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Original Research Article

Awareness of menstrual cup among reproductive age group women

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ABSTRACT

Background: The first type of menstrual cup having a bullet-shape was patented in 1932 by the midwifery group of McGlasson and Perkins. The first medical grade silicone menstrual cup was manufactured in 2001 by Mooncup UK. Menstrual cups are considered as environmentally friendly and inexpensive alternative to expensive disposable pads. The capability to reuse the cups with a service life of 10 years is a significant advantage of menstrual cups. Menstrual cups have been in use since a long time but very limited studies are conducted about their awareness among Indian women. Hence, in this present study, the awareness of menstrual cup among reproductive age group women was evaluated.

Methods: Data was collected from the eligible and chosen women in reproductive age through a pre-developed questionnaire and completed in the presence of the interviewer. It was a descriptive cross-sectional study conducted over a period of 1 month in Srinivas Institute of Medical Sciences and Research Centre, Mangalore, Karnataka, India.

Results: In this study, total of 508 participants were included. The maximum number of participants was in the age group of 21 years to 25 years (58.46%). The educational status of the participants was mostly in the category of undergraduate level (69.88%). The marital status of most of the participants was unmarried (89.37%). Most of the participants belong to low-income group (<Rs.20000-72.44%). 465 participants (91.5%) have heard about menstrual cups but only 1.57% of them were using menstrual cups alone whereas around 9.8% use them occasionally along with other methods.

Conclusions: Menstrual sanitary management is difficult in low-income reproductive aged women due to conventional way of life, lack of knowledge on best sanitary practices, and restricted access to suitable and reasonably priced menstrual hygiene products. As an alternative to sanitary napkins, menstrual cups can be effectively used to contain the menstrual flow. Even though it is observed that the awareness about menstrual cups is very good among the reproductive aged women in India, the usage is very limited. As menstrual sanitary management is a more and more important issue and as India is facing a major threat in the form of managing the soiled napkins waste which results in multiple complications, the usage of menstrual cups must be promoted.

Keywords: Attitude, Awareness, Knowledge, Menstrual Cups, Menstrual Sanitary Management, Practice, Reusable

INTRODUCTION

Menstruation is a significant stage in the development and maturity of adolescent girls. Despite the onset of menstruation being an important landmark in the transition to adulthood, it can present serious problems and concerns among adolescent girls and women who cannot afford sanitary napkins or similar materials needed for menstrual management.[1] Worldwide, every month, a very large number of women experience menstruation which is a regular biological process. The beginning of menstruation cycle indicates that a female has started her reproductive years. It indicates the evolution to a full-grown adult woman. Because of social concern and need for guidance in under developed and developing countries, most of the girls go through anxiety, bewilderment, disgrace, and

uneasiness while they attempt to be habituated to this biological process.[2]

In the undeveloped and developing countries, managing the menstrual hygiene is not only hard; but serious undesirable effect on the lives of women happens. Even where taboos are not a main difficulty, convenient or low-priced menstrual collection resources may just not be accessible. Efforts to manufacture reasonably priced materials are simply lacking.[3] Women use cloths or spongy napkins to collect and dispose the menstrual flow. Washing down the clothes or disposal of the napkins hygienically is a very difficult challenge for the majority of the women. In many societies, women resort to the use of old cloths, which is reused, but washing them is limited because of lack of water or the seclusion needed to wash and reuse the napkins or cloths, resulting in the use of moist or even wet contaminated cloths.[3] Contaminated old cloths augment the probability of reproductive tract infections (RTI's) including vaginal, urinary and perineal infection.[4]

Therefore, under these conditions, menstruation can be an obstacle to education and growth for numerous girls, as there is lack of effective sanitary products which restricts girls' involvement in social and educational pursuit. During the menstruation period they don't go to school owing to the concern of leaking, awkwardness, pain or inadequate sanitation amenities that do not permit them to clean or change in privacy.[4]

A technique for menstrual sanitation management which is alternative to sanitary napkins is the usage of menstrual cup. It is a bell-shaped device made out of high grade medical silicon, rubber, latex, or elastomer which is inserted into the vagina during menstruation to collect the menstrual flow. They are 6 cm long, 4.2 cm in diameter in its broad portion and their storage space capacity vary between 10 to 38 cm. They can be drained, boiled and reinserted once per month and can be used for 5-10 years. Manufacturers recommend draining it each 4 to 12 hours and cleaning it with water before using it again.[5] These cups collect more blood than a typical sanitary napkin and is environmentally amiable with not many recognized side effects.[6]

It's projected that a woman might use up to 17,000 napkins or tampons over her life time. But 2 to 3 menstrual cups are enough during the entire reproductive cycle of women. This puts ahead the menstrual cup against sanitary napkins and other methods in terms of the enormous difficulty of waste material that is not so easy to reprocess or reuse.[7] Re-utilizable menstrual cups are inexpensive than the disposable napkins. As they are manufactured using health-grade non-allergic, non-toxic silicone, they are totally inert and smooth thereby keep away from the harms like allergies, infections, rashes, and abrasion. Menstrual cup are non-absorptive and do not disturb the vaginal epithelium.[8] As it is put-on internally, it get rid of foul stench and feeling of dampness. It can also be put-on for extended hours because of its ability to acclimatize to the body wholly. As menstrual cup can be sterilized by boiling before each use, it is the cleanest and protected menstrual hygienic method.

Currently almost 100 brands of menstrual cups are available globally.[2] Though obtainable as one of the menstrual hygiene products in marketplace since mid-20th century, menstrual cup stayed as a stranger amid women, often being ignored and discarded because of apprehension and lack of knowledge about the method of usage. Even though they are outstanding as compared to all the conservative type of hygiene products available in the Indian market, they still stay in the dark; ethical taboo, lack of knowledge, and marketplace strategies are part of the cause to this present situation.[9] Further, the current situation is attributed to the simple cause that even the educated women remain apprehended about this alternative. Here the responsibility of a medical professional who specializes in women's health must play a part to investigate and promote the awareness and use of the menstrual cups.

The use of menstrual cups has been investigated in developed, developing and under developed countries.[6,10,11] In the investigations conducted in developed countries, the menstrual cup was satisfactory, due to less leakage, comfort, less frequent need to change and less odour as compared to sanitary napkins.[6,10,11] Similar studies conducted in developing and under developed countries have confirmed the suitability of menstrual cups among girls and women and stated to be a safe choice for menstruation management and have received positive responses.[12] Limited number of investigations is found on the awareness, knowledge and attitude towards menstrual cups as a method of menstrual sanitation management in India.

With these observations, this present investigation was proposed to study and evaluate the awareness about the menstrual cups among Indian women. In addition, issues linked with the awareness such as tradition, attitude, and information of reproductive women in using menstrual cups in India were also investigated.

METHODS

The eligible women participants in reproductive age group were chosen from Srinivas Institute of Medical Sciences and Research Centre, Mangalore, Karnataka, India. After getting the essential administration approvals and ethical committee clearance, the chosen participants were contacted and those agreed to take part in the study were included. The pertinent data was collected using an interviewer administered questionnaire over a period of 1 month.

The statistical factors studied were: awareness on menstrual cup, attitude and practice on the use of menstrual cup among women of reproductive age. A

knowledge score using a scale of 1 to 10 was established based on the stated factors. The other factors such as age group, educational and marital status, profession, income group, etc., were considered as significant descriptive variables.

Inclusion criteria

Women in the reproductive age group (15-45 years) studying and working in Srinivas Institute of Medical Sciences and Research Centre, Mangalore, Karnataka, India.

Exclusion criteria

Adolescence not attained menarche. Post-menopausal women and women who underwent surgical menopause.

Statistical analysis

All the data collected were statistically analysed. Descriptive statistical tests (like proportion, central tendency, variation), inferential statistics like chi-square test, and other suitable statistical tests were used. Data was represented using appropriate diagrams. The relationship between subjective variables and knowledge, attitude, and practice (KAP) was evaluated by comparison of the mean values. Categorical variables were compared using percentages and cross tabulation Chi square test was employed to investigate the statistical significance. P value <0.05 was considered statistically significant. IBM SPSS version 22 was used for statistical analysis.

RESULTS

508 participants were included in the final investigation. The maximum number of participants was in the age group of 21 years to 25 years (58.46%). The educational status of the participants was mostly in the category of undergraduate level (69.88%) or graduate level (15.55%). The marital status of most of the participants was unmarried (89.37%). Most of the participants belong to low-income group (<Rs.20000- 72.44%). The details are presented in Table 1 below.

Table 1: Descriptive analysis of demographic parameters in the study population (N=508).

Parameter	Frequency	Percentage
Age		
16-20 years	141	27.76
21-25 years	297	58.46
26-30 years	47	9.25
31-35 years	11	2.17
36-40 years	9	1.77
>40 years	3	0.59
Educational status		
Up to 2nd PU	24	4.73
Under graduate	355	69.88
Graduate	79	15.55
Post graduate	50	9.84
Field		
Medical	269	52.95
Dental	128	25.20
Physiotherapy	41	8.07
Nursing	60	11.81
Other health care workers	10	1.97
Occupation		
Student-medical	236	46.46
Student-dental	131	25.79
Student-nursing	44	8.66
Student-physiotherapy	30	5.91
Receptionist/clerk	9	1.77
Physiotherapist	10	1.97
Doctor	30	5.90
Nurse	18	3.54
Marital status		
Married	54	10.63
Unmarried	454	89.37
Monthly income		

Continued.

Parameter	Frequency	Percentage
<Rs.20,000	368	72.44
Rs. 20,000- Rs.50,000	83	16.34
>Rs.50,000	57	11.22

Table 2: Descriptive analysis of awareness parameters in the study population (N=508 participants including everybody/465 participants who have awareness).

Parameter	Frequency	Percentage
Types of sanitary measures currently used by women (N=508)		
Participants using cloth alone	3	0.59
Participants using sanitary pads alone	230	45.28
Participants using tampons alone	1	0.20
Participants using menstrual cups alone	8	1.57
Participants using cloth or sanitary pad or tampon	216	42.52
Participants using cloth or sanitary pad or tampon or menstrual cups	50	9.84
Awareness on menstrual cups (N=508)		
Heard of menstrual cups	465	91.54
Not heard of menstrual cups	43	8.46
Awareness on place of availability of menstrual cups (N=465)		
Pharmacy alone	80	17.20
Online stores alone	107	23.01
Departmental store alone	2	0.43
Anganavadis alone	1	0.22
Government health centers alone	2	0.43
Pharmacy or online stores or department stores	228	49.03
Other sources/combinations	24	5.16
No answer	21	4.52
Awareness on cost of menstrual cups (N=465)		
Less than Rs.150	47	10.11
Rs.150-250	116	24.95
Rs.250-500	222	47.74
Rs.500-1000	40	8.60
No idea	40	8.60
Awareness on reusability of menstrual cups (N=465)		
Participants who are aware of reusability	404	86.88
Participants who are not aware of reusability	8	1.72
Don't know either	53	11.40
Awareness on service life of menstrual cups (N=465)		
2 years	202	43.44
5 years	119	25.59
10 years	82	17.64
No answer	62	13.33
Awareness on cleaning of menstrual cups (N=465)		
Wash with hot water and dry it	352	75.70
Wash with cold water and dry it	25	5.38
Wipe with a wet/dry cloth	1	0.22
Dispose the collected menstrual blood, wash, reuse	1	0.22
Sterilize/boil menstrual cup/sterilizers are available	3	0.65
Special cleaning solution is required	33	7.09
Dispose it	10	2.15
No need to clean	6	1.29
No idea and no answer	34	7.31
Willingness to use menstrual cups (N=465)		
Willing to use	268	57.63
Not willing to use	143	30.75

Continued.

Parameter	Frequency	Percentage
Don't know	54	11.61
How did you come to know about menstrual cup initially? (N=465)		
Social media	306	65.81
Peers	17	3.65
Doctors	11	2.36
Print media	6	1.29
Nurse	1	0.22
Combinations of the above	91	19.57
No answer	33	7.10

The current sanitary measures used by the participants is mostly sanitary napkins (45.28%). 465 (91.5%) participants were aware of the menstrual cup but only 8 (1.57%) of them were using only menstrual cups as of now. It was also observed that 50 (9.8%) participants use menstrual cups sometimes along with other methods. Many of them were also aware of where to purchase them. 306 (65.81%) participants got information from social media and others from peer or doctor or nurse. 404 (86.88%) participants were aware of the reusability of the menstrual cups, and 352 (75.7%) of them knew how to clean the cups. 268 (57.63%) participants were willing to use the menstrual cups. The details are presented in Table 2.

The major complication observed with the menstrual cup was found to be itching (20.22%), followed by pain in the abdomen (15.27%). Many participants observed that it can be used by unmarried girls, it is environment friendly, less leakage and require less frequent change. Many (36.99%) also felt that it is cumbersome to use. The details are presented in Table 3.

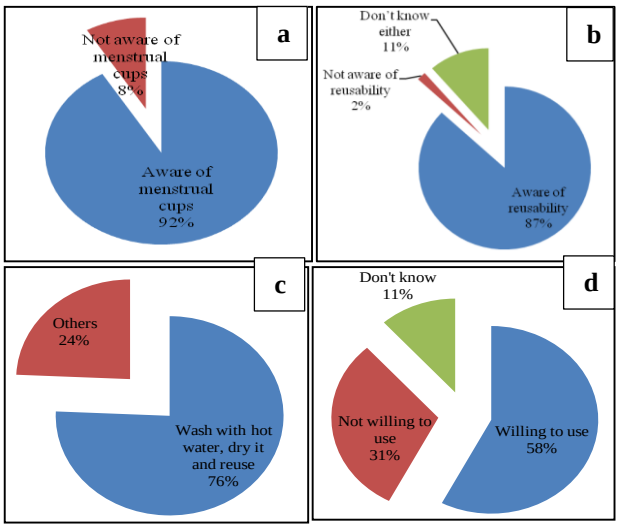

Figure 1: Graphical representation of important awareness and willingness parameters: a) awareness on menstrual cups; b) awareness on reusability of menstrual cups; c) awareness on cleaning of menstrual cups; d) Willingness to use menstrual cups.

Table 3: Descriptive analysis of parameters that concerns the use of menstrual cups in the study population (N=465).

Parameters	Frequency	Percentage
Complications with the use of menstrual cup among participants (N=465)		
Itching	94	20.22
Pain in the abdomen	71	15.27
Foul smelling discharge	18	3.87
White discharge pv	6	1.29
Excessive bleeding pv	14	3.01
Combinations of foul smelling discharge/ itching white discharge pv/ pain in the abdomen/ excessive bleeding pv/ infections/ fever/ discomfort	93	20.00
Fear	1	0.21
Forgetting to remove it	2	0.43
Difficult and painful to insert	2	0.43
Toxic shock syndrome	1	0.21
No complications	11	2.37
No Answer	152	32.69
Concern on assistance required to insert menstrual cups (N=465)		
Required	93	20.00
Not required	262	56.34

Continued.

Parameters	Frequency	Percentage
Not aware of requirement of assistance	110	23.66
Awareness on using menstrual cups in virgins/unmarried girls (N=465)		
Can be used	361	77.63
Cannot be used	17	3.66
Don't know	87	18.71
Awareness on benefits of menstrual cups (N=465)		
Yes, it is beneficial	311	66.88
No, it is not beneficial	21	4.52
Don't know	133	28.60
Advantages in the use of menstrual cups (N=465)		
Less leakage	23	4.95
Less frequent change	39	8.39
Environment friendly	58	12.47
Better than pads/ any other current method	32	6.88
Combination or all of less frequent change/ less leakage/ environment friendly/ better than pads/ any other current method/ comfortable, no rashes	245	52.69
Don't know	68	14.62
Disadvantages in the use of menstrual cups (N=465)		
Feel cumbersome to use	172	36.99
Poor availability	40	8.60
Higher cost	41	8.82
Combinations of higher cost/ feel cumbersome to use/ poor availability/ assistant to use it initially/ difficulty/no knowledge in insertion	128	27.53
Don't know what size to buy	1	0.22
Difficulty of disposal	1	0.22
Not comfortable	1	0.22
No answer	81	17.42

Table 4: Descriptive analysis of knowledge score in the study population (N=465).

Knowledge score	Frequency	Percentage
Good knowledge (≥6)	404	86.9
Poor knowledge (<6)	61	13.1

A knowledge score using a scale of 1 to 12 was established for the chosen parameters. The age of the participants did not contribute to the knowledge score. The difference in the proportion of age group between knowledge category was not statistically significant (p=0.273). The educational status of the participants contributed to the knowledge score. The difference in the proportion of educational status group between knowledge category was statistically significant (p=0.05). The occupation of the participants also very much contributed to the knowledge score. The difference in the proportion of occupational group between knowledge category was statistically significant (p<0.00001). The marital status of the participants influenced the knowledge score. Among those who had good knowledge, majority of them were unmarried girls. The difference in the proportion of marital status groups between knowledge category was statistically significant (p<0.00001). The income of the participants did not contribute to the knowledge score. The difference in the proportion of income group between knowledge category was not statistically significant (p=0.7168). Details are summed up in the Table 5.

Table 5: Descriptive analysis of knowledge score group/category wise (N=465).

Parameters	Knowledge score Good knowledge (≥6) (N=404)	Poor knowledge (<6) (N=61)	Chi square value	P value
Age group				
16-20 years	113 (27.97%)	18 (29.51%)	6.35	0.2733
21-25 years	244 (60.40%)	32 (52.46%)		
26-30 years	34 (8.42%)	6 (9.84%)		
31-35 years	6 (1.49%)	3 (4.92%)		
36-40 years	6 (1.49%)	1 (1.64%)		
>40 years	1 (0.25%)	1 (1.64%)		

Continued.

Parameters	Knowledge score Good knowledge (≥6) (N=404)	Poor knowledge (<6) (N=61)	Chi square value	P value
Educational status				
Up to 2nd PU	13 (3.22%)	6 (9.84%)	7.7	0.05
Under graduate	289 (71.53%)	39 (63.93%)		
Graduate	60 (14.85%)	12 (19.67%)		
Post graduate	42 (10.40%)	4 (6.56%)		
Occupation				
Student-medical	194 (48.02%)	19 (31.14%)	29.98	<0.00001
Student-dental	107 (26.49%)	16 (26.23%)		
Student-nursing	31 (7.67%)	9 (14.75%)		
Student-physiotherapy	26 (6.43%)	3 (4.92%)		
Receptionist/clerk	5 (1.24%)	4 (6.56%)		
Physiotherapist	6 (1.49%)	3 (4.92%)		
Doctor	27 (6.68%)	1 (1.64%)		
Nurse	8 (1.98%)	6 (9.84%)		
Marital status				
Married	38 (9.4%)	33 (54.1%)	81.82	<0.00001
Unmarried	366 (90.6%)	28 (45.9%)		
Monthly income				
Less than Rs.20,000	290 (71.78%)	46 (75.41%)	0.66	0.7198
Rs 20,000-50,000	67 (16.58%)	10 (16.39%)		
More than Rs.50,000	47 (11.63%)	5 (8.20%)		

DISCUSSION

This was a descriptive cross sectional study exploring the awareness, knowledge, feasibility and tolerability of using menstrual cups for menstrual sanitary management among reproductive aged women in Mangalore, Karnataka, India. The outcome revealed the realistic, environmental and economic advantages of using the menstrual cup, as well as the contradictions, concerns and discomfort related to its use. The major finding is that there is good awareness on menstrual cups and immense willingness to use them and they seem to be practical and agreeable for menstrual sanitary management in the illustrated objective group and setting. But it will be vital to solve the mentioned discomfort, contradictions, and concerns and encouraging family and peer support.

We evaluated our findings on (1) how women are coping with their menstruation currently? (2) are they aware of menstrual cups, their cost, service life, availability, reusability, the cleaning method and willingness to use it? (3) complications, benefits, awareness on method of using it, apparent advantages, disadvantages of using menstrual cups and (4) knowledge score on these parameters based on a 10 point scale, the details of which are presented in the results.

Due to restricted income, girls would use home-made cloth napkins but sense them as "cumbersome" and unpleasant due to stench and leakage.[11] Many other investigations revealed taboos linked to menstruation which lead to apprehension.[13,14] McMahon and colleagues detailed on how girls became embarrassed during their menstruation, putting on a sweater close to their waist, red-shade clothes, or requesting friends to pace closely in the rear of them to prevent others spotting blood stains on their clothes.[14] This fear possibly decreased attentiveness at school.[13] Many of these studies assessed the menstrual sanitation of adolescent school aged group who have attained their menarche.[15] Indian investigations have shown sanitary pads are used among best part of school going girls and women.[3,4,16] The National Family Health Survey conducted by International Institute for Population Sciences, ([NFHS-4), established that 57.6 per cent of women in the age group of 15-24 years (average of 15-19 and 20-24) are now using commercial or locally made sanitary napkins. In urban population the usage of sanitary napkins is at 77.5 per cent while in rural population the usage of sanitary napkins is at 48.2 per cent.[17] This might be due to the reason that menstrual cups are not common like sanitary napkins and cloth among school going girls and reproductive age group or owing to accessibility of napkins at primary health care centre at free of cost.[12,16]

A study conducted in the Indian state of Gujarat demonstrated that women in the age group of 20 to 50 years are aware of and preferred the use of menstrual cup as it was effortless to insert and take off, with advantages like dryness, less stench, superior comfort, and very less side effects.[3] In an investigation in a Kenyan school, adolescent girls aged between 14 to 16 years were assessed for use of menstrual cups without any health issues as compared to sanitary pads. Menstrual cups were established as a more efficient menstrual sanitation method and it is also recognized that there is less *E. coli* growth and no confirmation on any other health issues.[8]

In their investigation conducted at the Indian city of Bangalore, Aishwarya and Tharani observed that in Bangalore many women are already using the menstrual cups and have very good knowledge about them.[18] In another investigation conducted in Nepal amongst the school-going girls even though many of the participants are aware of menstrual cups they have reported their worry concerning the leakage, loss of fertility and loss of virginity. Furthermore, in this study, it was also stated that assistance from the family, peers and teachers can considerably decrease the stigma linked with the use of the menstrual cup.[19] In a feasibility study conducted at a Sub-Saharan African (SSA) region it is observed that supply of menstrual cups was linked with less bacterial vaginosis, which is very widespread in SSA and a recognized risk factor for sexually transmitted and reproductive tract infections and HIV transmission and acquisition. It is established in this study that the menstrual cups are harmless to use and well received after a familiarization period.[20]

Further, India is facing a major threat in the form of managing the soiled napkins waste which results in multiple complications. Every woman in her reproductive age is projected to use and dispose 11000 sanitary pads/and menstrual products. 12.3 billion sanitary napkins are disposed each year in India resulting in 1,13,000 tonnes of non-decomposing solid waste. Each one of the sanitary napkin contain 2.4 gm of plastics which is equivalent to 4 plastic bags. 80% of urban women use inorganic disposable napkins. The non-organic sanitary napkin takes up to 250-800 years to decompose or may not at all decompose.[21,22] The unclean and soiled pads are not separated out by the waste handlers. The menstrual waste when poorly managed end up into drainages, streams, rivers and oceans, clogging the toilets, and septic tanks, blocking sewer systems, scattered on soil, and finish up in the landfills adding to the existing problem of plastic pollution.[23] Perfumed napkins have around 15000 chemicals, the majority of which are endocrine disruptors. Additionally, napkins contain super absorbent polymers (SAP), volatile organic compounds (VOCs), phthalates and other detrimental chemicals which cause conditions varying from fatigue, nausea to cancer. Further, the low cost incinerators installed in many places are not burning the napkins at 800°C (optimal temperature) thus discharging cancer causing chemicals like furans and dioxins.[21,24] Therefore, the major risks associated with sanitary napkins are that the inhalation by people nearby, being eaten by fish, aquatic organism, animals, direct contact with human especially with waste handlers, and pickers. Hence, menstrual cups are more feasible choice as they have fewer chemicals, reusable and long service life.

In this present study, the objective group encompasses mostly medical fraternity and other hospital/paramedical staff. Most of them used sanitary pad alone, or cloth to maintain sanitary hygiene during menstrual days. Nearly 92% of the participants had good awareness of menstrual cup. Around 58% of them were willing to use menstrual cup as menstrual sanitary aid during menstrual days. Even though, there was good awareness and knowledge about menstrual cup among present study group, many of them had not used it even once. Only 1.57% was found to have used menstrual cup only and 9.8% of them used it rarely along with other methods.

CONCLUSION

This investigation provides contextual and precise evidence about the awareness of menstrual cups among reproductive age group women in Mangalore, Karnataka, India. The awareness, knowledge, attitude and acceptance for the use of menstrual cups are good among the educated groups, women in good occupation and unmarried girls. Hence it is established that higher the educational status and occupation level more is awareness and knowledge about menstrual cups. There is a vast disparity between awareness and actual use and willingness to use. As there are multiple advantages with menstrual cups, the usage of menstrual cups among Indian Women particularly in rural areas where the basic hygiene products are deprived of must be promoted by creating awareness and making them accessible to all. Hence, awareness increasing programs such as meetings/counselling sessions highlighting the use of menstrual cups among women in reproductive age group must be conducted by central/state health administration.

Recommendations

Future research must investigate this issue from the perception of variety of stakeholders, including health care providers, teachers, relatives, parents and men. Other stakeholders may shed light on further obstacles. They might facilitate the use of menstrual cup use and help identify method in which menstrual cups could be a strategic prospect to improve inter-sectional inequalities, gender impartiality as well as equity within communities, schools and family. Probable payback which would be worth exploring include: saving water, bringing down the waste, and economical benefits.

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