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Study on the Acceptance and Effectiveness of Menstrual Cups in managing Menstrual Health and Hygiene

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A B S T R A C T

Background: Menstruation, while a natural biological function, is often surrounded by socio-cultural stigmas, particularly in developing countries such as India. Menstrual cups offer a sustainable and hygienic alternative to traditional menstrual products.

Objectives:

1. Assess awareness about menstrual cups.
2. Evaluate the effectiveness of menstrual cups compared to sanitary napkins.
3. Compare ease of use in daily activities between the two products.
4. Measure user satisfaction.
5. Examine acceptance and willingness for continued use.

Methodology: A prospective study was conducted in the Department of Obstetrics and Gynaecology with 150 healthcare professionals. Participants completed a pre-tested questionnaire assessing initial awareness, followed by a three-month trial using menstrual cups. Post-use feedback was collected via telephonic interviews and structured questionnaires. Data were analyzed using SPSS v25, with significance set at $p < 0.05$.

Findings: Awareness of menstrual cups was observed in 83.3% of participants. By the third cycle, 90% reported ease of insertion. Most users (93%) found removal convenient, and 90% experienced comfort. Leakage was noted by only 6.66%, attributed mostly to early-use errors. Overall, 90% reported improved satisfaction compared to previous menstrual products.

Conclusion: Menstrual cups are practical, economical, and environmentally beneficial. Their wider promotion through governmental and non-governmental support can enhance menstrual hygiene practices across the country.

Keywords: Menstrual hygiene, menstrual cups, eco-friendly menstrual products

INTRODUCTION:

Despite being a normal biological occurrence, menstruation is fraught with cultural, religious, and traditional taboos in many developing nations, including as India. During their periods, many women have limitations such as loneliness, restricted access to water sources, and difficulty taking a bath. Menstruation is still stigmatized, as evidenced by the euphemisms used in discussions and advertising to avoid bringing up the topic directly.[1]

Despite cultural taboos, managing menstruation hygiene is still difficult since there aren't enough accessible and reasonably priced sanitary goods. Many women still use fabric, rags, or locally accessible absorbent materials, and they frequently struggle to wash and dispose of them in a healthy manner. In addition to increasing the risk of genital malignancies[2], poor menstrual hygiene can cause illnesses such as trichomoniasis vaginalis, candidiasis, and bacterial vaginosis. It can also prevent girls from attending school because of insufficient sanitary facilities and a dearth of appropriate menstruation products.[3]

The United Nations Environment Programme (UNEP) estimates that between 75 and 199 million tons of plastic are currently in the world's oceans, with about 1,000 rivers accounting for 80% of the total amount of plastic pollution that enters the ocean, or between 0.8 and 2.7 million tons per year. [4]

A study by the Indian Institute of Science (IISc) and Praxis Global Alliance estimates that only 30% of the 3.4 million tons of plastic garbage produced annually in India is recycled. On July 1, 2022, the Indian government banned single-use plastics due to the seriousness of the problem. At the moment, 43% of the nation's plastic trash is composed of single-use plastics.[3]

According to the article, a standard disposable sanitary pad is made up of four layers: a back sheet, absorbent core, transfer layer, and permeable top layer, as well as release paper and adhesives. There are typically 48% fluff pulp, 36% polyethylene and polypropylene, 7% adhesives, 6% super-absorbent polymers (SAPs), and 3% release paper in a sanitary pad. Out of these, only the paper and fluff pulp components are biodegradable, and about half of the pad is not.[3]

According to Menstrual hygiene alliance India, assuming 36% of women or girls in India use sanitary pads regularly with average of 8 pads per month,336 million menstruating women and girls will be using 1 billion sanitary napkins per month or 12.3 billion sanitary napkins.[2]

Additionally, when these pads' additives are exposed to sunlight, they decompose into microplastics that linger in the environment for years. According to a recent study, a single woman who uses disposable sanitary pads made by a commercial company produces about 14.1 kg of non-biodegradable trash in her lifetime.[3]

Menstrual cups have existed since at least 1932, when a "vaginal receptacle" was patented by L. J. Goodard. Menstrual cups are small, bell-shaped cups made of a flexible material (e.g. silicone or rubber) and are to be inserted into the vagina during menstruation. Rather than absorbing menstrual flow, these cups collect menstrual flow. It collects around 30 ml of blood lasting 4 to 8 hours before emptying is required. They can be reinserted after emptying and requires simple boiling which makes them better cost-effective product available in the market.

Medical-grade materials like silicone, rubber, latex, and elastomer are used by manufacturers to create these goods because they are soft, pliable, sterile, and easily cleaned. An eco-friendly and sanitary substitute for conventional menstruation products are menstrual cups. Even though they have been around for decades, their use has been restricted because of things like their bulk and the need for different sizes.

Other advantages of menstruation cups are their affordability and long-term usefulness. Because blood-collecting menstrual cups are non-absorptive and do not damage the vaginal epithelium, there is a lower risk of staphylococcus aureus infections, a known cause of toxic shock syndrome linked to menstrual tampon use.

Menstrual cups are an eco-friendly substitute for sanitary pads. Dr. Soumya Swaminathan, a former head scientist at the World Health Organization (WHO), claims that silicone menstrual cups significantly reduce waste generation—by almost 99%—when compared to disposable sanitary pads. She stressed the advantages of menstrual cups for the environment while speaking at the release of a report on managing menstrual hygiene. She advocated for communication initiatives led by the community to promote the use of menstruation cups, especially among women switching from cloth-based alternatives. Encouraging menstruation cups as alternative to pads and tampons would allow women to select the option that works best for them.

The purpose of this study is to evaluate the usefulness and adaptation of menstrual cups, especially for women who have historically relied on cloth, tampons, or sanitary pads for menstrual protection. To make wise judgments and give women and girls more thorough menstrual health education, knowledge about the safety, acceptability, and leaking of menstrual cups is crucial.

Aims / Objectives:

1. To know the level of awareness about the availability of menstrual cups
2. To compare the efficiency of menstrual cup vs sanitary napkins in healthy women.
3. To compare the ease of daily activities with the use of menstrual cup vs sanitary napkins in healthy women.
4. To compare the satisfaction score with the use of menstrual cup vs sanitary napkins in healthy women.
5. To assess the acceptability and willingness to continue menstrual cup in healthy women.

Methods:

A prospective study was conducted at the department of obstetrics and gynaecology, S S Institute of medical sciences & research Centre, Davangere. A total of 150 participants aged 20 to 50 with regular menstrual cycles were enrolled. The participants included health care providers like medical students, house surgeons, nursing staff, class IV workers, postgraduate students and a few consultants working in the hospital. They were asked to fill up a pre-questionnaire to know the level of awareness on menstrual cups.

Participants were provided with one appropriate size menstrual cups to use for three consecutive menstrual cycles, along with detailed instructions on proper usage. Feedback was collected after each cycle using a structured questionnaire. Informed consent taken. Ethical committee clearance obtained.

Inclusion Criteria:

- Married women with at least a high school education
- In the age group of 21 to 50 years
- Subjects included medical students, house surgeons, postgraduate students, consultants and class IV workers.
- Having Regular menstrual cycles
- Previous use of sanitary pads, tampons, or cloth
- Those consenting for the study

Exclusion Criteria:

- Women planning pregnancy within next six months
- Those allergic to silicone
- Women with active vaginal or urogenital infections
- Those unable to understand the study's purpose

The menstrual cup used in this study was made of medical-grade, non-toxic, and non- allergenic silicone, designed for internal use. It was flexible and had a thin-walled reservoir to collect menstrual fluid, ensuring comfort and minimizing bulk for easy insertion and removal. The insertion and removal techniques were demonstrated by the postgraduate student in charge of the study.

Procedure: Menstrual cups are small, bell-shaped cups made of a flexible material (e.g. silicone or rubber) and are to be inserted into the vagina during menstruation. A small stem protrudes from the cup's bottom for users to grab to pull the cup out after some time. Every time the menstrual cup is filled and removed, it needs to be emptied and rinsed before it can be reinserted into the vagina. For cleaning, it is sufficient to wash the cup with water and a gentle cleanser during the cycle and to sterilize it by boiling for 20 minutes before and after use at the beginning and end of the menstrual cycle.

Results:

Table 1: PARTICIPANT CHARACTERISTICS (n= 150)

CHARACTERISTIC	GROUP	PERCENTAGE
Age (in years)	20 -29	**75 (50%)**
	30-39	**55 (36.6%)**
	40-50	**20 (13.3%)**
Parity	Nulliparous	**80 (53.3%)**
	Primipara	**20 (13.3%)**
	Multipara	**50 (33.3%)**
Menstrual History	Normal bleeding	**110 (73.3%)**
	Heavy bleeding	**40 (26.6%)**
Menstrual sanitary Method	Clothes	**20 (13.3%)**
	Sanitary napkins	**123 (82%)**
	Tampons	**7 (4.6%)**
Income spent on buying sanitary product in a year (Average) in INR	<500	**30 (20%)**
	500-1500	**100 (66.6%)**
	>1500	**20 (13.3%)**
Level of satisfaction with current method	Satisfied	**22 (14.6%)**
	Dissatisfied	**128 (85.3%)**

Table 2: KNOWLEDGE REGARDING MENSTRUAL CUP (n = 150)

	CATEGORY	FREQUENCY	PERCENTAGE (%)
Do you know about menstrual cup	Yes	125	**83.3**
	No	25	**16.6**
Menstrual cup is made of	Silicone	100	**66.6**
	Rubber	25	**16.6**
	Latex	0	**0**
	I don't know	25	**16.6**
Is menstrual cup a safe device	Yes	125	**83.3**
	No	25	**16.6**

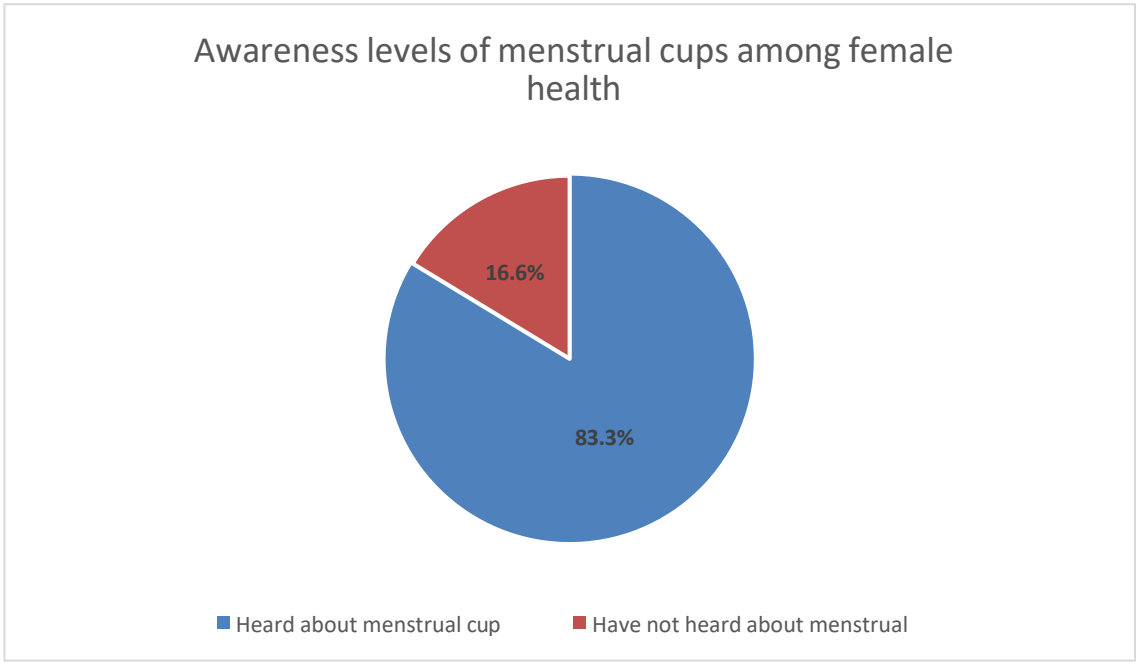

Figure 1: Awareness Levels of Menstrual Cups Among Female Healthcare Providers

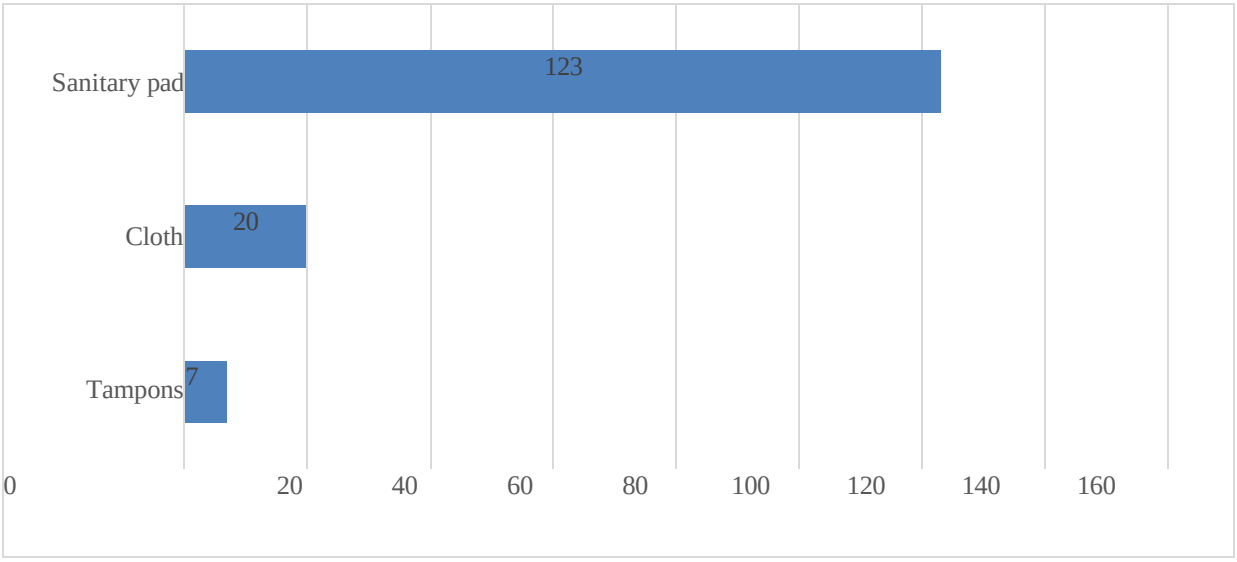

Figure 2: Current Product for Menstrual Hygiene (N=150)

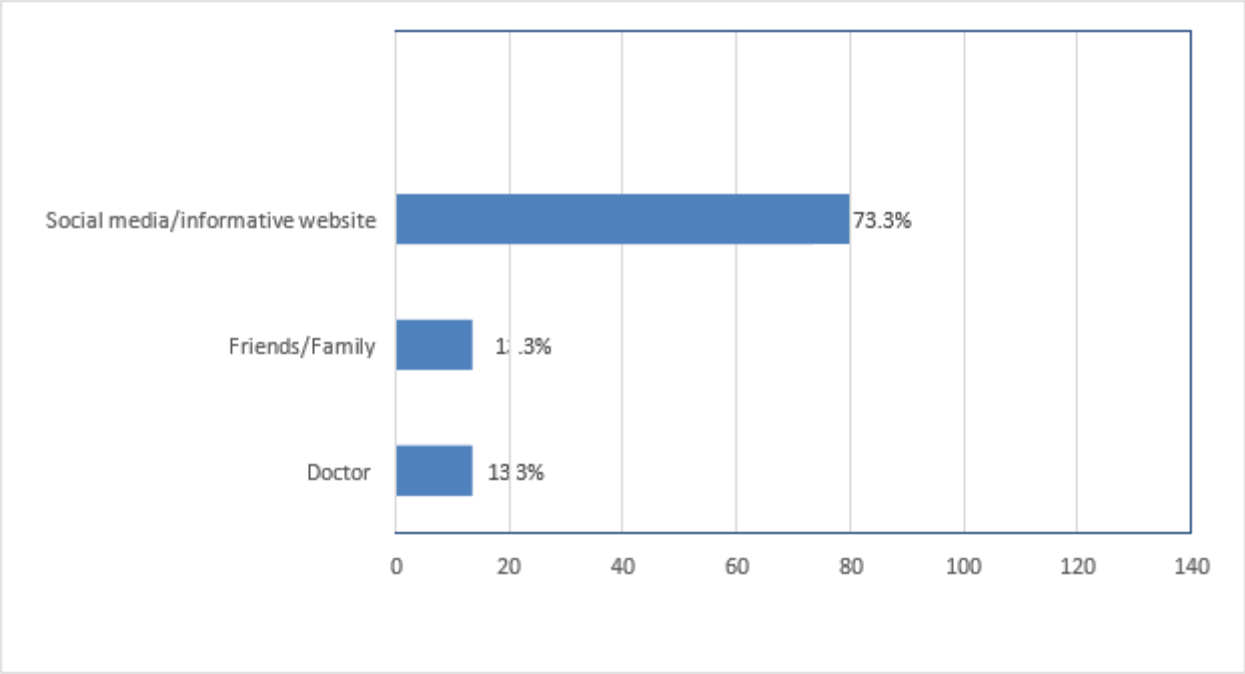

Figure 3: Source of Information Regarding the Menstrual Cup

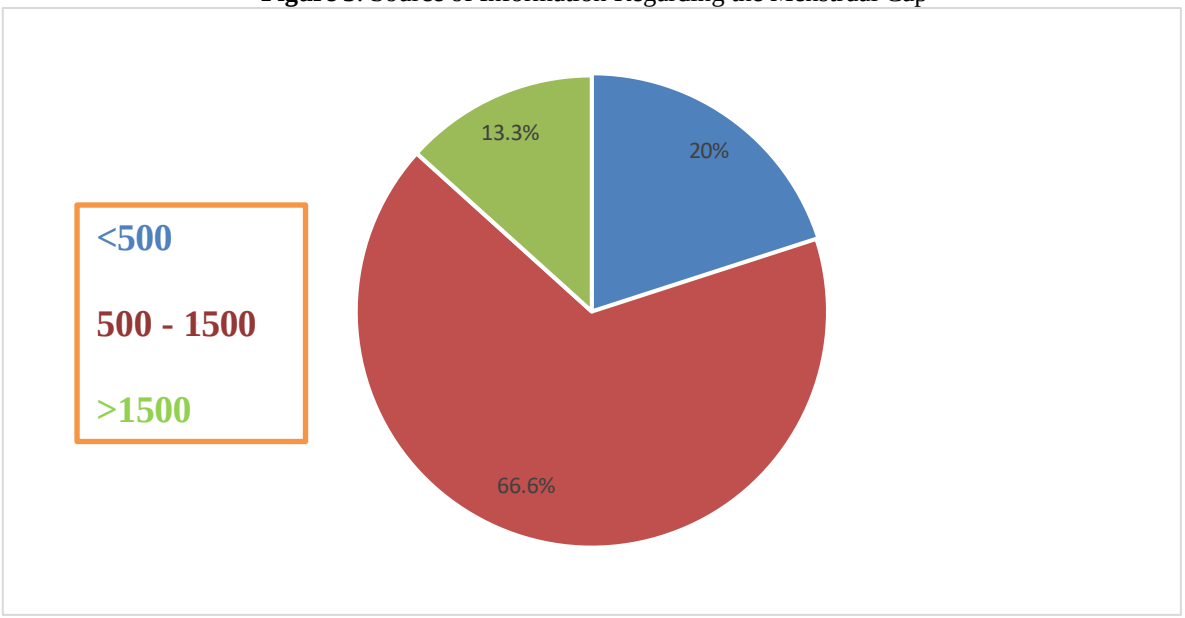

Figure 4: Amount Spent on Sanitary Product On Average in A Year (In Rupees)

Table 3: PARTICIPANT FEEDBACK AFTER THREE CYCLES

	Category	Frequency	Percentage (%)
INSERTION	Easy	135	**90%**
	Difficult	15	**10%**
FEEL	Comfortable	139	**92.6%**
	Uncomfortable	11	**7.3%**
REMOVAL	Easy	140	**93%**
	Difficult	10	**6.6%**
LEAKAGE	Yes	10	**6.6%**
	No	140	**93%**
CLEANING	Easy	130	**86.6%**
	Difficult	20	**13.3%**
ODOUR	Yes	0	**0%**
	No	150	**100%**

Table 4: PARTICIPANT FEEDBACK SIDE EFFECTS

Variable	Category	Number	Percentage
	Rashes	0	**0%**
	Allergy	0	**0%**
	Dryness	2	**1.3%**
	Infection	0	**0%**

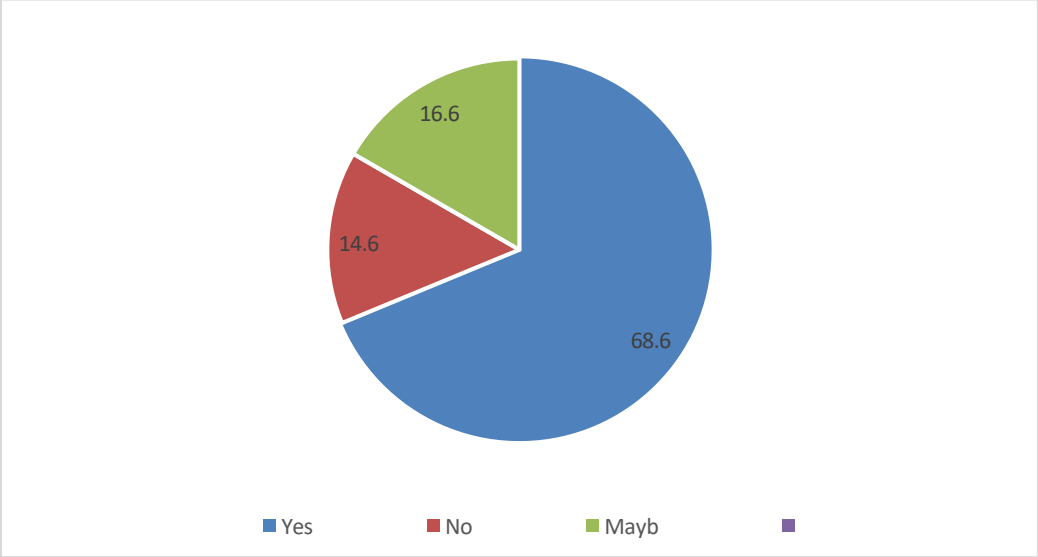

Figure 5: Willingness to change over to Menstrual Cup

Among the 150 participants, most participants were between 20 and 29 years old, with 53.3% nulliparous and 33.33% being multiparous women. About 26.66% of participants reported to have heavy menstrual bleeding during menstrual cycles, rest of them were having normal cycles.

At the beginning of the study, 82% were using sanitary pads, 13.33% were using cotton cloths, and 4.66% were using tampons for menstrual protection. However, only 14.6% were satisfied with their current menstrual hygiene method, with complaints related to overnight use, exercising, and comfort during daily activities. 83.3% participants were aware of menstrual cup. Even though two third of the participants had good knowledge regarding menstrual cup, fear of insertion and leakage were the most common concern for not trying menstrual cup.

Among the respondents, 68.6% are willing to use if it is made available and 92.6% considered it as a comfortable device as a menstrual hygiene method at the end of 3 cycles.

Key Findings:
Ease of Use: 90% of participants found it easy to insert by third cycle. The main difficulties were improper insertion technique, fear, and embarrassment.
Removal Comfort: 93% of participants found removal easy by third cycle. Comfort Level: 92.6% of participants were comfortable using by third cycle.
Leakage Issues: Initially reported by 6.6% of participants. Leakage incidents decreased as they became more accustomed to the product.
Side Effects: Minor side effects were reported, such as rashes (0 cases), dryness (2 cases), and infections (0 cases) in the first cycle.
Overall Satisfaction: 90% of participants were satisfied with the menstrual cup compared to their previous methods.

Discussion:
In comparison to conventional period hygiene items, menstrual cups are reusable, easy to store, long-lasting, sustainable, eco-friendly, and maybe more hygienic. They also help improve menstrual hygiene and health management. Compared to sanitary napkins, they offer dependable leak protection, lower the risk of infections, allergies, and rashes, and have long-term positive effects on the environment and the economy. Over 83.3% of participants were aware of menstruation cups, and many of them valued their cost-effectiveness, comfort, and hygienic benefits.[5,6,7]

Kakani C R et al. state that those who did encounter leakage evaluated it as being on par with leakage using their previous techniques. After two to twelve cycles of use, menstrual cups were found to be acceptable by up to 45% of 52 Canadian women in a 1995 study.[8] According to a research conducted in Nepal among teenage schoolgirls, 60% of them were using cups after six months. According to a Zimbabwean survey, 86% of women believed using menstruation cups would improve their life.[9]

According to a related study by Ballal K et al., 82% of participants were aware of menstruation cups, but just 2.6% had actually used them, and 43% were open to switching.[10]

In our study, 68.6% of individuals were willing to switch to cups after three cycles of use, 4.6% were only using menstrual cups, and 83.3% were aware.

Compared to the Kakani CR trial, where the degree of difficulty was 1-3%, 90% of the females in our study found it easy to insert, 93% found it easy to remove, and just 10% had trouble inserting and 6.6% had trouble removing. Initially, 6.6% of participants had leakage, which decreased as they gained used to the products. 68.6% of them indicated a willingness to switch to menstruation cups.[8] Overall, with good counselling and awareness initiatives, we can make the right changeover to menstruation cups.[11,12,13] Other aspects such as the availability of cups, water supply, and cost effectiveness play a vital impact in the choosing of products, particularly in rural regions.

Proper insertion and removal need practice, which may be unpleasant and messy for first-time users. In some countries, cultural taboos and lack of information prevent widespread usage. A few people with gynaecological disorders like vaginal prolapse or sensitiveness found menstruation cups unsuitable; age is a complicating factor. Young ladies will have increasing exposure to social media and hence require only basic knowledge of menstruation cups. Though awareness is there, the usage rate is quite low.

"As part of the My Nation Kerala project, Thinkal was introduced in 2019 and distributed 5,000 menstrual cups to promote the usage of menstruation cups rather than non-biodegradable sanitary pads.[14]

In order to encourage menstrual hygiene and offer an environmentally friendly substitute for sanitary pads, the Karnataka government's "Suchi Nanna Maitri" program gives menstruation cups to teenage girls. It is being tested in two districts, Dakshina Kannada and Chamarajanagara.[15]

In order to promote sustainable choices for a period-friendly world, the Pradhan Mantri Bhartiya Jan Aushadi Reusable Pariyojana has made the Jan Aushadi reusable menstruation cups reasonably priced.[16]

Conclusion:
This study highlights that menstrual cups are a practical and eco-conscious alternative to conventional menstrual hygiene products. They offer numerous benefits including cost-effectiveness, reusability, and improved comfort, particularly after a brief adaptation period. The high levels of user satisfaction and willingness to continue use among participants indicate strong potential for broader adoption.

To promote menstrual cups as a mainstream option, awareness campaigns led by healthcare professionals and supported by governmental and non-governmental organizations are essential. These efforts can help break cultural taboos, educate women about proper usage, and address misconceptions surrounding their safety and applicability. Despite some challenges related to insertion techniques and initial discomfort, the overall findings suggest menstrual cups are a feasible and acceptable choice for effective menstrual hygiene management, especially in resource-limited settings.

Funding and Conflicts of Interest:

- No funding sources were involved in this study.
- No conflicts of interest were declared.

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