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Assessing Changes in Women's Knowledge, Perceptions, and Psychological Responses to Menstrual Cup Usage

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Abstract: Women need menstrual hygiene to prevent infection, feel comfortable, and maintain dignity. In recent years, awareness and use of clean menstrual products in India have increased, although gaps remain, especially in rural areas. With adequate education and support, women can use reusable menstrual cups. Thus, this study examined rural Keralan women's knowledge and views on menstrual cups. A cross-sectional descriptive study was conducted with 208 women aged 17–45 in Kannur, Kerala. Samples meeting inclusion requirements were selected using convenience sampling. Knowledge of menstrual cup use was assessed using a questionnaire. Descriptive and inferential statistics were used to examine the data, and the results showed that most women (52.43%) had good knowledge about menstrual cups, with a mean score of 15. A significant association was found between knowledge score and selected demographic variables, including age (X2 = 67.5), dysmenorrhea (X2 = 29.26), menstrual care product (X2 = 55.75), and source of information (X2 = 67.5). The findings indicate a positive but gradual shift toward awareness of sustainable menstrual hygiene practices among women in this region. These results suggest that broader education and consistent health promotion efforts are essential to ensure uniform awareness across all segments of women.

Keywords: Reusable Menstrual Cups; Broader Education; Rural Areas; Inferential Statistics; Clean Menstrual Products; Convenience Sampling; Demographic Variables; Psychological Responses.

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1. Introduction

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1.1. Background of the Study

Menstruation is a natural biological process in women and adolescent girls. It is a major transition in the reproductive life cycle. It is the regular loss of the uterine lining when conception does not take place and is an important marker of reproductive health. The menarche, the start of menstruation, is one of the most important physiological changes that occur in adolescence. This stage is generally marked by physical, emotional and psychological changes and needs appropriate knowledge, awareness and hygienic practices to ensure overall well-being [1]. Although menstruation is a natural biological process, it is still surrounded by social taboos, cultural restrictions and misinformation in many parts of the world, especially in developing countries like India. These factors significantly influence menstrual hygiene practices and access to the appropriate menstrual products. Menstrual hygiene management is important for women's health and helps prevent infections, especially reproductive tract infections (RTIs). Poor menstrual hygiene practices, such as use of unclean absorbents, inadequate washing facilities and improper disposal methods, may lead to various health complications [2]. These include bacterial infections, urinary tract infections, skin irritation and long-term reproductive health issues. Hence, promoting safe, affordable and sustainable menstrual hygiene products is critical to improving women's health outcomes and ensuring dignity during menstruation. Today, many menstrual hygiene products are available, and one of the most popular and viable alternatives to conventional sanitary pads and tampons is menstrual cup [3]. A menstrual cup is a flexible, bell-shaped cup that we insert into your vagina during your period to collect your menstrual fluid. It is usually made of medical-grade silicone, latex or thermoplastic elastomer, all of which are known for their safety, durability and hypoallergenic qualities.

Menstrual cups collect the menstrual flow instead of absorbing it like sanitary pads and tampons. Collecting the flow reduces the chance of dryness and irritation. A cup makes a seal against the vaginal walls, so there's no leak. We can leave it in for longer [4]. The cup can be worn for 6 to 12 hours depending on the individual's flow, then emptied, cleaned and reinserted. Longer wear time offers convenience and less frequent changes, making it especially ideal for women with busy lifestyles or limited access to sanitation facilities. One major benefit of menstrual cups is their long life. With proper care, a menstrual cup can last five to ten years. This makes it a cost-effective alternative to disposable menstrual products. The upfront cost of a menstrual cup may be higher than a pack of sanitary pads, but over time it can lead to huge savings [5]. This is particularly helpful for women from lower-income backgrounds who may not be able to afford disposable products regularly. Beyond the economic advantages, menstrual cups also have a massive environmental impact. Disposable sanitary pads and tampons are used in large numbers and produce a lot of non-biodegradable waste, which is a serious environmental problem. Because they are reusable, menstrual cups significantly reduce solid waste and encourage sustainable menstrual hygiene practices. Menstrual waste is an emerging environmental threat in countries like India, which have high population density and often poor waste management systems. Millions of sanitary pads are disposed of every day. Many of them are made using plastic components that take hundreds of years to decompose [6]. Flushing pads or disposing of them in open spaces is improper and contributes to environmental pollution and public health risks.

In this respect, menstrual cups are an environmentally friendly alternative that is consistent with sustainable development goals. Reducing Environmental Degradation: Menstrual cups help decrease reliance on disposable products and encourage responsible consumption. While there are many benefits, the adoption of menstrual cups in India remains low [7]. Several factors are responsible for this slow acceptance, including lack of awareness, cultural beliefs, misconceptions and reluctance to vaginal insertion. Many women are unfamiliar with menstrual cups and may have concerns about safety, comfort and ease of use. Open discussion about menstrual health is also often discouraged by societal taboos surrounding menstruation, which further restricts access to accurate information [8]. Educational initiatives and awareness programmes are thus critical to addressing these barriers and promoting informed decision-making among women and adolescent girls. Safe, effective use and care of menstrual cups are essential. The cup should be sterilised by boiling in water for a few minutes before first use. Empty the cup every 4 to 12 hours, depending on menstrual flow. When you remove it, rinse it with clean water and replace it. At the end of every menstrual cycle, wash the cup thoroughly and boil it again to sterilise it. Good hand hygiene during insertion and removal also helps prevent infection. For most users, menstrual cups are safe to use and have few known adverse effects when used correctly [9]. Another key consideration is choosing the right size and type of menstrual cup. Most manufacturers offer at least two sizes, generally based on age, childbirth history and menstrual flow. If we have a heavy flow or delivered vaginally, we may need a larger size. Younger women or those with a light flow may prefer a smaller size.

Other factors that affect cup choice include cervical height, pelvic floor muscle strength and personal comfort [10]. The cup's firmness and flexibility can affect ease of insertion and comfort when wearing it. Therefore, users may have to experiment with different options to find the best fit. Health Benefits of Menstrual Cups vs. Traditional Menstrual Products: Menstrual cups offer many health benefits over traditional menstrual products. They don't absorb moisture, so they help to maintain the natural vaginal environment and reduce the risk of dryness and irritation [11]. Unlike tampons, menstrual cups aren't associated with toxic shock syndrome (TSS), a rare but serious disease caused by toxins from bacteria. They also eliminate exposure to toxic chemicals and synthetic materials often found in disposable products. This makes them a safer choice for women with sensitive skin or allergies. Education and awareness play an important role in promoting menstrual hygiene. Schools, healthcare providers

and community organisations play a key role in raising awareness of the availability of menstrual health and hygiene products. Menstrual education should include information about the menstrual cycle, hygiene practices, product options, and proper disposal methods [12]. It should also help dispel cultural myths and misconceptions so women can make informed choices about their health. Involving men and boys in menstrual education can also help reduce stigma and create a supportive environment for women and girls. Government initiatives and policy interventions are also important to improve menstrual hygiene management. Initiatives that include affordable menstrual products, sanitation infrastructure and awareness can greatly improve access and uptake [13]. In India, various schemes have been launched to distribute sanitary pads and improve menstrual health education.

However, participation in sustainable alternatives like menstrual cups in such programs remains minimal. Subsidies, awareness campaigns and training programs can help expand the reach and acceptance of reusable products. Menstrual hygiene management is also linked to gender equality and social inclusion, in addition to health and environmental issues. Inadequate access to menstrual hygiene products and facilities can result in absenteeism from school or work, reduced participation in daily activities, and loss of dignity [14]. This disproportionately impacts girls and women in rural and marginalised communities. Accessible, sustainable menstrual hygiene solutions can promote women's participation in education, employment and social life, contributing to overall development and empowerment. Long-term impact will be achieved in part by integrating menstrual hygiene management into broader public health and development frameworks. Treating menstrual health as a basic human right is about enabling women and girls to manage their menstruation safely, hygienically and with dignity. Innovative solutions such as menstrual cups are a practical, sustainable and health-oriented approach to this goal. Ongoing research, policy support and community engagement are needed to confront today's challenges and to foster wider acceptance. Menstruation is a significant factor in women's health that requires proper hygiene management to prevent health risks and ensure well-being. Menstrual cups are a promising alternative to conventional menstrual products, with economic, environmental and health advantages. Although adoption has been challenging, increased awareness, education, and supportive policies can facilitate their acceptance and use [15]. By adopting sustainable menstrual hygiene practices, societies can progress towards better health outcomes, environmental sustainability and gender equality.

2. Review of Literature

In 2022, a quantitative study included 100 teenage females from two higher secondary schools in Kerala, India. The study aimed to evaluate attitudes toward and understanding of menstrual cup use. According to the study's findings, 50% of students had good knowledge, 35% had sufficient knowledge, 8% had exceptional knowledge, 6% had weak knowledge, and 1% had extremely poor understanding of menstrual cup use. The majority viewed menstrual cups favorably (81%), 19% neutrally, and none negatively [1]. Thus, most participants had positive attitudes toward using menstrual cups. In Kerala, India, 50 teenage schoolgirls participated in another descriptive study assessing their attitudes and knowledge of menstrual cups. Purposive sampling was used to select participants. Researchers gathered data using a standardized questionnaire. The results showed that 4% had insufficient knowledge, 86% had moderate knowledge, and 10% had adequate knowledge [2]. No discernible correlation was found between teenage girls' knowledge of menstrual cups and the chosen demographic factors. A quantitative study included 400 female undergraduate medical students from Raja Rajeswari Medical College and Hospital in Karnataka. The study aimed to evaluate participants' understanding of menstrual cups and their use.

According to the study's findings, none of the 372 participants who answered the questionnaire had ever used a menstrual cup. 76.6% said they didn't look into alternatives because they were comfortable with sanitary pads, 27.5% said they weren't using them because they weren't familiar with the insertion and removal process, and 15.8% linked it to cultural factors because they weren't sure whether virgins could use them. At the Gujarat Medical Education and Research Society, 158 women aged 22 to 50 with normal menstrual cycles participated in a quantitative study. The study aimed to assess the menstrual cup's suitability and effectiveness in maintaining menstrual hygiene and wellness. Participants were given menstrual cups to use for three consecutive menstrual cycles [3]. According to the study's findings, 80% of women found wearing the cup to be easy in the first cycle, 83.33% in the second, and 90.11% in the third. In the first cycle, 80% of the sample reported being comfortable, and 20% reported being uncomfortable; in the second cycle, 88% reported being comfortable, and 12% reported being uncomfortable. In the third cycle, 6.66% of participants reported discomfort and 93.33% reported comfort [4]. The first cycle had 6.66% leakage, the second cycle had 5.33%, and the third cycle had 3.33%. Ninety percent of the samples reported a favorable overall experience using menstrual cups compared to their prior sanitation method.

At the National Medical College Campus in Birgunj, Parsa, 83 nursing students participated in a descriptive cross-sectional study. The nursing students were selected using stratified proportionate random sampling. For data collection, a standardized, self-administered questionnaire was created [5]. The study results showed that 56.7% had a moderate level of knowledge, 13.3 % had an inadequate level of knowledge, and only 12.0% had an adequate level of knowledge regarding the menstrual cup. The study also reveals that the majority of respondents (97.6% knew the area of insertion of the menstrual cup, whereas only 22.9% gave a correct response about the parts of the menstrual cup. The majority (85.1% had knowledge regarding the duration

of emptying the menstrual cup during menstruation, and 32.5% knew the average holding capacity of the menstrual cup, whereas 28.9% gave a correct response about storage of the menstrual cup [6]. A descriptive study was carried out on fifty women aged twenty to thirty-five who visited the outpatient department (OPD) of a private hospital in Kerala, India, either as patients or bystanders. The study used non-probability purposive sampling. A systematic questionnaire was used to gather information about menstrual cup knowledge and attitudes. According to the study's findings, 24% of women had strong knowledge, 14% had low knowledge, and roughly 62% had an average understanding of menstrual cups. About 44% of women had a neutral opinion toward menstrual cups, while 56% of women had a positive attitude. No one had a negative attitude.

2.1. Need for Study

A key component of the Swachh Bharat Mission guidelines (SBM-G) is menstrual hygiene management (MHM). The Menstrual Hygiene Alliance of India (MHAI) estimated that 336 million women in India menstruate, of whom 36% use disposable sanitary napkins—121 million women in total—according to the State of India's Environment 2019 report. Sanitary pads can lead to allergic reactions, skin irritation, rashes, and pollution. The menstrual cup is an alternative to sanitary pads and tampons for managing menstrual hygiene. During menstruation, the menstrual cup—a bell-shaped device made of premium medical silicone—is placed inside the vagina.

The device should be boiled once a month and can be used for 5-10 years. It collects more blood than standard sanitary pads, is environmentally friendly and has few known side effects. Knowledge about menstrual cups can motivate women to start using them, as they are an eco-friendly, cost-effective and sustainable method that promotes menstrual hygiene. Menstrual hygiene is an important part of women's health because it helps prevent infection, supports comfort, and promotes dignity during menstruation. In India, awareness and use of hygienic menstrual products have improved in recent years, but gaps remain, especially in rural areas. Reusable menstrual cups can be acceptable when women receive proper information and support. Hence, the following study was proposed with the objectives defined below.

2.2. Problem Statement

A study to assess the level of knowledge and perception of the use of menstrual cups among women in selected rural communities in Kerala, India.

2.2.1. Objectives

- A study to assess the level of knowledge and perception regarding menstrual cups among women in selected rural communities.
- To determine the association between the level of knowledge of women and selected demographic variables.

2.2.2. Hypothesis

- **H_1:** There is a significant association between the level of knowledge and perception of menstrual cups and selected demographic variables.

2.2.3. Assumption

The study assumes that:

- Women may have some knowledge of using menstrual cups.
- Use of menstrual cups may be less common among rural women.
- Women may cooperate and respond appropriately to the questionnaire.

3. Materials and Methods

A Cross-sectional quantitative approach was used for the present study, as the purpose was to assess knowledge and perceptions of menstrual cup use among rural women. A descriptive study design was adopted to assess knowledge and perceptions. The study was conducted in a selected rural community in Thaliparamba Taluk, Kannur district, Kerala, India.

The demographic variables studied were age, religion, marital status, qualification, monthly income, family type, age of menarche, dysmenorrhea, length of menstrual bleeding, type of menstrual care product, previous knowledge regarding menstrual cup, and source of information. The sample consisted of 208 women aged 17-45 years who met the inclusion criteria.

3.1. Sampling Techniques

The researcher used convenience sampling to select participants and elicit information about women's knowledge of menstrual cup use. Women who met the inclusion criteria and were willing to participate were selected as the study sample. Inclusion criteria included women who were willing to participate and were of reproductive age during the study period.

3.2. Instrument of the Study

The demographic variables include age, religion, marital status, qualification, and monthly income; menstruation, personal care products, and previous knowledge and sources of information regarding the menstrual cup. Respondents were asked to place a tick mark () next to the appropriate option in the space provided. The knowledge and perception questionnaire consisted of 20 questions on the menstrual cup. The questionnaire consisted of multiple-choice questions. The maximum total score was 20, and the minimum score was 0.

4. Results and Discussions

4.1. Description of the Demographic Variables

The majority (94.2%) of the sample was aged 17-25 years. The majority (51.4%) of the sample belonged to Hinduism, and (92.8%) were single. Most (92.3%) were undergraduates. The majority (79.3%) had an income of <30,000. (81.7%) samples belonged to a nuclear family. The majority (65.9%) attained menarche at ages 10-13 years. Most of the samples (65.9%) had dysmenorrhea. In terms of duration, the majority (49.5%) had 5-7 days of menstruation. (83.2%) used sanitary pads as their personal care products. The majority (92.3%) of the samples have prior knowledge of using menstrual cups (Table 1).

Table 1: Description of level of knowledge and perception regarding usage of menstrual cup

Frequency and Percentage Distribution of the Sample According to Their Level of Knowledge, N=208			
Level of Knowledge	**Range of Scores**	**Frequency**	**Percentage**
Good	16–20	109	52.43%
Average	11–15	83	39.9%
Below Average	6–10	14	6.70%
Poor	1–5	2	0.9%

Most samples (58.3%) gained information about menstrual cups from social media. Knowledge and perceptions of women in selected institutions regarding menstrual cups were calculated using frequency, mean, median and standard deviation. Among 208 women in selected institutions who participated in this study, the majority (52.43%) had good knowledge, (39.9%) had average knowledge, (6.70%) had below-average knowledge, and (0.97%) had poor knowledge regarding menstrual cups. The mean knowledge score is 15.21, with a standard deviation of 2.89 and a range of 4-20; the median score is 10. Table 2 shows that the mean knowledge score is 15.21, with a standard deviation of 2.89, a range of 4-20, and a median score of 10. Chi-square analysis was used to examine the relationship between women's knowledge levels and particular demographic factors.

Table 2: Mean, median and standard deviation of women's knowledge and perception on usage of menstrual cup

Range	Mean	Median	Standard Deviation
4–20	15.21	10	2.89

The knowledge score is significantly correlated with some demographic factors, including age (df (48) = 67.5, calculated value = 69.304), dysmenorrhea (df (16) = 29.26, calculated value = 32.468), menstrual care product (df (32) = 55.75, calculated value = 47.050), and source of information (df (48) = 67.5, calculated value = 77.711) (Table 3).

Table 3: Association between the level of knowledge among women and selected demographic variables, N=208

No.	Demographic Variables	Chi-Square Value	Degree of Freedom	Table Value	Inference
1	Age	69.304	48	67.5	S
2	Religion	17.865	32	55.75	Ns
3	Marital Status	17.525	16	29.26	Ns
4	Qualification	11.296	16	29.26	Ns
5	Monthly Income	42.196	48	67.5	Ns

6	Family Type	40.098	32	55.75	Ns
7	Age of Menarche	11.269	16	29.26	Ns
8	Dysmenorrhea	32.468	16	29.26	S
9	Duration of Menstruation	19.821	32	55.75	Ns
10	Menstrual Care Product	47.050	32	55.75	S
11	Previous Knowledge	23.044	16	29.26	Ns
12	Source of Information	77.711	48	67.5	S
P>0.05; (S: Significant, NS: Not significant), df (16) = 29.26, df (32) = 55.75, df (48) = 67.5.					

There is no significant association between the knowledge scores and other demographic variables such as religion df (32) = 55.75 calculated value = 17.865, marital status df (16) = 29.26 calculated value = 17.525, qualification df (16) = 29.26 calculated value = 11.296, monthly income df (48) = 67.5, calculated value = 42.196, Family type df (32) = 55.75, calculated value = 40.098, age of menarche df (16) = 29.26, calculated value = 11.269, duration of menstrual bleeding df (32) = 55.75, calculated value = 19.821, previous knowledge df (16) = 29.26, calculated value = 23.044, at 0.05 levels of significant.

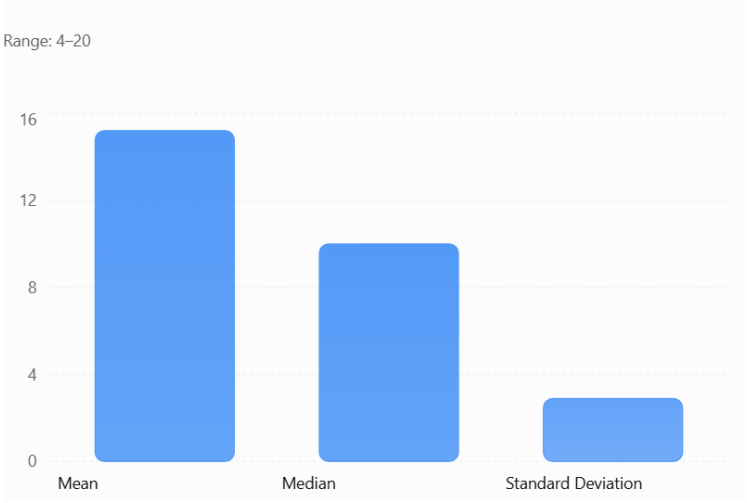


Figure 1: Statistical distribution of women's knowledge and perception scores on menstrual cup usage

Figure 1 demonstrates women's knowledge and perception of menstrual cup use (mean, median, and SD). Observed ratings ranged from 4 to 20. The mean score was 15.21, and median score was 10. The standard deviation was 2.89. Figure 1 illustrates the variation in participants' knowledge and perception assessments. The study's findings are discussed below in relation to the findings of the other studies reviewed by the researcher. In the present study, the majority (52.43%) of participants had good knowledge, 39.9% had Average knowledge, 6.70% had below-average knowledge, and 0.97% had poor knowledge regarding menstrual cups. The present study results are congruent with those of a quantitative study conducted among 100 adolescent girls from two higher secondary schools in Kerala, India, in 2022. According to the study's findings, 50% of students had good knowledge, 35% had sufficient knowledge, 8% had exceptional knowledge, 6% had weak knowledge, and 1% had extremely poor understanding of menstrual cup use. The majority (81%) had a positive attitude towards menstrual cup usage, 19% had a neutral attitude, and none had a negative attitude. Therefore, most subjects had a positive attitude toward menstrual cup use. Additionally, the current study sought to ascertain the relationship between certain demographic characteristics and women's knowledge levels. The study found a statistically significant correlation between a few demographic factors, including age, dysmenorrhea, menstrual care product, and information source. Other demographic variables, such as religion, marital status, education, monthly income, family type, menarche, length of menstrual flow, and prior knowledge, did not significantly correlate with knowledge scores. This study is consistent with a 2023 cross-sectional study evaluating women's menstrual cup knowledge, attitudes, and practices in an urban Kerala, India, environment. Knowledge of the menstrual cup was found to be statistically significantly correlated with younger age, educational status, socioeconomic status, and marital status among women of reproductive age.

5. Conclusion

This study analyzed women's knowledge and perceptions of menstrual cup use in a selected rural community in Kannur district, Kerala, India. The results indicated a mean knowledge score of 15.21, and more than half of the participants (52.43%) had favorable attitudes and sufficient knowledge regarding menstrual cups. The results indicate slow but promising growth in

awareness and acceptance of sustainable menstrual hygiene practices among women in the rural community. However, knowledge levels were substantially associated with certain demographic characteristics. No significant association was found with marital status, educational qualification, age at menarche, dysmenorrhea, duration of menstruation, previous knowledge, and source of information. The results underline the need to understand the demographic characteristics that affect women's awareness and perceptions of using menstrual cups. The overall awareness is gratifying, but the need of the hour is to concentrate on awareness and acceptance." Health education programs, social media awareness and institutional support might help overcome preconceptions and enhance confidence in adopting menstrual cups. Healthcare professionals also need to give accurate, accessible and reliable information to help people make educated choices. Better menstrual hygiene education can improve personal health, promote sustainable self-care practices, support women's well-being and protect the environment.

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Data Availability Statement: The data used in this study are available from the corresponding author upon reasonable request. Access will be provided for research purposes subject to appropriate conditions.

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Ethics and Consent Statement: The ethical clearance of this study was obtained from the Institutional Ethical Committee.

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