

Knowledge, Attitude, Practices of Menstrual Cup among Women at an Educational Institute in Tamil Nadu – A Cross-Sectional Study

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Abstract

Background: Menstrual hygiene is a crucial aspect of women's health, yet many individuals remain unaware of sustainable alternatives such as menstrual cups. Despite their advantages, adoption rates remain low due to limited awareness, misconceptions, and cultural barriers. The objective is to assess the knowledge, attitude, and practices regarding menstrual cup usage among women of reproductive age at an Educational institute in Tamil Nadu. **Material and Methods:** A cross-sectional study conducted from September to November 2024 among women aged 15-45 years at Vivekanandha Educational Institution in Tamil Nadu. Data collected using a pre-tested questionnaire on socio-demographic characteristics, knowledge, attitude, and practices regarding menstrual cups. Ethical clearance obtained. Data analysis was conducted using SPSS (Version 26.0) and included appropriate descriptive statistics. **Results:** This study involved 2,901 women aged 15 to 45 years. Most of the participants (73.3%) were between 16 and 20 years old, with a mean age of 20.15 ± 3.12 years. Despite moderate awareness (62.6% had heard of menstrual cups), actual usage remained low (7%), indicating barriers to acceptance. The internet and social media were the dominant sources of information (66.8%). Many women were unsure about menstrual cups, with 44.7% unwilling to recommend them and 50.3% uncertain if it was a better alternative. While menstrual cup users found comfort (69%) and environmental benefits (35.5%), non-users expressed discomfort (37.2%) and insertion fears (16.1%). **Conclusion:** Our study highlights a substantial knowledge gap regarding menstrual cups and underscores the need for awareness campaigns and educational interventions. Addressing misconceptions and providing practical guidance can significantly improve acceptance and adoption rates, promoting better menstrual health management.

Keywords: Menstrual cup, Menstrual hygiene, Awareness, Health education, Barriers.

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INTRODUCTION

Menstruation is a complex, coordinated biological process, and its onset marks the onset of reproductive years in a woman's life.^[1,2] However, the inadequate information about menstruation and menstrual hygiene practices creates a culture of taboos, which leads to a big barrier in the field of menstrual hygiene management. Approximately 70% of the reproductive infections among Indian women are due to poor menstrual hygiene practices. The lack of information about menstrual hygiene practices and products itself creates potential health risks such as vaginal infections, cervical cancer, Reproductive Tract Infections (RTI), Urinary Tract Infections (UTI), Hepatitis B, and different types of Yeast infections.^[3]

As a mark of transition from pieces of cloth (sometimes supplemented with charcoal, sand, ash, grass, wood shavings, newspapers, and hay or leaves), to Disposable Sanitary Napkins (DSNs), our society has had a major leap in accessing a modern, universally accessible product that could impart quality health and hygiene. Sanitary napkins are among the most preferred menstrual products in India due to their ease of use, availability, and product diversity.^[4] However, they also form a major source of solid waste,

approximately constituting an annual menstrual waste generation of 113 thousand tonnes in India.^[5] An alternative to sanitary pads or tampons is the menstrual cup, which has received attention in small-scale studies in high-income and low- and middle-income countries, including among primary school girls. A menstrual cup is a non-absorbent, reusable, bell-shaped device with a stem that can be inserted into the vagina to collect and hold menstrual blood during periods.^[6] Even though menstrual cups are safe, eco-friendly, cost-effective, and long-lasting, there are still many reasons they are not as popular as they once were. Even among educated people, there are still some barriers to using menstrual cups despite the many benefits they offer.^[7-9]

Therefore, the purpose of this study was to evaluate reproductive-

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age women's knowledge and attitudes toward using menstrual cups, as well as the experiences of those who had used them. The findings of this study will help bridge knowledge gaps and address some concerns related to the use of menstrual cups.

Objective

To assess the knowledge, attitude, and practices of menstrual cups among women of reproductive age group at a Women's Educational institute in Tamil Nadu.

MATERIALS AND METHODS

We conducted a cross-sectional study over 3 months, from September 2024 to November 2024, enrolling all women of reproductive age (15 to 45 years) studying at Vivekanandha Educational Institute, Namakkal, in Tamil Nadu. Women who were unwilling to provide consent for the study were excluded.

The nature and objectives of the study were explained to the participants, and written informed consent was obtained before data collection. A pre-tested, semi-structured questionnaire was used to collect information on socio-demographic variables and knowledge of menstrual cups. The questionnaire was divided into sections, and data on participants' understanding of menstrual cups, their attitudes

towards cups, and their experiences with cups were collected. Clearance from the institutional ethics committee was obtained before the study began.

The data was collected and compiled in MS Excel. Descriptive statistics are used to present the data. To analyse the data, SPSS (Version 26.0) was used. Qualitative variables are expressed as frequency and percentages, and Quantitative variables are expressed as Mean and Standard Deviation. An appropriate statistical test was used to determine whether the difference was significant.

RESULTS

The study included 2,901 participants from a Women's Educational Institution in Tamil Nadu, aged 16-45 years, with a mean age of 20.15 ± 3.12 years. The majority (73.3%) were between 16 and 20 years old, followed by 22.1% in the 21-25 age group, while only a small percentage (4.6%) were above 25 years. Regarding educational background, 66.1% were from Engineering, followed by 12.2% from Dental studies and 10.4% from Arts & Science. A significant proportion of participants (64.3%) belonged to rural areas, while 35.7% were from urban areas. Most participants identified as Hindu (93.6%), with 3.8% Muslims and 2.7% Christians, indicating a predominantly Hindu population. [Table 1]

Table 1: Sociodemographic profile of study participants

Sociodemographic profile		Frequency (N=2901)	Percentage (%)
Age	16-20	2127	73.3
	21-25	642	22.1
	26-30	76	2.6
	31-35	18	0.6
	36-40	27	0.9
	41-45	11	0.4
Mean + SD		20.15 + 3.12	
Educational Qualification	Engineering	1918	66.1
	Dental	353	12.2
	Arts & Science	302	10.4
	Nursing	170	5.9
	Management Studies	104	3.6
	Medicine	46	1.6
	ANM	5	0.2
	Health Science	1	0
	Pharmacy	1	0
Place of Residence	Rural	1865	64.3
	Urban	1036	35.7
Religion	Hindu	2714	93.6
	Muslim	109	3.8
	Christian	77	2.7
	Atheist	1	0

As shown in [Table 2], a vast majority of the participants (93.2%) used sanitary pads, while 3.2% reported using menstrual cups, and 3.6% used a combination of tampons, cloth pads, or other menstrual products. 83.4% of participants had regular menstrual cycles, while 16.6% experienced irregular cycles. Most reported a moderate flow (88.6%),

whereas 8.1% had heavy flow and 3.3% had scanty flow. 92.9% of participants reported no gynecological problems, while 7.1% reported some issues. When asked about problems faced with their sanitary products, 19.3% reported discomfort, while 80.7% faced no problems.

Table 2: Menstrual hygiene practices

MENSTRUAL HYGIENE PRACTICES		Frequency (N=2901)	Percentage(%)
Type of sanitary hygiene product used	Combined use (tampons, cloth pad, etc.)	94	3.6
	Menstrual cup	203	3.2
	Sanitary pads	2604	93.2

Is your menstrual cycle regular?	Yes	2418	83.4
	No	483	16.6
Nature of menstrual flow	Heavy	235	8.1
	Moderate	2569	88.6
	Scanty	97	3.3
Do you have any gynecological problems?	Yes	205	7.1
	No	2696	92.9
Do you face any problems with the sanitary product you use during your menstrual period?	Yes	559	19.3
	No	2342	80.7

Table 3: Problems faced with sanitary products

Various Problems Faced	Frequency (N)*(multiple responses)	Percentage(%)
Expensive	274	9.5%
Disposal problems	312	10.7%
Discomfort	784	27.1%
Leakage	429	14.7%
Foul odor	242	8.3%
Itching	705	24.3%
Rashes	507	17.5%
No issues	1313	45.3%
Irritation	772	26.6%

*Multiple responses

Among those who reported issues with their current sanitary products, the most common problems were discomfort (27.1%), irritation (26.6%), and itching (24.3%). Other notable issues were leakage (14.7%), rashes (17.5%), and

disposal problems (10.7%). Additionally, foul odor (8.3%) and the expense (9.5%) were also concerns. However, 45.3% of participants reported no issues, indicating that many were comfortable with their current menstrual hygiene products.

Table 4: knowledge of menstrual cups

Knowledge of Menstrual Cups	Frequency (N=1817)	Percentage(%)	
Do you know about menstrual cup?	Yes	1817	62.6
	No	1084	37.4
What is your source of information?	Family	248	13.6
	Friends	325	17.9
	Through Education	28	1.5
	Social media and internet	1214	66.8
	Doctor	2	0.1
Menstrual cup is made of which of the following material?	Latex	97	5.3
	Rubber	345	19
	Silicone	910	50.1
	Don't know	465	25.6
Do you think the menstrual cup is a safe device to use?	Yes	1293	71.2
	No	524	28.8
Do you think the menstrual cup is reusable?	Yes	1602	88.2
	No	215	11.8
Do you think the menstrual cup is expensive compared to the sanitary pads?	Yes	964	53.1
	No	853	46.9
Which of the following method is the best for menstrual cup sterilization?	Boiling water	1276	70.2
	Water	89	4.9
	Water and Soap	69	3.8
	Don't Know	383	21.1
At what frequency the menstrual cup should be emptied? (assuming normal menstrual flow)	2 to 3 times/ day	160	8.8
	2 times/ day	361	19.9
	> 3 times/day	586	32.3
	Don't know	710	39.1

Table 5: self-assessment of knowledge on menstrual cups

How will you rate your knowledge on menstrual cup on the scale of 1-10, ranging from lowest to highest?	Frequency (N=1817)	Percentage(%)
1	78	2.7
2	70	2.4
3	132	4.6
4	136	4.7
5	465	16
6	225	7.8
7	276	9.5
8	255	8.8

9	108	3.7
10	72	2.5
Total	1817	62.6
MEAN + SD	5.78 + 2.176	

When assessing knowledge about menstrual cups, 62.6% of participants were aware of them, while 37.4% had never heard of them. The most common source of information was social media and the internet (66.8%), followed by friends (17.9%) and family (13.6%). Only a small percentage learned about menstrual cups through education (1.5%) or doctors (0.1%). Regarding the material composition, 50.1% correctly identified silicone, while others believed it was made of rubber (19%) or latex (5.3%), and 25.6% did not know. Furthermore, 71.2% of participants believed menstrual cups

were safe, whereas 28.8% had concerns about their safety. Participants were asked to rate their knowledge of menstrual cups on a scale of 1-10, with an average score of 5.78 ± 2.176 , suggesting moderate awareness. Only 16% rated themselves at level 5, while 9.5% rated themselves at level 7, and 8.8% at level 8. A significant proportion (27.5%) rated themselves below 4, indicating low self-assessed knowledge levels. This suggests the need for greater educational efforts to improve understanding and confidence regarding menstrual cups.

Table 6: attitude towards menstrual cups

Attitude Towards Menstrual Cups		Frequency (N=2898)	Percentage(%)
I have tried to know more about the menstrual cup	Yes	1262	43.5
	No	1636	56.4
Menstrual cup is a better alternative to other sanitary products	Yes	981	33.8
	No	458	15.8
	Don't know	1459	50.3
I would recommend the usage of menstrual cups to others	Yes	908	31.3
	No	693	23.9
	Don't know	1297	44.7
I would likely to consider using a menstrual cup in the near future	Currently using it/used it	170	5.9
	Very likely	665	22.9
	Not at all likely	652	22.5
	I don't know	1411	48.6

Regarding actively seeking information about menstrual cups, 43.5% had tried to learn more, while 56.4% had not. When asked whether menstrual cups were a better alternative to other sanitary products, only 33.8% agreed, while 50.3% were unsure. 31.3% of participants were willing to

recommend menstrual cups to others, while 23.9% would not, and 44.7% were uncertain. Regarding the likelihood of trying a menstrual cup, 22.9% were very likely to consider it, but 48.6% were unsure, and 22.5% had no intention of using one.

Table 7: experience of menstrual cup users

Experience of Menstrual Cup Users		Frequency (N=203)	Percentage(%)
Do you use menstrual cup in practice?	Yes	203	7
	No	2698	93
Duration of usage of menstrual cup?	< 6 months	123	60.6
	6- 12 months	46	22.7
	>1 year	34	16.7
Do you regularly use it in every cycle?	Yes	111	54.7
	No	92	45.3
Usage of other sanitary products along with menstrual cup on days with heavy flow?	Yes	110	54.2
	No	93	45.8
Do you find more comfortable doing daily activities while using a cup?	Yes	140	69
	No	63	31
How will you rate ease of using a menstrual cup during menstrual cycle?	Very easy	77	37.9
	Easy after using a few times	95	46.8
	Difficult	31	15.3
What are the reasons for choosing menstrual cup over other sanitary products?	Economical	33	16.3
	Environment friendly	72	35.5
	Increased comfort in doing daily activities	48	23.6
	Less frequency in changing/cleaning	25	12.3
	Less leakage	25	12.3
What is the likelihood of continuing usage of a menstrual cup?	Very likely	73	36
	I will try and see for a few more cycles	102	50.2
	Not likely	28	13.8

Only 7% (203 participants) reported using menstrual cups, while the majority (93%) had never tried them. Among users, 60.6% had used them for less than 6 months, 22.7% for 6-12

months, and 16.7% for over a year. More than half of the users (54.7%) used the menstrual cup regularly in every cycle, while 45.3% alternated between cups and other

products. The majority (69%) of the users found the menstrual cup comfortable for daily activities, while 31% did not. In terms of ease of use, 37.9% found it very easy, 46.8% adjusted after a few uses, and 15.3% found it difficult. The most cited reasons for using menstrual cups were

environmental benefits (35.5%), comfort in daily activities (23.6%), and economic factors (16.3%). Regarding continued usage, 50.2% were open to trying the menstrual cup for a few more cycles, while 36% were certain about continuing, and 13.8% were unlikely to continue.

Table 8: concerns/ difficulties of the participants regarding the use of menstrual cups

Concerns/ difficulties of the participants regarding the use of menstrual cups	Frequency (N) Multiple responses	Percentage (%)
Discomfort	2033	
Fear of insertion of a foreign body	878	16.1
Limited knowledge	872	16
Difficulty in accessing the cups	595	10.9
Allergies/infection	410	7.5
Leakage	401	7.3
Fear of losing virginity	268	4.9

The most common concern regarding menstrual cup usage was discomfort (37.2%), followed by fear of inserting a foreign body (16.1%), and limited knowledge (16%). Other concerns included difficulty accessing menstrual cups (10.9%), fear of infection or allergy (7.5%), and worries about leakage (7.3%). Around 5% of participants feared that using a menstrual cup would affect their virginity, highlighting the need for education to dispel myths and misconceptions. Minor concerns such as sterilization (0.03%) and menstrual cramps (0.03%) were also noted.

DISCUSSION

The Menstrual Hygiene Alliance of India (MHAI) estimates that there are 336 million menstruating women in India, of whom 36% use disposable sanitary napkins, for a total of 121 million women, according to the State of India's Environment 2019 Survey.² This suggests that India has 12.3 billion disposable sanitary napkins to dispose of annually, the most of which are not composting or biodegradable. Items contaminated with blood and bodily fluids, such as cotton, dressings, soiled plastercasts, lines, and bedding, are considered biomedical waste and should be burned, autoclaved, or microwaved to destroy pathogens, per the Solid Waste Management (SWM) Rules of 2016.^[10]

Our study had 2,901 participants, whereas studies by Ballal et al. and Eti et al. had a much smaller sample size of 300 and 400 participants respectively.^[7,8] The age distribution in our study showed that 73.3% of participants were between 16 and 20 years, whereas in the Ballal et al. study, only 28% fell within this age group, with the majority (38%) in the 21-25-year bracket. Additionally, the Ballal et al. study had a greater representation of older age groups, with 19.33% aged 26-30 years and 5% aged 40 years or older. In contrast, the present study had only 4.6% aged 25 years or older.^[7]

Regarding education, the current study included a majority of engineering students (66.1%). In comparison, Ballal et al. had 50.67% undergraduate students and a notable proportion of medical students (48%), and Eti et al. had 100% medical students.^[7,8] Additionally, Ballal et al. included doctors (8.67%) and paramedical staff (2%), whereas our study primarily included students. Regarding marital status, 78% of participants in Ballal et al. were unmarried, which aligns

closely with the younger age group in our study. Income levels also differed: 61.67% of Ballal et al. study participants earned less than Rs. 20,000, whereas our study did not explicitly assess income levels.⁷

Awareness of menstrual cups was higher in the Ballal et al. and Eti et al. studies, with 82% and 93% of participants, respectively, having heard about them, compared to 62.6% in our study.^[7,8] This difference could be attributed to the fact that the Ballal et al. and Eti et al. studies included a higher percentage of medical students of 48% and 100% respectively, who are likely to have greater exposure to menstrual health topics.^[7,8] Also, Devan et al. reported a significantly higher level of awareness, with 93.4% of females in an urban setting in South Kerala aware of menstrual cups.²⁰ In both studies, social media and the internet played a significant role in spreading awareness, which was in line with the Devan et al. study, which could be attributed to the widespread influence of social media, which was the primary source of information for 76.6% of their respondents, compared to friends (37.4%) and medical personnel (13.7%) in their research.²⁰ In the Ballal et al. study, good knowledge (≥ 6 score) was significantly associated with medical students (66.67%). In contrast, in our study, the average self-rated knowledge score was only 5.78 ± 2.176 , indicating a moderate level of awareness.^[7] Also, Eti et al. in their study revealed that 99% of medical students correctly identified the mechanism as blood collection rather than absorption, and 84.13% of students believed menstrual cups could be used by virgins, showing a clear understanding of how menstrual cups function.^[8]

Another notable finding from Ballal et al.'s study was that the proportion of participants with good knowledge was highest among those aged 36-40 years (83.33%). In contrast, in the current study, younger age groups predominated, potentially affecting overall awareness levels.^[7]

To maintain sanitary hygiene during menstrual days, the majority (93.2%) in our study used a sanitary pad alone or a combination of a cloth and a tampon. According to surveys conducted in India, the majority of adults and school-age girls use sanitary napkins, as this study also found. This may be because menstrual cups are less common among these age groups than hygienic pads and cloth, or because napkins are provided free at the main health care center.^[11,14-16]

Despite higher awareness in the Ballal et al. and Eti et al. studies, actual menstrual cup use remained very low in both. In the

present study, only 7% had tried menstrual cups, while in Ballal et al study, this figure was even lower at 2.67% and in the Eti et al study none of their study participants had used one.^[7,8] This suggests that while awareness levels may vary, it does not necessarily translate to adoption. However, in the study by Devan et al., 15.1% of participants tried a menstrual cup, which was higher than in our study.^[20] Among those who had used menstrual cups in Ballal et al.'s study, only 3 participants had used them for 2-3 cycles, while the rest had used them only once, indicating hesitation in continued use.^[7] In contrast, in our study, 16.7% had used them for over a year, and 54.7% used them in every cycle, showing slightly better retention among users. According to a meta-analysis, 70% of participants across 13 trials expressed a desire to continue using menstrual cups.^[11]

The most commonly cited reasons for using menstrual cups in studies included comfort, reduced odor, and reduced environmental impact.^[7] However, in our study, 69% of users found menstrual cups comfortable for daily activities. In contrast, in Ballal et al.'s study,^[7] 87.5% found removal easy, and 37.5% found insertion easy, indicating a learning curve for new users. According to a similar study conducted in Gujarat, menstruation cups were more popular among adults aged 20 to 50 because they were easier to insert and remove, comfortable, dry, and had fewer adverse effects, including rashes, dryness, or infection.^[14] Also, a study comparing the safety of menstrual cups to sanitary napkins and pads in Kenyan school girls aged 14 to 16 revealed that menstrual cups were more effective since long-time users displayed lower levels of *E. coli* growth and no signs of health problems.^[17]

Our study identified barriers to menstrual cup adoption, where 37.2% cited discomfort, and 16.1% feared inserting a foreign body, and lack of awareness (16%). In Ballal et al.'s study, the most common disadvantages reported were cumbersome usage, higher cost, and poor availability, which aligns with our findings.^[7] Notably, Ballal et al.'s study also highlighted economic factors, as 61.67% of participants had a monthly income below Rs. 20,000, making cost a significant deterrent.⁷ In another study by Devan et al, the authors found that 56.2% of participants cited fear of insertion as the primary reason for not trying menstrual cups, followed by 22.6% reporting a lack of knowledge.^[20]

According to Eti et al, 60.2% of students thought that menstrual cups could be used during the postpartum period (less than six weeks), which is not advised because of the danger of infection. Additionally, there are misconceptions regarding the usage of menstruation cups, as 5.3% of students incorrectly believed that they may be used as a contraceptive method. The high preference for sanitary pads (76.6%) in the Eti et al study was another significant factor in non-adoption, indicating that students were content with the status quo and had not looked into other possibilities.^[8]

Additionally, Ballal et al.'s study reported concerns about side effects like rashes and dryness. In contrast, our study found that 4.9% of participants feared menstrual cups might affect virginity, highlighting the persistence of cultural taboos in menstrual health discussions. In Ballal et al, more than half of the participants believed menstrual cups were

more beneficial than pads, yet only 43.67% considered using them. In the present study, only 33.8% agreed that menstrual cups were a better alternative, while 50.3% were unsure. This suggests that while the benefits of menstrual cups are recognized, hesitation remains in actual adoption.^[7]

In the present study, a large proportion of participants were undecided about recommending menstrual cups (44.7%), indicating the need for further educational interventions. In Ballal et al.'s study, many cited a lack of information as a reason for reluctance. However, compared with our study, Kakani et al,^[14] reported a higher acceptance rate because their subjects had received earlier counseling.

CONCLUSION

Our study highlights moderate awareness (62.6%) of menstrual cups among young engineering students, yet actual use remains low (7%). While participants recognize some benefits, misconceptions and barriers—such as fear of insertion, discomfort, and cultural taboos—continue to hinder adoption. The study emphasizes the need for targeted awareness campaigns, improved education on menstrual health, and better accessibility to menstrual cups. Addressing these gaps through education, affordability, and availability could increase acceptance and adoption of menstrual cups as a sustainable alternative to conventional menstrual products.

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Conflicts of interest

There are no conflicts of interest.

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