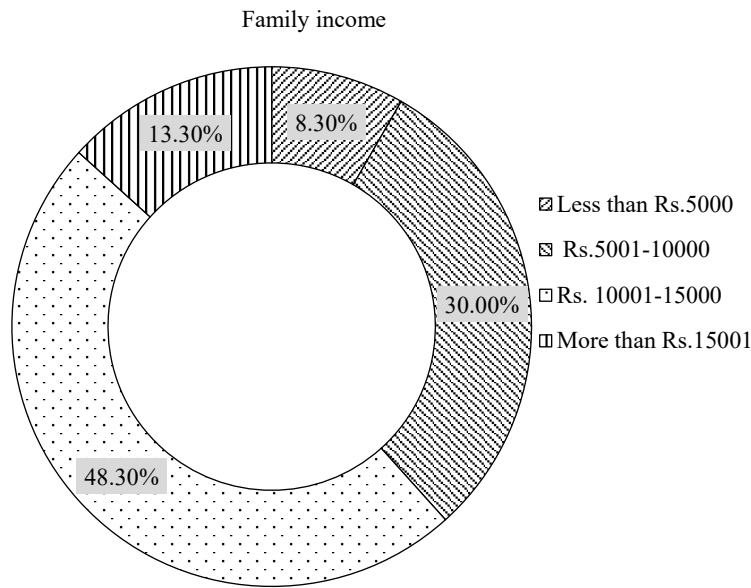


Figure 7. Distribution of subjects by family income.

Table 8. Frequency and percentage distribution of teenage girls according to source of information (n = 60).

Source of information	Frequency	Percentage
Mass media	4	6.7
Friends	19	31.7
Relatives	19	31.7
Health personnel	18	30.0
<i>Total</i>	<i>60</i>	<i>100</i>

Table 8 and Figure 8 reveal that 31.7% of subjects received information from their friends, 31.7% from relatives, and 30% of them had health personnel as their source of information.

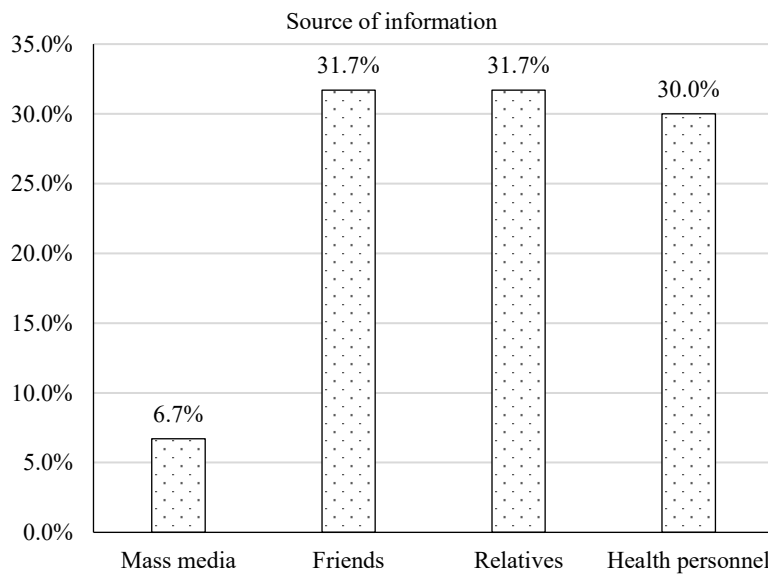


Figure 8. Distribution of subjects by present source of information.

Section II: Knowledge Level of Teenage Girls Regarding the Usage of Menstrual Cups and Their Benefits

Table 9 and Figure 9(a) and (b) show that the majority, 65% of the teenage girls, had inadequate knowledge, 30% had moderate knowledge, and the remaining 5% of them had adequate knowledge in the pre-test. After administration of the information booklet, 80% of the subjects had adequate knowledge, 20% had moderate knowledge regarding the usage of the menstrual cups and their benefits in the post-test.

Table 9. Overall pre-test and post-test knowledge scores of the teenage girls (n = 60).

Knowledge level	Pre-test		Post-test	
	Frequency	%	Frequency	%
Inadequate knowledge	39	65.0	0	0.0
Moderate knowledge	18	30.0	12	20.0
Adequate knowledge	3	5.0	48	80.0
<i>Total</i>	<i>60</i>	<i>100</i>	<i>60</i>	<i>100</i>

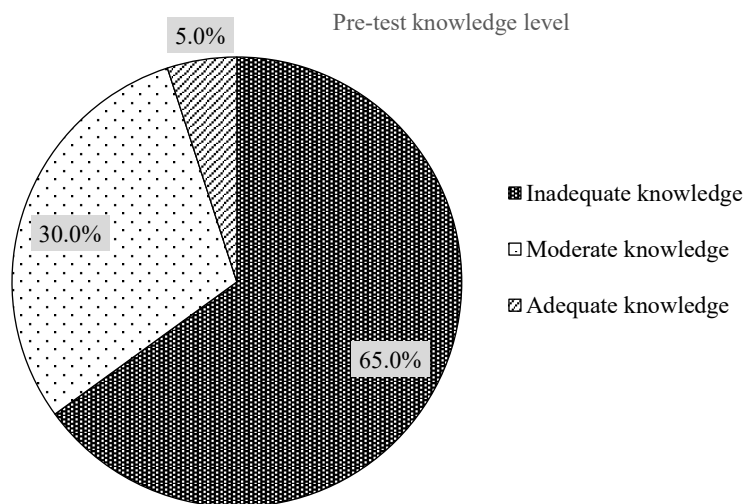


Figure 9. (a) Overall pre-test knowledge level of teenage girls.

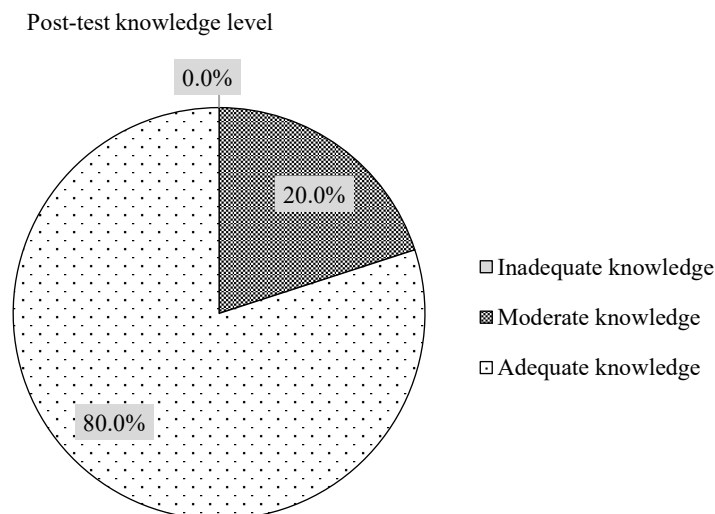


Figure 9. (b) Overall post-test knowledge level of teenage girls.

Table 10. Area-wise analysis of pre-test knowledge scores of teenage girls (n = 60).

Knowledge aspects	Number of items	Maximum score	Mean	Mean %	Median	SD
Pre-test	30	30	13.58	45.26	14	5.356
Post-test	30	30	24.13	80.43	25	4.904

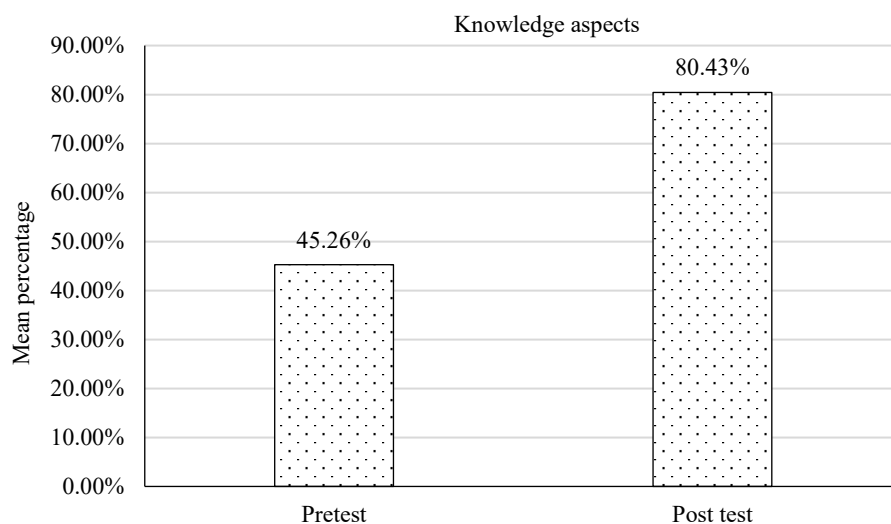
**Figure 10.** Analysis of pre-test and post-test knowledge scores of teenage girls.

Table 10 and Figure 10 illustrates that the respondents' pre-test mean knowledge score was 13.58 (45.26%), with a standard deviation of 5.356, indicating that the teenage girls had insufficient knowledge. Following the distribution of the information booklet, the post-test mean knowledge score increased to 24.13 (80.43%) with a standard deviation of 4.904, demonstrating a significant improvement in their knowledge levels.

Section III: Comparison of the Knowledge Level of Teenage Girls Studying in Selected PU Colleges

Table 11 and Figure 11 show that the calculated "t" value of 13.086 exceeded the critical value at a significance level of 0.05. This indicates that the "t" value is statistically significant. Therefore, it can be concluded that there is a significant difference in the knowledge of subjects studying in the selected PU colleges regarding the use of menstrual cups and their benefits.

Table 11. Comparison of knowledge scores of teenage girls (n = 60).

Knowledge	Mean	SD	Mean difference	t value	Inference
Pre-test	13.58	5.356	10.55	13.086	S
Post-test	24.13	4.904			

Section IV: Association of the Pre-test Knowledge Scores of Teenage Girls with the Demographic Variables

Table 12 presents the association between the post-test knowledge scores of the teenage girls and the selected demographic variables. The analysis was conducted using the chi-squared test at a significance level of 0.05.

Among the variables assessed, the *educational status of the mother* showed a statistically significant association with the respondents' post-test knowledge scores ($\chi^2 = 8.492$, $df = 3$, $p = 0.042$). This finding indicates that teenage girls whose mothers had higher levels of education (especially those with a PU college or degree and above) were more likely to have knowledge scores at or above the median

following the intervention. This suggests a possible influence of maternal education on receptivity and understanding of health education materials.

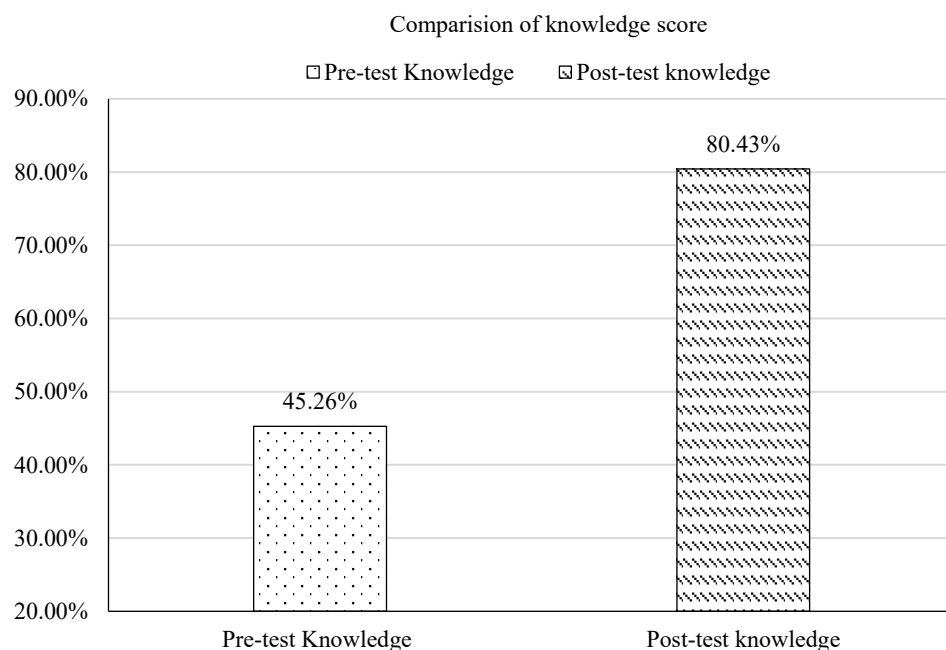


Figure 11. Comparison of the mean percentage of pre-test and post-test scores.

Table 12. Association of post-test knowledge score of teenage girls with the demographic variables (n = 60).

Variables	Below median	Median and above	Chi-square	DF	P-value (0.05)	Inference
Age in years						
a. 16 years	7	7	2.680	3	0.444	NS
b. 17 years	8	7				
c. 18 years	5	13				
d. 19 years	6	7				
Age at menarche						
a. 9–11 years	11	12	0.750	3	0.861	NS
b. 12–14 years	8	11				
c. 15–17 years	6	8				
d. 18–20 years	1	3				
Educational status of the mother						
a. Primary education	9	7	8.492	3	0.042	S
b. Secondary education	9	2				
c. PU Colleges	7	14				
d. Degree and above	1	11				
Occupation of the mother						
a. Housewife	17	21	1.058	3	0.787	NS
b. Coolie	2	4				
c. Private employee	4	7				
d. Government employee	3	2				

In contrast, other demographic factors such as the age of the respondents ($\chi^2 = 2.680, p = 0.444$), age at menarche ($\chi^2 = 0.750, p = 0.861$), and mother's occupation ($\chi^2 = 1.058, p = 0.787$) were not

significantly associated with the post-test knowledge scores. These findings imply that these variables did not have a notable impact on how well teenage girls understood or retained the information provided regarding menstrual cup usage.

DISCUSSION

The study findings are presented under the following sections:

- *Section I:* Overview of the demographic characteristics of teenage girls enrolled in the selected PU colleges.
- *Section II:* Assessment of the knowledge level of teenage girls regarding the usage and benefits of menstrual cups.
- *Section III:* Comparison between the pre-test and post-test knowledge scores of teenage girls from selected PU colleges.
- *Section IV:* Analysis of the relationship between knowledge scores and selected demographic factors.

CONCLUSION

The present study demonstrated that the use of an information booklet significantly improved teenage girls' knowledge of the usage and benefits of menstrual cups. Prior to the intervention, many participants exhibited a limited understanding of menstrual cups, reflecting the widespread lack of awareness and persistent menstrual taboos in society. Following the distribution of the educational booklet, there was a notable increase in the post-test knowledge scores, highlighting the effectiveness of structured health education in addressing menstrual health issues.

This finding underscores the critical role of accessible, age-appropriate educational interventions in empowering adolescent girls to make informed choices regarding menstrual hygiene management. Promoting the use of menstrual cups not only supports better health outcomes and environmental sustainability but also encourages body literacy and menstrual confidence among young women.

In conclusion, this study reinforces the importance of integrating menstrual health education into school-based programs and suggests that educational materials such as information booklets can be a practical and impactful tool in bridging knowledge gaps. Wider implementation of such interventions can contribute to breaking the silence around menstruation, reducing stigma, and promoting safe and sustainable menstrual practices among adolescent girls.

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