

Title:

Bridging the Awareness–Utilisation Gap in Reusable Menstrual Product Use Among Female Medical Students and Healthcare Professionals: A Cross-Sectional Study

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Running Title:

Reusable menstrual product use among healthcare trainees

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Keywords:

Menstrual hygiene, reusable menstrual products, menstrual cup, sustainability, healthcare professionals, menstrual health

Authors' Contributions:

C.F.W-A.: Conceptualisation, methodology, investigation, data curation, formal analysis, writing—original draft preparation and editing.

I.I.N.: Investigation and validation, Writing- review

All authors approved the final version of the manuscript.

ABSTRACT:

Background:

Reusable menstrual products provide sustainable and cost-effective alternatives to disposable sanitary products; however, their adoption remains limited, even among healthcare professionals.

Objectives:

To assess awareness, knowledge, perceptions, and utilisation of reusable menstrual products among female medical students and healthcare professionals, and to identify predictors of willingness and use.

Design: Cross-sectional analytical study.

Setting:

An online survey was conducted among female medical students and healthcare professionals in Nigeria.

Participants: A total of 203 female respondents aged 15–55 years.

Intervention: Not applicable.

Primary Outcome Measures:

Utilisation of reusable menstrual products and willingness to adopt their use.

Secondary Outcome Measures:

Awareness, knowledge, perceptions, and barriers.

Methods:

Data were collected using a structured questionnaire and analysed using descriptive statistics, chi-square tests, and logistic regression.

Results:

Awareness was high (96.06%), but utilisation was low, with 5.42% ever using and 4.43% currently using reusable products. About 31.53% were willing to use them. Respondent type was not associated with willingness ($p = 0.735$), although healthcare professionals had higher knowledge ($p = 0.024$). Positive perception predicted willingness (AOR = 7.58, 95% CI: 3.18–18.03, $p < 0.001$). Good knowledge (AOR = 14.96, $p = 0.014$) and increasing age (AOR = 1.28, $p = 0.004$) predicted utilisation.

Conclusion:

Despite high awareness, utilisation remains low. Perception influences willingness, while knowledge drives use. Targeted behavioural and educational interventions are needed.

Keywords:

Menstrual hygiene, reusable menstrual products, menstrual cup, sustainability, healthcare professionals

Article Summary

Strengths and limitations of this study

- This study used a cross-sectional design with a structured questionnaire to assess awareness, knowledge, perceptions, and utilisation of reusable menstrual products among healthcare trainees and professionals.
- The inclusion of both medical students and healthcare professionals enabled comparison across groups with differing levels of clinical exposure.
- The use of multivariable logistic regression allowed identification of independent predictors of willingness and utilisation.
- The study employed convenience sampling and an online survey, which may limit the representativeness of the sample.
- Data were self-reported, which may introduce recall and social desirability bias.

Bridging the Awareness–Utilisation Gap in Reusable Menstrual Product Use Among Female Medical Students and Healthcare Professionals: A Cross-Sectional Study

Background

Menstrual hygiene management (MHM) is a key determinant of reproductive health and gender equity and has received increasing global attention in recent years (World Health Organisation [WHO], 2022; Hennegan et al., 2019). Reusable menstrual products, including menstrual cups, reusable sanitary pads, and menstrual discs, are designed for repeated use and offer sustainable alternatives to disposable products due to their long-term cost-effectiveness and reduced environmental impact (van Eijk et al., 2019; Kuhlmann et al., 2017).

Despite these advantages, disposable sanitary products remain the predominant choice in many settings, contributing significantly to environmental waste and recurring financial burden (Kuhlmann et al., 2017). This continued reliance reflects not only issues of accessibility and convenience but also entrenched behavioural norms and sociocultural perceptions surrounding menstruation (Hennegan et al., 2019).

Healthcare professionals and medical students occupy a unique position as both users and disseminators of reproductive health knowledge. Their personal practices and professional recommendations can significantly influence menstrual health behaviours within the broader population. However, existing evidence suggests that awareness of reusable menstrual products does not necessarily translate into their adoption, highlighting a persistent knowledge–practice gap (van Eijk et al., 2019).

Understanding this gap is particularly important in low- and middle-income contexts, where sustainable menstrual hygiene solutions could offer both economic and environmental benefits (WHO, 2022). This study, therefore, aimed to assess the utilisation, knowledge, and perceptions of reusable menstrual products among female medical students and healthcare professionals, with a view to identifying barriers and opportunities for improved adoption.

Methods

This study employed a cross-sectional descriptive design to assess the utilisation, knowledge, and perceptions of reusable menstrual products among female medical students and healthcare professionals. The study was conducted using an online survey distributed across relevant academic and professional networks.

The study population comprised female medical students and healthcare professionals, including doctors, nurses, and allied health workers. Eligible participants were females aged 15–55 years who had experienced menstruation and provided informed consent to participate. Participants who declined consent or submitted incomplete responses were excluded from the analysis.

Participants were recruited using a convenience sampling technique through online platforms, including social media and professional communication channels. Data were collected using a structured, self-administered questionnaire developed using Kobo Toolbox Software. The questionnaire was designed based on existing literature on menstrual hygiene practices and included both closed-ended and multiple-response questions.

The instrument comprised the following sections:

Section A: Sociodemographic characteristics (age, respondent type, educational level, income, residence)

Section B: Menstrual history (cycle regularity, duration, flow characteristics, dysmenorrhea)

Section C: Awareness and knowledge of reusable menstrual products

Section D: Utilisation patterns (current and past use of menstrual products)

Section E: Willingness to adopt reusable menstrual products

Section F: Perceptions (assessed using Likert-scale items)

Section G: Barriers to use

Section H: Recommendations and educational needs

Awareness was assessed by asking participants whether they had heard of reusable menstrual products. Knowledge was evaluated using structured questions addressing safety, cost-effectiveness, environmental impact, and product longevity. Responses were categorised based on correctness and level of certainty.

Utilisation was assessed through self-reported current and past use of reusable menstrual products. Willingness to adopt these products was measured using categorical responses (yes, no, not sure).

Perceptions were assessed using Likert-scale items evaluating safety, comfort, hygiene, environmental impact, and cost-effectiveness. Barriers were identified through multiple-response questions covering informational, cultural, and practical factors.

The questionnaire was distributed electronically, and participation was voluntary. Informed consent was obtained before participation, and responses were collected anonymously to ensure confidentiality.

Data were exported into Microsoft Excel and subsequently analysed using IBM SPSS version 25. Descriptive statistics were computed and presented as frequencies and percentages for categorical variables and means with standard deviations for continuous variables. Bivariate analysis was conducted using the chi-square test and Fisher's exact test to assess associations between categorical variables, including respondent type, knowledge level, and willingness to use reusable menstrual products.

Multivariable binary logistic regression analysis was performed to identify independent predictors of willingness to use and current utilisation of reusable menstrual products. Variables entered into the regression model included age, respondent type, knowledge level, perception, and barrier count. The primary outcomes included awareness, utilisation, and willingness to adopt reusable menstrual products. Results were presented using tables and graphical representations.

This study adhered to the STROBE reporting guidelines. (see Appendix II)

Ethical Considerations

Ethical approval for the study was obtained from the Medical Science Ethical Committee. Participation was voluntary, and informed consent was obtained from all participants. Confidentiality and anonymity were maintained throughout the study, and no identifying information was collected.

Results

A total of 203 respondents participated in the study, with a mean age of 23.07 ± 6.96 years. The majority were undergraduate medical students (75.37%), while healthcare professionals constituted 20.69% of the sample.

Awareness of reusable menstrual products was high (96.06%) ; however, utilisation remained low, with only 5.42% of respondents having ever used them and 4.43% currently using them.

This disparity between high awareness and low utilisation is illustrated in Figure 1. As shown in Figure 2, disposable sanitary pads remain the predominant menstrual product. Approximately 31.53% of respondents were willing to use reusable menstrual products, 36.45% were unwilling, and 28.08% were uncertain. The reported barriers to the adoption of reusable menstrual products are presented in Figure 3.

There was no statistically significant association between respondent type (student vs healthcare professional) and willingness to use reusable menstrual products ($p = 0.735$). Similarly, respondent type was not significantly associated with current utilisation ($p = 1.000$).

However, a statistically significant association was observed between respondent type and knowledge level, with healthcare professionals more likely to demonstrate good knowledge compared to students (31.7% vs 14.8%, $p = 0.024$).

In multivariable logistic regression analysis, positive perception emerged as the only significant independent predictor of willingness to use reusable menstrual products (AOR = 7.58, 95% CI: 3.18–18.03, $p < 0.001$). Other variables, including knowledge level, respondent type, age, and barrier count, were not statistically significant predictors of willingness.

For current utilisation, good knowledge was a significant predictor (AOR = 14.96, 95% CI: 1.73–129.60, $p = 0.014$). Increasing age was also significantly associated with a higher likelihood of utilisation (AOR = 1.28, 95% CI: 1.08–1.51, $p = 0.004$).

Discussion

These findings align with previous studies that have demonstrated the safety and acceptability of reusable menstrual products such as menstrual cups (Beksinska et al., 2015; Phillips-Howard et al., 2016). However, the present study also highlights a substantial awareness–utilisation gap. While awareness was nearly universal, actual utilisation remained remarkably low. These findings reinforce existing evidence that awareness, in isolation, is insufficient to drive meaningful behavioural change in menstrual health practices (van Eijk et al., 2019).

Importantly, inferential analysis provides deeper insight into the drivers of this gap. The lack of association between respondent type and both willingness and utilisation suggests that professional training alone does not necessarily influence menstrual product choices. Despite

healthcare professionals demonstrating significantly higher knowledge levels, this did not translate into increased willingness to adopt reusable products.

One of the most notable findings of this study is that perception, rather than knowledge, was the strongest predictor of willingness to use reusable menstrual products. Participants with positive perceptions were over seven times more likely to express willingness to adopt these products. This observation is consistent with the Health Belief Model, which posits that perceived benefits and barriers influence health-related behaviours (Rosenstock, 1974).

Interestingly, while knowledge did not predict willingness, it was a significant predictor of actual utilisation. Respondents with good knowledge were substantially more likely to use reusable menstrual products. This suggests a two-step pathway: perception influences intention, while knowledge facilitates actual behaviour.

Age was also found to be a significant predictor of utilisation, with older respondents more likely to adopt reusable products. This may reflect increased autonomy, financial independence, or greater exposure to menstrual health information over time.

The absence of a significant association between healthcare professional status and utilisation is particularly noteworthy. As individuals expected to serve as health educators and advocates, this finding highlights a missed opportunity for promoting sustainable menstrual practices within clinical and educational settings.

These findings collectively suggest that interventions aimed at increasing the adoption of reusable menstrual products should not focus solely on knowledge dissemination. Instead, they should adopt a more holistic approach that addresses perceptions, cultural beliefs, and practical concerns. Strategies such as peer-led education, practical demonstrations, and healthcare provider endorsement may be particularly effective.

From a public health perspective, improving the uptake of reusable menstrual products has important implications for environmental sustainability and cost reduction. Addressing the awareness–utilisation gap among healthcare trainees and professionals could have a multiplier effect, influencing broader community practices.

However, the findings related to utilisation should be interpreted with caution due to the small number of current users, which may limit statistical power and precision of estimates.

Conclusion

This study provides evidence that while awareness of reusable menstrual products is high among female medical students and healthcare professionals, utilisation remains significantly low. The findings highlight a critical gap between knowledge and practice, driven by a combination of informational, cultural, and practical barriers.

Addressing this gap requires more than increasing awareness; it necessitates targeted, multifaceted interventions that incorporate practical education, healthcare professional advocacy, and improved accessibility. Given the influential role of healthcare providers, empowering this group with accurate knowledge and practical experience is essential for broader societal impact.

Promoting the adoption of reusable menstrual products has important implications for sustainability, cost reduction, and improved menstrual health management. Bridging the awareness–utilisation gap is therefore not only a matter of individual behaviour change but also a public health priority.

Limitations

This study has several limitations. The use of a cross-sectional design limits the ability to establish causality. Additionally, the reliance on convenience sampling may affect the generalizability of findings. Data were self-reported and may be subject to recall and social desirability bias. Furthermore, although inferential analysis was conducted, the small number of respondents currently using reusable menstrual products may limit the robustness of estimates related to utilisation. Future research incorporating inferential analysis and longitudinal designs is recommended.

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Conflict of Interest: None

Acknowledgement: Department of Human Physiology, College of Medical Sciences, Rivers State University.

Data Availability Statement:

The datasets generated and/or analysed during the current study are publicly available in the Figshare repository at <https://doi.org/10.6084/m9.figshare.31982160>. The data are provided in anonymised form to protect participant confidentiality.

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APPENDIX I

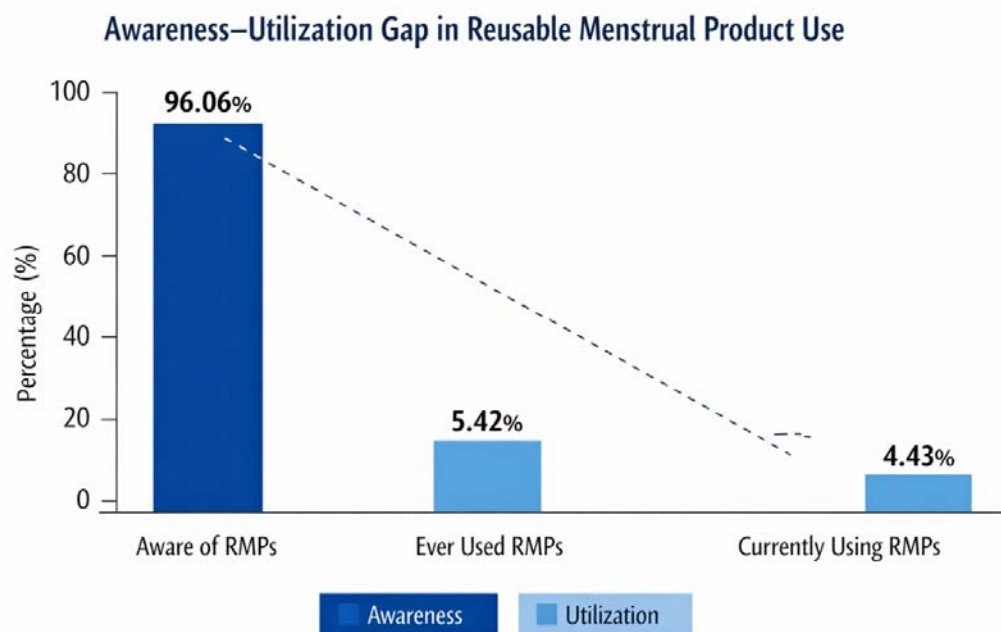


Figure 1. Awareness–Utilisation Gap in Reusable Menstrual Product Use Among Respondents.
 The figure demonstrates a substantial disparity between high awareness (96.06%) and markedly low levels of ever use (5.42%) and current use (4.43%), highlighting a critical gap between knowledge and practice.

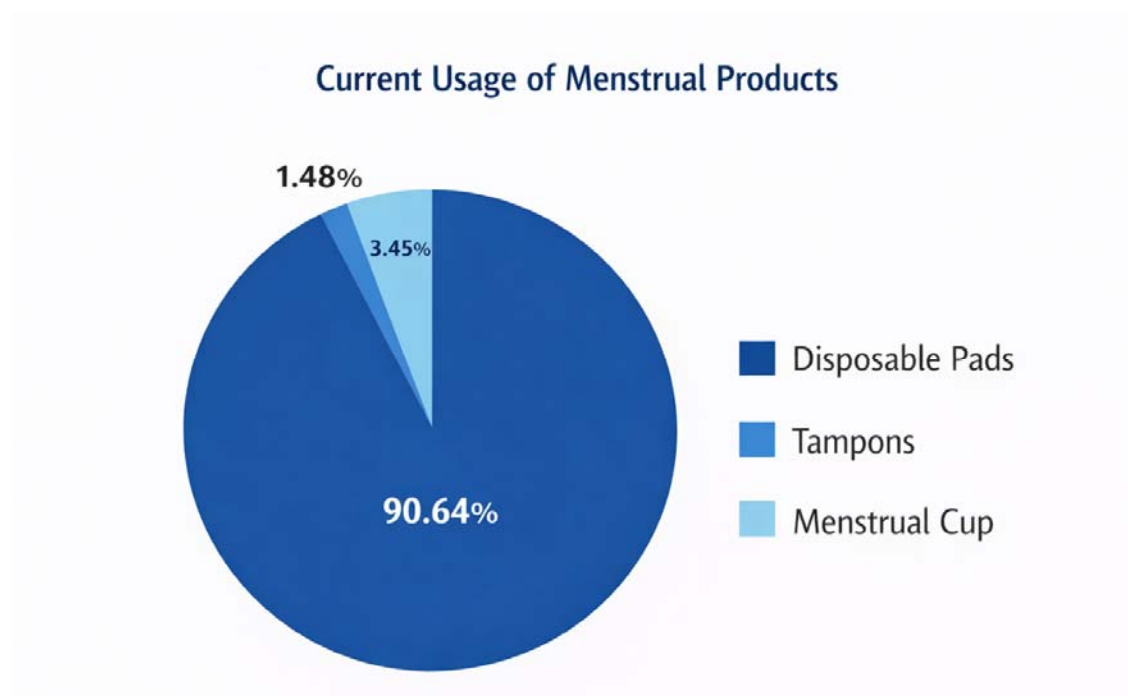


Figure 2. Distribution of current menstrual product use among respondents.
 Disposable sanitary pads were the predominant menstrual hygiene product (90.64%), with minimal use of tampons (3.45%) and menstrual cups (1.48%), reflecting low adoption of alternative menstrual products.

APPENDIX I



Figure 3. Reported Barriers to the Adoption of Reusable Menstrual Products.

Key barriers included lack of knowledge, fear of infection, concerns about insertion-related discomfort, cultural or religious beliefs, and difficulty with cleaning or sterilisation, indicating both informational and sociocultural constraints.

SUPPLEMENTARY TABLE I

The STROBE reporting checklist

	Item Description	Location (or reason for not reporting)
Title and abstract		
1a. Indicate the study's design	Indicate the study's design with a commonly used term in the title or the abstract.	Title ("Cross-Sectional Study"); Abstract (Methods)
1b. Abstract	Provide in the abstract an informative and balanced summary of what was done and what was found.	Abstract section
Introduction		
2. Background / rationale	Explain the scientific background and rationale for the investigation being reported.	Background section, paragraphs 1–4
3. Objectives	State specific objectives, including any prespecified hypotheses.	End of Background section
Methods		
4. Study design	Present key elements of study design early in the paper.	Methods (first paragraph)
5. Setting	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection.	Methods (Study design paragraph)
6a. Eligibility criteria	Cohort study: Give the eligibility criteria, and the sources and methods of selection of participants. Describe methods of follow-up. Case-control study: Give the eligibility criteria, and the sources and methods of case ascertainment and control selection. Give the rationale for the choice of cases and controls. Cross-sectional study: Give the eligibility criteria, and the sources and methods of selection of participants.	Methods (Study population paragraph)
6b. Matching criteria	Cohort study: For matched studies, give matching criteria and number of exposed and unexposed. Case-control study: For matched studies, give matching criteria and the number of controls per case.	Not applicable (no matching used)
7. Variables	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable.	Methods (Measurement of variables)
8. Data sources / measurement	For each variable of interest give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group.	Methods (Data collection instrument)
9. Bias	Describe any efforts to address potential sources of	Limitations section

	bias.	
10. Study size	Explain how the study size was arrived at.	Results (N = 203 participants)
11. Quantitative variables	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen, and why.	Methods (Data analysis section)
12a. Statistical methods	Describe all statistical methods, including those used to control for confounding.	Methods (Data analysis section)
12b. Statistical methods – subgroups and interactions	Describe any methods used to examine subgroups and interactions.	Not explicitly analysed
12c. Statistical methods – missing data	Explain how missing data were addressed.	Not reported (no missing data stated)
12di. Statistical methods – loss to follow-up	Cohort study: If applicable, describe how loss to follow-up was addressed.	Not Applicable
12dii. Statistical methods – matching cases and controls	Case-control study: If applicable, explain how matching of cases and controls was addressed.	Not Applicable
12diii. Statistical methods – sampling strategy	Cross-sectional study: If applicable, describe analytical methods taking account of sampling strategy.	Methods (Convenience sampling)
12e. Statistical methods – sensitivity analyses	Describe any sensitivity analyses.	Not performed
Results		
13a. Participant numbers	Report the numbers of individuals at each stage of the study—e.g., numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed; Consider use of a flow diagram.	Results (first paragraph)
13b. Participants – non-participation	Give reasons for non-participation at each stage.	Not reported
13c. Participants – flow diagram	Consider use of a flow diagram.	Not included
14a. Descriptive data – participant characteristics	Give characteristics of study participants (e.g., demographic, clinical, social) and information on exposures and potential confounders. Present the information in a table.	Results (sociodemographic section)

14b. Descriptive data – missing data	Indicate the number of participants with missing data for each variable of interest.	Not reported
14c. Descriptive data – follow-up time	Cohort study: Summarise follow-up time—e.g., average and total amount.	Not Applicable
15. Outcome data	Cohort study: Report numbers of outcome events or summary measures over time. Case-control study: Report numbers in each exposure category, or summary measures of exposure. Cross-sectional study: Report numbers of outcome events or summary measures.	Results (awareness, utilisation, willingness)
16a. Main results	Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (e.g., 95% confidence intervals). Make clear which confounders were adjusted for and why they were included.	Results (statistical analysis + regression)
16b. Main results – category boundaries	Report category boundaries when continuous variables were categorised.	Methods (categorisation of variables)
16c. Main results – risk	If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period.	Not applicable
17. Other analyses	Report other analyses done—e.g., analyses of subgroups and interactions, and sensitivity analyses.	Results (logistic regression)
Discussion		
18. Key results	Summarise key results with reference to study objectives.	Discussion (first paragraph)
19. Limitations	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias.	Limitations section
20. Interpretation	Give a cautious overall interpretation considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence.	Discussion section
21. Generalisability	Discuss the generalisability (external validity) of the study results.	Discussion (last paragraphs)
Other information		
22. Funding	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based.	After Limitations

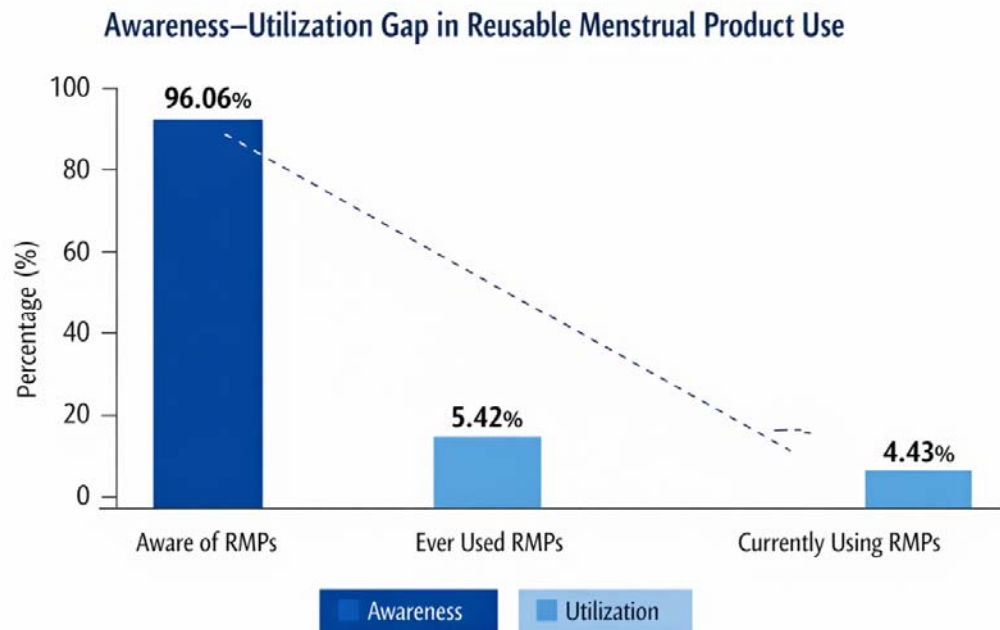


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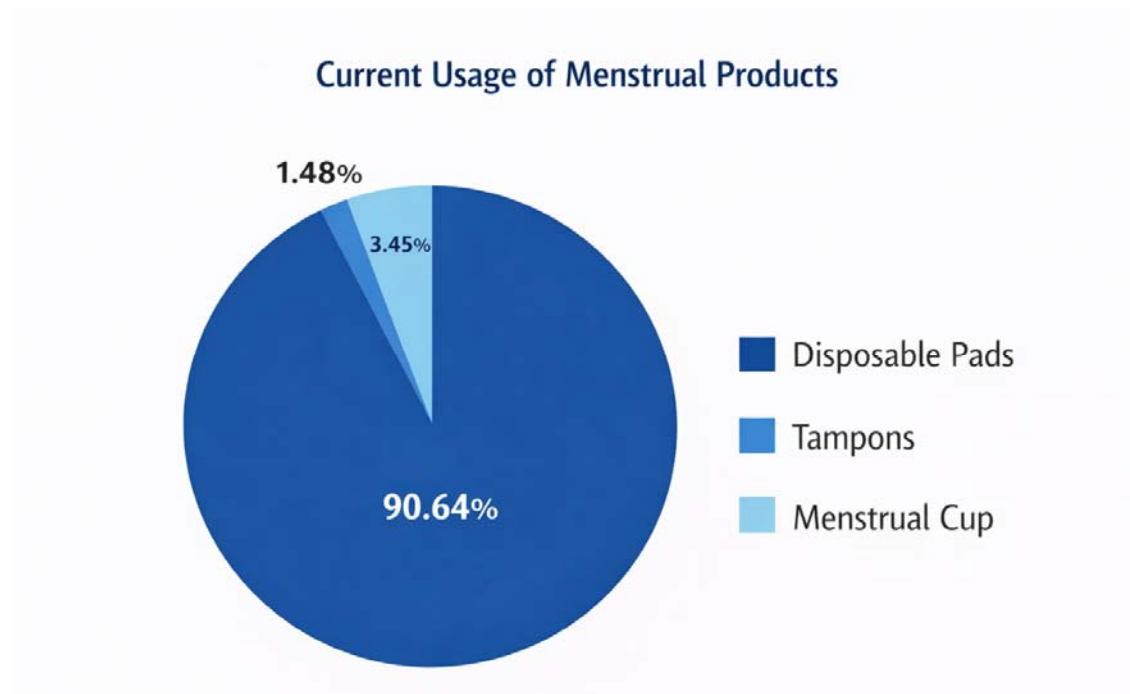


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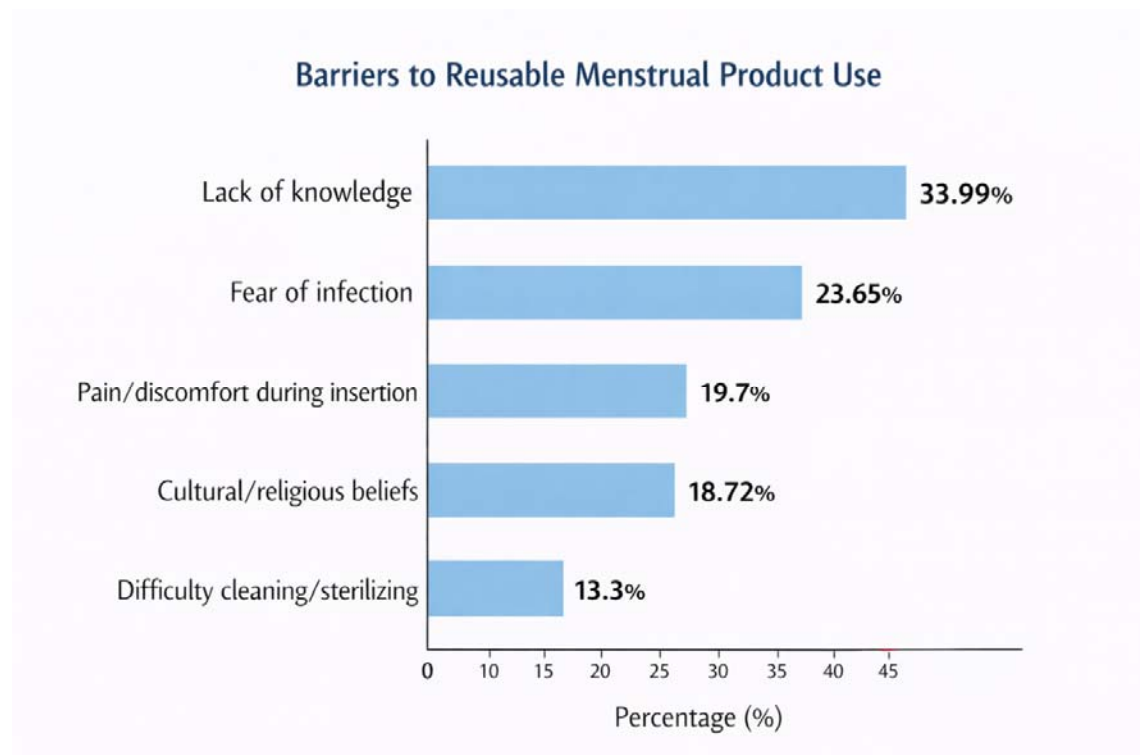


Figure 3. Reported Barriers to the Adoption of Reusable Menstrual Products.

Key barriers included lack of knowledge, fear of infection, concerns about insertion-related discomfort, cultural or religious beliefs, and difficulty with cleaning or sterilisation, indicating both informational and sociocultural constraints.