



# Uptake and Adherence to Using a Menstrual Cup for Managing Menstruation Among Women in Rural Areas of India

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## Abstract

**Purpose** The study aims to assess the uptake and adherence of menstrual cups among tribal-rural women.

**Methods** The study was conducted in rural tribal areas of Gujarat from 2018 to 2020. A total of 106 menstruating women aged 18–54 years were enrolled. Participants were provided information regarding menstrual cups. Those women who opted were provided menstrual cups (marketed as Ever cups) at Rs. 100 (US \$ 1.25). They were followed up for at least three consecutive menstrual cycles. Their experiences were recorded using a structured questionnaire. Uptake was defined as the percentage of women who used menstrual cups at least once. Adherence is the percentage of cycles for which the menstrual cup was used out of the total scheduled processes.

**Results** Of 106 women, 73 (68.87%) women used the cup at least once. Among them, 55 (75%) women used cups during all menstrual cycles during the study period. 72 (98.63%) users expressed satisfaction with the menstrual cup. The average adherence was 79.91%. The common reasons for the non-usage of the cup were unmarried status and lack of hygienic facilities and privacy.

**Conclusion** The menstrual cup was well accepted among this predominantly working population of married women in rural settings. As per user experiences, the menstrual cup has been easy to use and saved time and money in comparison with prevailing products. However, the cup was less acceptable among unmarried women.

**Keywords** Menstrual cup · Menstrual hygiene · Eco-friendly

## Introduction

Menstruation is accompanied by challenges, myths, taboos, and various societal and cultural stigmas [1]. Management of periods is still a dream for most menstruating women, and when it comes to resource-poor settings, the situation worsens. Safe and dignified menstruation is unachievable for many women, especially those coming from lower and middle-income countries (LMICs) [2–4].

In villages, marginalized women have often been too embarrassed to dry out their menstrual cloth pads after washing, thereby risking infection [5]. Many studies have reported school and workplace absenteeism due to a lack of menstrual-related facilities, cultural customs, or taboos, thereby hindering the growth and opportunities of menstruators [6]. Apart from the existing taboos, there is an inconvenience and compromised mobility associated with menstruation [7, 8], as also the issue of disposal of sanitary napkins. The commercially available sanitary pads are non-biodegradable and thus harmful to the environment [9].

As per National Family Health Survey (NFHS5) data, 58% of women use unhygienic absorbents to manage their menstruation in India.

The menstrual cup was first invented in 1920 by American actor Leona Chalmers. Despite a long history of the use of menstrual cups in other countries, few Indian women are aware of their existence [10]. Preliminary studies have found the cups have great potential in low and middle-income countries [11–14]. Cups are a better alternative to

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tampons and pads (disposable and reusable) and is a sustainable solution to menstrual hygiene management, with good cost savings and much-reduced environmental effects [14]. Findings from a study in Nepal suggest that school girls can use menstrual cups, with acceptance improving with peer group education [13, 15]. Menstrual cups can replace the current methods of menstrual sanitation due to lower costs and improved hygiene [16].

The aim of the study is to assess uptake and adherence of menstrual cups among Indian rural women. As the cup has the potential to be a valuable tool for working women as well, it needs to be worth further research.

## Objective

1. To assess the uptake and adherence of menstrual cups for managing menstruation.
2. To assess the determinants of uptake.
3. To compare the level of satisfaction for menstrual cups compared to previously used products.

## Methodology

### Study Design

Prospective interventional study.

### Study Setting and Participants

This study was conducted in five villages in the Bharuch and Narmada districts of Gujarat, India, by a not-for-profit organization, SEWA Rural. Most study participants (18–54 years) were working females in a local self-help group associated with the organization, women employed at the SEWA Rural organization, frontline health workers, and a few were homemakers.

### Selection of Participants

One hundred and six menstruating women were purposefully recruited from June 2018 to August 2018. After the awareness session, women who opted into the study were provided menstrual cups at different points of time. The inclusion criteria included (a) being a menstruating woman in the age group of 18–54 years, (b) giving written consent to participate in the study, and (c) being ready to use or try the menstrual cup. Women who self-reported being pregnant or planning for pregnancy soon were not given the cups. During selection, we verbally asked about the presence of symptoms related to vaginal infections and bleeding problems. We excluded the participants with any positive symptoms.

## Intervention

The menstrual cup is an internal device to be inserted in vagina to collect menstrual blood. The bell-shaped cup fits against the vaginal wall just below the cervix. It can be removed, emptied, cleaned, and reinserted (Fig. 1). The brand used was “Ever Cup.” It is an FDA-registered, American-made brand owned and operated by an ISO: 13485-certified factory in Maine. It comes with a discrete medical-grade silicone case. It is 65 mm long, has a 42–46 mm rim, and is a flexible and thin-walled container used to collect menstrual blood. It can hold up to 35–37 ml of blood and can be kept inserted for 10–12 h at a stretch [12]. To avoid the variability based on quality of Cups from different brands, we planned to use only single brand for this study.

The participants were offered menstrual cups at different points during the study tenure after being provided education and training about their usage. A senior gynecologist trained all participants using models and videos. The consented participants were given a menstrual cup with a storage case and an instruction manual at a token charge of 100 Rs. (US \$ 1.25) which was 25% of the market price of most brands. The token price was set to avoid freebies. A dedicated trained counselor was in place to provide on-call support for the participants for the initial three months.

## Outcomes of Interest

The primary outcome of interest was the uptake of the menstrual cup. Uptake is the percentage of women who used a menstrual cup at least once out of the number of women provided with it. Those participants who could not use the menstrual cup for at least one cycle (in spite of attempted use) were considered non-users.

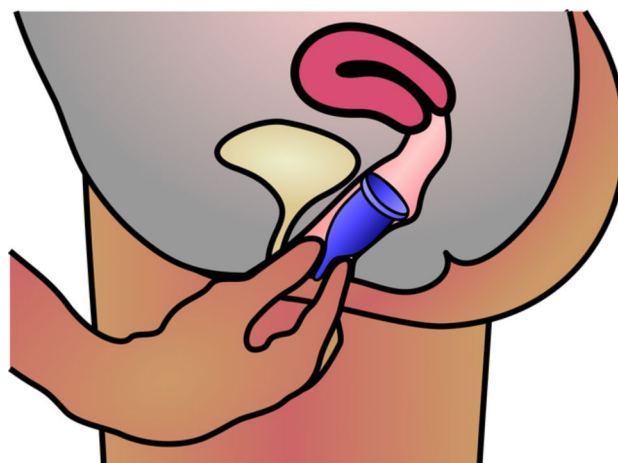


Fig. 1 How to use menstrual cup

The secondary outcome of interest was adherence to using a menstrual cup; that is, the percentage of cycles for which a menstrual cup was used out of the total scheduled.

## Data Collection

The quantitative data were collected digitally using a structured questionnaire at the end of the study. A data collector was trained by one of the investigators to collect the data.

The qualitative data were collected by an expert in the subject *t*. The participants were visited at their respective workplace and interviewed by the expert using an interview guide. Interviews were recorded digitally, transcribed as a MS Word file, and translated to English by an expert.

The data were collected individually by a trained and experienced female data collector from May 2020 to September 2020.

## Data Analysis

The quantitative data were extracted and analyzed in MS Excel, and the Weft Qualitative Data analysis software was used for qualitative data.

## Results

A total of 106 females were enrolled in the study; 68.9% (73) agreed to use the menstrual cup. Twenty-eight percentage (30) women could not insert the device and withdrew from the study, and 2.8% (3) women were not available for follow-up during the study (Fig. 2).

We received sociodemographic data from 103 participants who agreed to use menstrual cups and provided consent to provide the information. The participants were aged 20–54 years; among them, 70% (72) of women were above 30 years. Eighty-four percentage (87) were married, and 93% (96) were Hindus. Further, 33% (34) of the

women were tribal, and 32% (33) were below the poverty line. The literacy rate among study participants was 100% (103), and 45.6% (47) studied until graduation and above (Table 1).

As per our outcome of interest, 68.9% (73) of women had used menstrual cups at least once. Women who used menstrual cups used them for 79.9% of the scheduled menstrual cycles.

At the time of enrollment, 54.79% (40) of women used disposable sanitary pads as their primary menstrual hygiene product, 2.74% (2) of women reported that they used old cloth exclusively, 35.62% (26) were using flannel cloth pads, 6.85% (5) were using a combination of flannel pads and sanitary pads, and there was one cup user among the selected group of women.

Of those who attempted use, the majority, 87.67% (64), reported easy insertion without discomfort. 91.78% (67) found removing and changing cups extremely easy, whereas 100% (73) of users reported the cleaning procedure as easy and hassle-free (Fig. 3).

The cup was preferred for its comfort, dryness, and being odor-free. The problem of leakage was encountered once among 13.7% (10 users); multiple leakages were reported by 4.1% (3 users), and the rest, 82.2% (60 users), did not experience leakage while using the menstrual cup.

Seventy-five percentage (55) of participants became regular users of the cup. The participants reported that the cup needed to be emptied less frequently (every 8–12 h) than pads which required changing every 2–4 h.

The cup also allowed its user to handle menstruation safely without recurring costs for many years. The previous annual expenditure was 500–1000 INR among 26.03%, reduced to 2.74% with cup usage.

Among all the participants, 74 (54%) preferred the cup over prior menstrual hygiene methods and reported that they would not switch to their old absorbent. These women rated the device superior and safer than previously used methods (Table 2).

Findings suggest that women were inclined toward cups on the recommendation from peer groups, friends, or colleagues. Around 61.64% (45) of cup users conveyed the information to > 3 people, including their friends, sisters, daughters, and neighbors. Some key reasons for not using the menstrual cup and experiences are described below.

## Non-users

Reasons among 30 non-users: (a) 47% (14) were unmarried, (b) 10% (3) got their menopause, (c) 17% (5) had given away the cup as a gift, (d) 6.7% (2) became pregnant, (e) 13.3% (4) had difficult and painful insertion, (f) 3% (1) felt that it was of incorrect size, and (g) 3% (1) had irregular cycles.

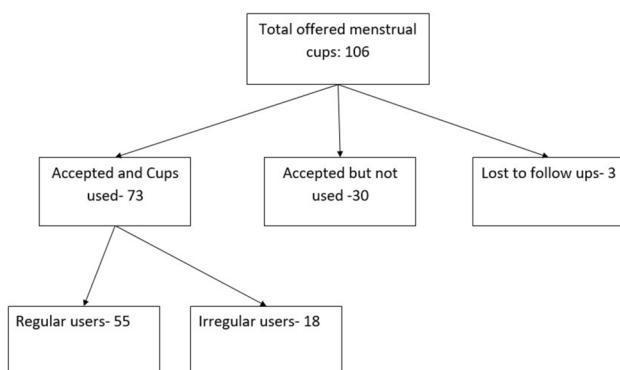
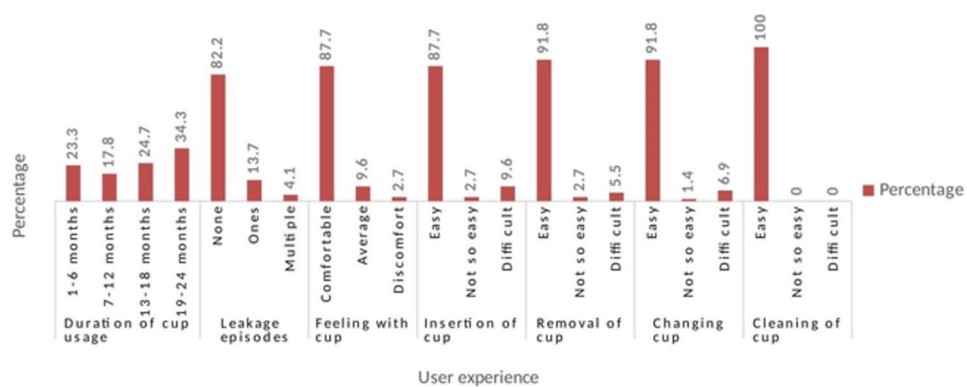


Fig. 2 Flowchart

**Table 1** Socio-demographic details of registered women in rural areas of Gujarat, India

Characteristics	Users (N=73)		Non-users (N=30)		P value
	Frequency	Percentage	Frequency	Percentage	
<i>Age</i>					
20–29 years	17	54.8%	14	45.2%	<b>0.019</b>
> 30 years	56	77.8%	16	22.2%	
<i>Marital status</i>					
Ever married	71	81.6%	16	18.4%	<b>&lt;0.001</b>
Unmarried	2	12.5%	14	87.5%	
<i>Religion</i>					
Hindu	68	70.8%	28	29.2%	0.97
Others	5	71.4%	2	28.6%	
<i>Caste</i>					
Others	55	79.7%	14	20.3%	<b>0.004</b>
SC/ST	18	52.9%	16	47.1%	
<i>Economic status</i>					
Below poverty line	24	72.7%	9	27.3%	0.77
Above poverty line	49	70.0%	21	30.0%	
<i>Education</i>					
Up to higher secondary (11–12 std)	42	75.0%	14	25.0%	0.31
Graduation and above	31	66.0%	16	34.0%	
<i>Occupation</i>					
Homemaker	18	75.0%	6	25.0%	0.61
Employed	55	69.6%	24	30.4%	

Bold *p* value presents the significant difference between the groups

**Fig. 3** User experiences of menstrual cups in western rural areas of India (N-73)

## Discussion

In this study, we learned that the menstrual cup is a better solution than other menstrual absorbents which are in use as it is cost-effective, easy to use, and eco-friendly. Learning from each other's experiences increased its uptake and resolved issues among menstrual cup users. Unmarried girls and sexually inactive women had difficult insertion. As menstrual cup can be used for 6–8 h at a stretch, the cup was appreciated by working women. However, a

minimum hygienic facility to clean and change the menstrual cup at the workplace was required for women with heavy bleeding.

The uptake of cups in our study was 69%, which was similar to the 74–87% from the study done in Uganda with refugee females after 1st and 3rd cycles, respectively [17]. The adherence to using cups was 80% in our study, whereas it was 91% in the randomized control trial comparing tampons and cups (“Flow”) and was even higher as compared to 57% in the study done elsewhere in India [14, 18]. Our study found that 34% of women have been using menstrual cups

**Table 2** Experiences of women registered for using the menstrual cup in rural area of Gujarat, India

Qualitative findings	
Privacy and dignity	<p>“I don’t need to take leave from Garment making work”</p> <p>“Easy to roam around, I don’t have to take leave from work now”</p> <p>“Now no fear during travel”</p> <p>“I don’t even feel that I am wearing something or menstruating, I can travel with peace”</p> <p>“I can attend marriages too”</p> <p>“People at home won’t see it”</p> <p>“In the rainy season my pads used to get wet, clothes get stained, which is not the case with cups”</p> <p>“I can play Holi (festival of colors) too,”</p> <p>“Can do farm-work”</p> <p>“My teaching job demands commuting daily for work, after the usage of cup travelling has become easy”</p> <p>“I like it very much, I wish I had gotten it before, I want to buy it for my daughter too”</p> <p>“Looking forward giving my daughter the menstrual cup to manage her menstruation when she starts menstruating.”</p> <p>“With the sanitary pads women can’t have privacy; if you are menstruating people will come to know due to frequent changing and disposal of absorbents. Same way cloth pads need to be washed and dried which we feel ashamed about. With cups we can move freely, participate in functions, which is not allowed in rural India when women are menstruating”</p>
Easy to use	<p>The respondents who used the menstrual cup reported improved quality of life in terms of higher social participation and mobility, time being saved which can be used productively in many other ways</p> <p>“Thighs don’t develop any rashes due to walking, easy to clean.”</p> <p>“I don’t feel hot, don’t have to wash clothes in chilly winters” “There is no hassle of cleaning and drying and clothes don’t get stained,”</p> <p>“Using a cup is real fun as there are no stains on clothes hence no tension” “my hands don’t get dirty.”</p> <p>“Very nice, there is no leakage at all,” no rashes, no worry of drying, the cup don’t get displaced, unlike pads. “can be used with limited water availability too.”</p> <p>“One cup can replace multiple flannel cloth pads easily, “I have a huge body and height, so the cup is very comfortable for me.”</p> <p>“The cup is easy to wash and insert. Very easy to use, I can carry it wherever I go.”</p> <p>“I don’t even feel that I am wearing something or menstruating, I can travel with peace.”</p> <p>“I am fat, so I find cups comfortable, and I remain very happy during my periods these days. ‘It doesn’t smell’ I get heavy flow; it is good for me.”</p>
Cost and affordability	<p>Women found cups cost-effective. “I don’t have to worry about buying pads every month as I need a number of pads and change frequently”</p> <p>“My time is saved in washing and drying, I can spend more time with my family.”</p> <p>“Can work more and earn money.”</p> <p>“I don’t have to wash and buy new flannel cloth every six months like before” “It is cost-effective and very comfortable to use”</p>
Ecofriendly option	<p>Women expressed the Menstrual cup as the ecofriendly option “There is no spillage, don’t have to throw, there is no garbage accumulation.”</p> <p>“It does not cause pollution” “no disposal issue” “Can be used with minimum water availability”</p> <p>“As menstrual cups can be used for a longer duration, maybe for 10 years. It doesn’t need waste management.”</p>
Health benefits	<p>The respondents shared numerous health benefits of using a menstrual cup...</p> <p>“No itching occurs on skin,” “The chances of getting infected reduces,”</p> <p>“I can know the amount of blood loss looking at the cup” “I do not get rashes now”</p>

for 24 months. The qualitative analysis in our study showed that using menstrual cups was easy and hassle-free. Similar findings were present in various studies done in Uganda, Kenya, and Zimbabwe [11–13]. In a study done in India, 43% of women found the cup better than sanitary pads [14].

A study in Ahmedabad, India, found that 80% of women perceived easy insertion, which is similar to our finding of 87% [16]. The main challenge for using menstrual cups was identified as difficult insertions shown in studies from Kenya and India [13, 14]. It was also found that difficulties reduced from 65 to 18% in three cycles after using it for multiple cycles [14]. Similarly, the adolescent girls of Kenya felt difficulty inserting the cup, which reduced over time [13]. The

insertion is more difficult for unmarried and sexually inactive women. Similarly, in our study, 87.5% (14) of unmarried participants faced difficulties in insertion compared to 18.4% (16) of married participants. The reason for non-adherence for some working women was the non-availability of cleaning facilities and privacy.

The fear of leakage is a significant issue with all types of menstrual products for women. In our study, only one woman reported leakage with the cup. Similarly, a study from Zimbabwe also showed 2–6% leakage incidents [12]. Also, there is the fear of dropping the cup while wearing it. In our study, one cup was lost by dropping in the toilet while inserting, and a rat destroyed another, which was eventually



replaced, so women could continue to use it. Similar incidents were noted in the study done in Uganda [17]. The fear of staining and soiling the clothes while menstruating is reduced drastically with the cup. The participants almost forgot that they were menstruating, mirroring results found in the study done in Nepal [15].

Removal of a cup was not a concern in any of the studies, the same result found in ours. Ninety-two percentage reported easy removal, almost equal to the 90% found in the study from Ahmedabad [16].

The satisfaction was found to be higher with the cup than with any other sanitary products. The same findings emerged from a study in Uganda where 94% of women are satisfied with menstrual cups [17]. It is a boon for working women who travel for work. Using the cup helps them manage their menstruation without any hassles of carrying, changing and cleaning a pad or other absorbent [17]. Also, 91% of women would use and recommend the cup as per the study of “Flow” [18]. The hierarchy of satisfaction shows that the menstrual cup has the highest level of satisfaction among all products, as found in a study done in Kenya [13].

The explanation for such a high uptake and adherence among the study population is that menstrual cups are an economical and environmentally friendly option for managing menstruation. Due to its lower cost and improved hygiene, the cup is preferred over other sanitary materials [16, 19]. The Uganda study also shows 87% uptake. Being economical, money saved can be used for ration, food, and preventing and saving on the use of soap in cleaning the reusable pads [17]. It also saves time and effort in washing, drying, and disposal [15]. Moreover, a study by Castensson et al. shows that the cup improves the lives of women and girls as it enables them to work and earn money without missing working days [19]. On an average, a woman uses 15–20 pads a month, around 8000–14000 in a lifetime. The time taken to decompose pads is around 500–800 years. The menstrual cup can be used longer, around ten years, so it is a sustainable, effective, low cost and environmentally safe option [11, 15, 20].

There are a few limitations of this study. The participants of the study were not a well-defined representative sample. No clinical examination was carried out to check for any sort of infection or any other condition. Such examination was done in the study conducted in Kenya to discover disorders like HIV and HSV-2 [21]. Kenya’s study examined safety among primary school girls using menstrual cups and did not detect any harm with menstrual cups [22]. The small sample size and purposive sampling from majority of working females having high literacy rate prevent generalizability of the findings in rural setting or population at large. As menstruation is a physiological process that cuts across all women, results can be applied to women of other socioeconomic areas.

Based on the study, we recommend that the Government and market may make the menstrual cup available in rural areas and create demand through various means of promotion and education [11]. The health system may focus on widening the scope of choice for menstrual absorbents like cups by generating awareness. Making menstrual cups available in low-income settings at an affordable price in the current scenario will require subsidies by Governments or organizations to cover the costs wholly or partly.

## Conclusion

The menstrual cup was well accepted among this predominantly working population of married women in rural settings. As per user experiences, the menstrual cup has been easy to use and saved time and money in comparison with prevailing products. However, the cup was less acceptable among unmarried women.

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**Author Contribution** NS was involved in data collection and wrote the first draft of the manuscript. MV was involved in the recruitment of study participants and development of the manuscript. The study was developed by SS, PS and SD, and they developed the protocol and reviewed and finalized the final draft of the manuscript.

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## Declarations

**Conflict of interest** The authors declare no competing interests. The “Ever Cup” is not involved in any of the tasks related to research.

**Ethical Approval** The ethical approval for this study was obtained from SEWA Rural’s institutional ethics committee (IEC-SEWA Rural).

**Informed Consent** Informed written consent was obtained from all agreeing participants individually after explaining the details of the study in a vernacular language.

## References

1. Australian Department of Foreign Affairs and Trade. Research on managing menstruation in the Pacific August 2016.
2. Chandra-Mouli V, Patel SV. Mapping the knowledge and understanding of menarche, menstrual hygiene and menstrual health among adolescent girls in low- and middle-income countries. *Reprod Health*. 2017;14(1):1–16.

3. Hennegan J, Shannon AK, Rubli J, et al. Women's and girls' experiences of menstruation in low-and middle-income countries: a systematic review and qualitative metasynthesis. *PLoS Med.* 2019;16:1–40.
4. Kaur R, Kaur K, Kaur R. Menstrual hygiene, management, and waste disposal: practices and challenges faced by girls/women of developing countries. *J Environ Public Health.* 2018;2018:9.
5. Das P, Baker KK, Dutta A, et al. Menstrual hygiene practices, WASH access and the risk of urogenital infection in women from Odisha, India. *PLoS One.* 2015;10(6):1–16.
6. Mason L, Nyothach E, Alexander K, et al. “We keep it secret so no one should know”—a qualitative study to explore young school-girls attitudes and experiences with menstruation in rural Western Kenya. *PLoS One.* 2013;8(11): e79132.
7. Sommer M, Chandraratna S, Cavill S, et al. Managing menstruation in the workplace: an overlooked issue in low- and middle-income countries. *Int J Equity Health.* 2016;15(1):1–5. <https://doi.org/10.1186/s12939-016-0379-8>.
8. Sivakami M, van Eijk AM, Thakur H, et al. Effect of menstruation on girls and their schooling, and facilitators of menstrual hygiene management in schools: surveys in government schools in three states in India, 2015. *J Glob Health.* 2019;9(1):010408.
9. Elledge MF, Muralidharan A, Parker A, et al. Menstrual hygiene management and waste disposal in low and middle income countries—a review of the literature. *Int J Environ Res Public Health.* 2018;15(11):2562.
10. Cup Pat, menstruation cup patent. Museum of Menstruation & Women's Health website. <http://www.mum.org/CupPat1.htm> (2024). Accessed 5 Feb 2024.
11. Hagander M, Velin S.: Identifying and addressing the challenges of mainstreaming the menstrual cup in Uganda [Internet]. Lunds (2017). <https://lup.lub.lu.se/student-papers/search/publication/8915547>
12. Madziyire MG, Magure TM, Madziwa CF. Menstrual cups as a menstrual management method for low socioeconomic status women and girls in Zimbabwe: a pilot study. *Women's Reprod Heal.* 2018;5(1):59–65. <https://doi.org/10.1080/23293691.2018.1429371>.
13. Mason L, Laserson KF, Oruko K, et al. Adolescent schoolgirls' experiences of menstrual cups and pads in rural western Kenya: a qualitative study. *Waterlines.* 2015;34(1):15–30.
14. Chintan S, Dipesh P, Maitri P. Use of flow care menstrual cups over conventional menstrual products in India. *Int J Adv Res Dev.* 2017;2(8):78–82.
15. Oster E, Thornton R, St Ann Arbor T.: Determinants of technology adoption (2009). <http://www.nber.org/papers/w14828>
16. Kakani CR, Bhatt JK. Study of adaptability and efficacy of menstrual cup in managing menstrual health and hygiene. *Int J Reprod Contracept Obstet Gynecol.* 2017;6(7):3045.
17. CARE international Uganda, WoMena, Oxfam, European Commission Humanitarian Aid, Akongo S. Ruby Cups: Girls in Imvepi Refugee Settlement Taking Control, pp. 1–29. <https://www.careevaluations.org/wp-content/uploads/Ruby-Cups-Pilot-Imvepi-FINAL-FINAL-Dec3rd2018.pdf> (2018)
18. Howard C, Rose CL, Trouton K, et al. FLOW (finding lasting options for women): multicentre randomized controlled trial comparing tampons with menstrual cups. *Can Fam Physician.* 2011;57(6):208–15.
19. Castensson A.: THE CAPABILITY OF CUPS A comparative field study in Uganda investigating the impact of menstrual cups on women and girls' achieved capabilities [Internet]. Uppsala University; 2018. <https://www.diva-portal.org/smash/get/diva2:1214444/FULLTEXT01.pdf>
20. Averbach S, Sahin-Hodoglugil N, Musara P, et al. Duet® for menstrual protection: a feasibility study in Zimbabwe. *Contraception.* 2009;79(6):463–8. <https://doi.org/10.1016/j.contraception.2008.12.002>.
21. Zulaika G, Kwaro D, Nyothach E, et al. Menstrual cups and cash transfer to reduce sexual and reproductive harm and school dropout in adolescent schoolgirls: study protocol of a cluster-randomised controlled trial in western Kenya. *BMC Public Health.* 2019;19(1):1–14.
22. Juma J, Nyothach E, Laserson KF, et al. Examining the safety of menstrual cups among rural primary school girls in western Kenya: observational studies nested in a randomised controlled feasibility study. *BMJ Open.* 2017;7(4):1–9.

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