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A Study to Evaluate the Knowledge of Menstrual Cups Among Engineering Students at Selected Colleges in Kuppam, Andhra Pradesh

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Abstract

Background and Aims: *Menstrual cups are an eco-friendly and cost-effective alternative to sanitary pads, yet they have not gained widespread popularity among Indian women. This study aims to evaluate the knowledge of menstrual cups among engineering students at selected colleges in Kuppam, Andhra Pradesh, to better understand awareness and acceptance of this alternative menstrual product.* ***Materials and Methods:*** *A cross-sectional descriptive research design was employed. A total of 143 engineering students were selected using a non-probability convenience sampling method. Data were collected through a structured questionnaire assessing the students' knowledge of menstrual cups, categorized into three levels: inadequate, moderate, and adequate.* ***Results:*** *The findings revealed that the majority of students, 103 (72%), had moderate knowledge about menstrual cups. A smaller group, 28 (19.6%), had inadequate knowledge, while 12 (8.4%) students demonstrated adequate knowledge.* ***Conclusion:*** *The results suggest that engineering students possess a moderate level of knowledge regarding menstrual cups, indicating some awareness of this alternative menstrual hygiene product. However, despite the numerous advantages of menstrual cups—such as being eco-friendly, cost-effective, and helping prevent reproductive tract infections—their usage appears to be limited. These findings underscore the need for targeted educational programs to enhance knowledge and promote the adoption of menstrual cups among Indian students, thereby increasing their prevalence and encouraging healthier menstrual practices.*

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INTRODUCTION

Menstruation was exclusive to females. Menstruation marks a significant change for girls during adolescence [1–3]. A menstrual cup, an alternative to sanitary pads and tampons, is a silicone device placed inside the vagina to collect menstrual flow [4]. The concept dates back to 1867, when the first models, initially called 'catamenial sacks,' were patented in the United States. In 1937, Leona Chalmers patented the first commercial prototype [5].

A menstrual cup was placed in the vagina during menstruation to collect the menstrual fluid.

Typically made from flexible medical-grade silicone, it resembles a bell with a stem that aids in easy insertion and removal. The bell-shaped design enabled the creation of a seal against the vaginal wall, below the cervix. The cup was removed, emptied, rinsed, and reinserted every 6–12 hours depending on the flow.

A menstrual cup is a bell-shaped device made of high-quality medical silicone intended for insertion into the vagina during menstruation. It should be boiled once a month and should last between 5 and 10 years. Compared to regular sanitary pads, they collect a larger volume of blood and are environmentally friendly with few reported side effects. The cup can be worn for 4–12 hours, depending on the type of cup and the heaviness of the menstrual flow, and it is suitable for overnight use. To empty it, simply remove the cup and dispose of menstrual blood in the toilet. The cup was then rinsed with a mild soap or gentle cleanser before reinserting it. At the end of the menstrual period, the cup should be sterilized by boiling, microwaving, or sterilizing the solution [4].

Need for the Study

Menstrual cups significantly reduce menstrual waste because they are reusable, unlike sanitary pads and tampons, thus making them eco-friendly. They are also more economical because they can last five or more years. Menstrual Hygiene Management (MHM) is a crucial component of the Swachh Bharat Mission Guidelines (SBM-G). The MHM Guidelines, released in December 2015 by the Ministry of Drinking Water and Sanitation, were designed to support all adolescent girls and women. According to the State of India's Environment 2019 Survey, the Menstrual Hygiene Alliance of India (MHAI) estimates that there are 336 million menstruating women in India, with 36% using disposable sanitary napkins, amounting to approximately 121 million women [6, 7].

According to the State of India's Environment 2019 Survey, approximately 336 million women menstruate in India, with 36% using disposable sanitary napkins, which is about 121 million women). This means India handles around 12.3 billion disposable sanitary napkins annually, most of which are not biodegradable or compostable. The 2016 Solid Waste Management Rules advise that all menstrual waste should be sent to one of 215 large-scale common biomedical waste incinerators across the country. However, this necessitates coordinated efforts for the segregation, collection, and transportation of menstrual and other sanitary waste on a large-scale. Disposing of sanitary pads remains a concern in India, as women and girls often feel uncomfortable disposing of them where others might see them. Consequently, many end up flushing them down the toilet and are unaware of the risks of blockage. Waste pickers manually separate soiled napkins from recyclable items, exposing them to harmful microorganisms such as *E. coli*, *Salmonella, Staphylococcus,* HIV, hepatitis, and tetanus [8].

Objectives of the Study

1. To assess the demographic variable
2. To assess the level of knowledge regarding menstrual cups among engineering students
3. To determine the association between the level of knowledge of engineering students and their demographic variables.

Hypotheses

$H0_1$: There is no significant relationship between the knowledge levels of engineering students regarding menstrual cups and the selected demographic variables at a significance level of 0.05.

MATERIAL AND METHODS

Research Approach

A quantitative approach was employed to evaluate menstrual cup knowledge among engineering students at selected colleges in Kuppam, Andhra, Pradesh.

Research Design

This study used a cross-sectional descriptive research design.

Research Setting

This study was conducted at the Engineering Colleges Kuppam Chittoor Dist., Andhra Pradesh, which is accredited by the National Board of Accreditation (NBA) and approved by the All-India Council for Technical Education (AICTE). The Kuppam Engineering College offers a range of undergraduate, postgraduate, and research programs aimed at uplifting rural societies. The undergraduate courses offered are Civil Engineering, Electrical and Electronics Engineering, Electronics and Communication Engineering, Mechanical Engineering, and Computer Science and Engineering. The postgraduate courses include M.Tech. programs in Power Electronics, Embedded Systems, VLSI, Machine Design, and Computer Science and Engineering, as well as a Master of Business Administration (MBA).

Population

Students at Engineering College, Kuppam.

Sample

The sample of the present study included all girls' students studying at an engineering college, including those who fulfilled the inclusion criteria.

Sample Size

The sample size for the study was determined using power analysis. Based on the article, 10% of the samples were added, and a total of 143 samples were included in the study.

Sampling Technique

The sample was selected by using a non-probability convenient sampling technique.

Sampling Criteria

Inclusion Criteria

- Students of 18 to 30 years.
- Students who are menstruating.
- Women studying 1st year of all courses.
- Students who can read English.

Exclusion Criteria

- Students who underwent partial or complete Hysterectomy
- Students who are absent during the time of data collection
- Students who are not given consent to study.

Research Variables

Dependent variables: Knowledge regarding menstrual cups among engineering students was assessed using a structured questionnaire.

Development and description of tools: A structured knowledge questionnaire was developed by the investigators based on a review of the literature and expert opinion regarding content validity.

Description of the tool: The structured knowledge questionnaire consisted of 40 questions.

Section A: Demographical variables including age of student, course, Religion, Educational Status of mother, Educational Status of father, Occupational Status of mother, Occupational Status of father, family monthly income, Marital Status of students, Average Menstrual Days, Menstrual Sanitation Method, previous knowledge of menstrual cup, and Source of Information regarding menstrual cup.

Section B: It consisted of 40 multiple-choice questions on knowledge regarding the menstrual cycle, menstrual cup, and care of menstrual cups among women of reproductive age. The correct response will be given a score of 'one' and the incorrect will be scored as 'zero.'

Validity: This tool was administered by nursing experts in the obstetrics department. A few questions were modified based on expert suggestions; 100% agreement was included in the tool, and content validity was ascertained.

Reliability

The reliability of this tool was assessed in a pilot study. Reliability was established using Cronbach's formula. The reliability of the tool was assessed in 15 subjects to assess the knowledge of engineering students regarding menstrual cups. The tool was statistically significant, with an R-value of 0.79.

Ethical clearance: Ethical clearance was obtained from the Institutional Human Ethics Committee of the Tertiary Care Teaching Hospital, Andhra Pradesh. The researcher explained the procedure to the engineering students and obtained verbal consent.

Pilot study: The Pilot study was conducted from 12.09.23 to 17.09.23, to assess the feasibility and practicability of the study and to determine whether the plan for statistical analysis was positive for conducting the main study.

Data collection procedure: The data collection procedure was performed for a period of four weeks from 20.09.2023 to 20.10.2023. Demographic variables and knowledge questionnaires were collected using a face-to-face interview method for a time period of 40–45 minutes, the confidentiality of the responses was maintained throughout the procedure, and the post-test was collected after a one-week gap duration using the same study participants.

RESULTS

The data is organized and presented in the following sections.

Section I: Frequency and percentage distribution of socio-demographic variables among engineering students.

Section II: Frequency and percentage distribution of level of knowledge regarding menstrual cup

Section III: Association between engineering students' level of knowledge of engineering students and their demographic variables

Section I: Frequency and Percentage Distribution of Socio-demographic Variables Among Engineering Students

Table 1 shows the Frequency and percentage distribution of the socio-demographic variables like age in years, course, religion, educational status of the mother, educational status of the father, occupation of mother, occupation of father, type of family, family income per month (Rupees), type of transportation to college, age of menarche, marital status, menstrual cycle, amount of bleeding, type of material used, pain during menstruation (periods), if the answer is yes, severity of pain, knowledge regarding menstrual cup, if yes, where do you get the knowledge among engineering students.

Table 1. Frequency and percentage distribution of the socio-demographic variables (N=143).

S.N.	Demographic variables	Frequency (f)	Percentage (%)
1	***Age in years***		
	18–20 years	63	44
	21–23 years	80	56
2	***Course***		
	Civil Engineering	28	19.6
	Computer Science and Engineering	41	28.6
	Electronics and Communication Engineering	22	15.4
	Electrical and Electronics Engineering	26	18.2

	Mechanical Engineering	26	18.2
3	***Religion***		
	Hindu	54	37.8
	Muslim	53	37.1
	Christian	33	23.1
	Any other	3	2.1
4	***Educational status of the mother***		
	No formal education	11	7.7
	Primary school	22	15.4
	Middle school	20	14
	Secondary school	41	28.7
	Higher Secondary school	28	19.6
	Degree and above	21	14.7
5	***Educational status of the father***		
	No formal education	9	6.3
	Primary school	15	10.5
	Middle school	41	28.7
	Secondary school	32	22.4
	Higher Secondary school	28	19.6
	Degree and above	18	12.6
6	***Occupation of mother***		
	Housewife	57	39.9
	Coolie	32	22.4
	Private Job	38	26.6
	Government	11	7.7
	Others_____	5	3.5
7	***Occupation of Father***		
	Not working	3	2.1
	Coolie	55	38.5
	Private Job	60	42
	Government	11	7.7
	Others_____	14	9.8
8	***Type of family***		
	Nuclear family	86	60.1
	Joint family	46	32.2
	Extended family	11	7.7
9	***Family income per month (Rupees)***		
	<10000	26	18.2
	10001 to 20000	66	46.2
	20001 to 30000	37	25.9
	> 30001	14	9.8
10	***Type of transportation to college***		
	Private transport (auto rickshaw, private bus)	45	31.5
	Government bus	49	34.3
	Self-vehicle	39	27.3
	Others_____	10	7
11	***Age of menarche***		
	<12 years	35	24.5

	13–15 years	96	67.1
	>15 years	12	8.4
12	***Marital status***		
	Married	18	12.6
	Unmarried	123	86
	Divorced	2	1.4
13	***Menstrual cycle***		
	< 28 days	36	25.2
	28 to 32 days	94	65.7
	< 33 days	13	9.1
14	***Amount of bleeding***		
	Mild (2 pads per day)	36	25.2
	Moderate (3 pads per day)	83	58
	Severe (5 pads per day)	21	14.7
	Very severe (7 or above 7 pads per day)	3	2.1
15	***Type of material used***		
	Sanitary pads	92	64.3
	Menstrual cups	34	23.8
	Cotton cloths	16	11.2
	Others_____	1	0.7
16a	***Pain during menstruation (periods)***		
	Yes	126	88.1
	No	17	11.9
16b	***If the answer is yes, the severity of pain***		
	Mild (1–3)	36	25.2
	Moderate (4–6)	76	53.1
	Severe (7–9)	26	18.2
	very severe (> =10)	5	3.5
17a	***Knowledge regarding menstrual cup***		
	Yes	119	83.2
	No	24	16.8
17b	***If yes, where do you get the knowledge***		
	From friends	38	26.6
	From family	28	19.6
	From books	18	12.6
	From social media	40	28
	Others_____	19	13.3

Section II: Frequency and Percentage Distribution of Level of Knowledge Regarding Menstrual Cup

Table 2. Frequency and percentage distribution of level of knowledge (N=143).

S.N.	Level of knowledge	Frequency (f)	Percentage (%)
1	Adequate knowledge	12	8.4
2	Moderate knowledge	103	72
3	Inadequate knowledge	28	19.6

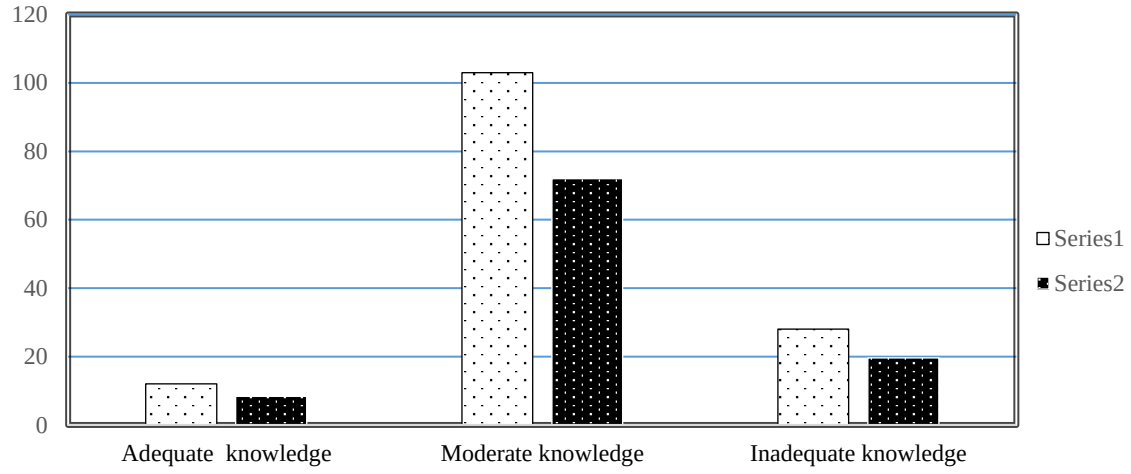

Figure 1. Level of knowledge regarding menstrual cups.

Table 2 and Figure 1 show their knowledge of menstrual cups. In the majority of the tests, 103 (72%) engineering students had moderate knowledge, 28 (19.6%) had inadequate knowledge, and the remaining 12 (8.4%) had adequate knowledge.

Section III: **Association Between Engineering Students' Level of Knowledge of Engineering Students and Their Demographic Variables**

Describes the association of knowledge scores of menstrual cup engineering students with their selected socio-demographic variables, showing that there was a significantly high relationship with the menstrual cycle (p-value =0.05), amount of bleeding (0.002), type of material used (0.05), knowledge regarding menstrual cup (0.01), and source of information (0.003). Hence, the corresponding R_{H02} was accepted.

DISCUSSION

The first objective of this study was to assess the level of knowledge of menstrual cups. The results revealed that the majority 103 (72%) of engineering students had moderate knowledge, 28 (19.6%) had inadequate knowledge, and the remaining 12(8.4%) had adequate knowledge.

The second objective was to determine the association between engineering students' level of knowledge levels and their demographic variables. The results revealed that there was a significantly strong relationship between the menstrual cycle, amount of bleeding, type of material used, knowledge regarding the menstrual cup, and source of information about the menstrual cup [9, 10].

CONCLUSION

The results showed that engineering students had a moderate level of knowledge of menstrual cups. This suggests that, despite being an advanced alternative with numerous benefits, including the prevention of many reproductive tract infections, there is likely a low prevalence of menstrual cup usage among these students.

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