

Original Article

## Empowering rural women through sustainable menstrual hygiene practices for enhanced reproductive health

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### ABSTRACT

**Objectives:** To assess menstrual hygiene practices in Aandhi village, Rajasthan, and evaluate the impact of educational interventions on menstrual health.

**Material and Methods:** A survey was conducted with 3290 males, 2994 females, and 242 senior citizens using structured questionnaires. Educational interventions promoting hygienic menstrual practices were implemented.

**Results:** Findings revealed poor menstrual hygiene practices, with 75% disposing of products improperly. Post-intervention, there was a significant improvement in hygiene practices and awareness.

**Conclusion:** The study emphasizes the need for better menstrual hygiene education, proper waste disposal systems, and access to sustainable menstrual products in rural India.

**Keywords:** Health disparities, Menstrual hygiene, Reproductive health, Rural women, Sanitary products

### INTRODUCTION

Menstrual hygiene management (MHM) involves maintaining hygiene during the menstrual process. According to the World Health Organization and United Nations Children's Fund (UNICEF) Joint Monitoring Program for Drinking Water, sanitation, and Hygiene (WASH), MHM involves the comprehensive care required for women and adolescent girls to manage their menstrual cycles safely, hygienically, and with dignity. This encompasses the use of clean menstrual products to absorb or collect menstrual blood, having access to facilities that provide privacy for changing and disposing of used materials, utilizing soap and water for personal hygiene, and having access to safe and convenient facilities to dispose of used menstrual discard.<sup>[1]</sup> Effective MHM ensures that women and girls can continue their daily activities, including attending school and work, without interruption or embarrassment caused by menstruation.

The situation of MHM in India is particularly dire; according to the National Family Health Survey-5 conducted in 2019–21, approximately 62% of women aged 15–24 in rural India use cloth during menstruation. The survey found that the utilization of hygienic materials (sanitary napkins, locally prepared napkins, tampons, and menstrual cups) during menstruation among adolescent women in rural India stood at only 43%, whereas in urban areas, it was 68%, indicating a significant 25% point gap between rural and urban areas. The previous analysis revealed that the difference in household wealth between rural and urban areas contributed about 69% of the

explained gap in hygienic material use. Other significant contributors were “transportation to a health facility” (5.6%), “mass-media exposure” (4.9%), and “level of education” (4.4%). These findings underscore the need for targeted interventions to improve menstrual hygiene practices among disadvantaged groups in rural India, particularly those from lower socioeconomic backgrounds with limited access to healthcare and media exposure.<sup>[2]</sup>

However, the key barriers to improving MHM practices in rural India are multifaceted [Figure 1]. Limited access to affordable and hygienic menstrual products remains a significant challenge. In addition, there is a lack of water, sanitation and hygiene (WASH) facilities in schools, with studies highlighting the need for separate and usable toilets for girls, along with access to water and soap for hand washing.

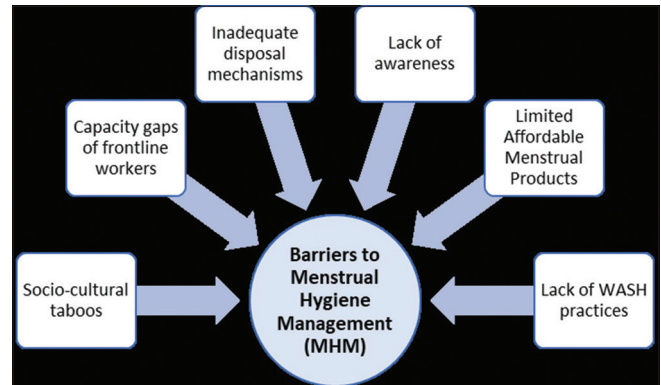
## MATERIAL AND METHODS

### Sustainable development goals (SDGs) aligned with MHM in rural India

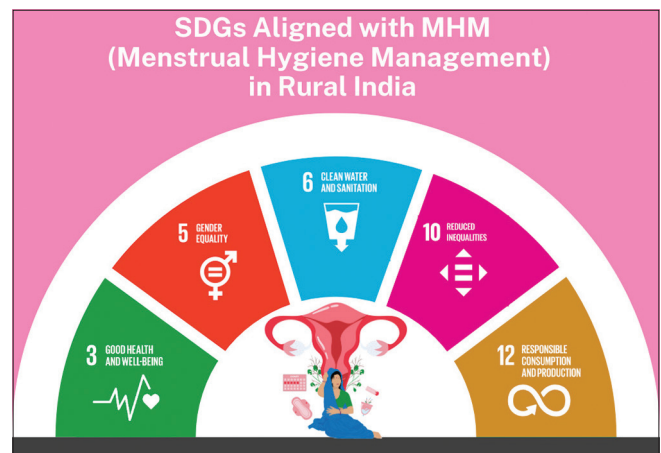
The African Coalition for Menstrual Health Management has emphasized that MHM is critical for attaining at least nine of the 17 SDGs. However, five Key goals connected directly to MHM include Goal 3 (Good Health and Well-Being), which underscores the necessity of proper MHM for ensuring healthy lives and promoting well-being for all; Goal 5 (Gender Equality), highlighting that achieving gender equality is unattainable without addressing menstruation’s social and economic impacts; Goal 6 (Clean Water and Sanitation), stressing the importance of adequate WASH facilities for proper MHM; Goal 10 (Reduced Inequalities), pointing out the need to eliminate inequalities in access to menstrual products and facilities between urban and rural population; and Goal 12 (Responsible Consumption and Production), advocating for the development of standards for safe and eco-friendly menstrual products [Figure 2]. Recognizing MHM as a contributing factor to a broad set of goals is essential for fully achieving the SDGs by 2030, necessitating explicit linkages between MHM and the SDGs to ensure menstrual health is appropriately addressed in development objectives.<sup>[1,3,4]</sup>

The objective of this study is to comprehensively assess the current state of MHM practices among women and adolescent girls in a model village in Rajasthan by the name of Aandhi Village, 50 Km from Jaipur. This includes evaluating the types of menstrual products used, the frequency of product changes, and disposal methods, with a focus on identifying unhygienic practices and their health implications.

In addition, the study aims to analyze the accessibility and affordability of hygienic menstrual products, as well as assess the availability and adequacy of WASH facilities



**Figure 1:** Figure illustrating the several barriers to improving menstrual hygiene management in rural India.



**Figure 2:** Figure illustrating the link between menstrual waste management in rural India and progress toward achieving the sustainable development goals (SDGs).

in schools and public areas. It will also explore socio-cultural perceptions and stigma surrounding menstruation to understand their impact on MHM practices and the willingness to discuss menstrual health openly.

Furthermore, the study will implement targeted educational interventions to improve MHM practices and evaluate their effectiveness in promoting awareness and behavioral change. Ultimately, the findings will lead to evidence-based recommendations for policymakers and stakeholders aimed at enhancing MHM in rural areas, improving access to products, education, and WASH facilities, and contributing to better health outcomes and quality of life for women and girls in the community.

### Study design

The study in Aandhi village includes structured interventions, starting with initial surveys to identify existing issues, followed by educational programs designed to promote

proper menstrual hygiene practices and effective waste disposal methods. This study seeks to present its findings, highlight the health impacts of poor menstrual hygiene, and discuss the effectiveness of implemented interventions.

The methodology for this study was designed to comprehensively address MHM challenges in Aandhi village, Rajasthan (India), through a systematic and multi-step process. The approach aimed to identify existing issues, implement interventions, and evaluate their effectiveness.

### Initial survey and problem identification

The research began with an initial survey to assess the current state of menstrual hygiene practices, waste disposal methods, and awareness levels among menstruators in Aandhi village. To gain a thorough understanding across different age groups, the study focused on adolescents, adult women, and older women. Data collection involved the use of structured questionnaires, which contained 50 questions addressing various topics, including demographics, household data, waste management, water and sewage systems, health, and the environment. The questionnaires were distributed through a door-to-door survey to a randomly selected sample comprising 3290 males, 2994 females, 242 senior citizens, and 1616 children (including infants, kids, and young children grouped). To ensure accuracy in the data collected for children and infants, the questionnaires were completed by volunteers who obtained information directly from parents or guardians. This provided quantitative data on menstrual product usage, disposal methods, infection frequency, and general menstrual health awareness.

In addition, focus group discussions (FGDs) with women and girls were conducted to gain qualitative insights into their experiences and challenges related to menstrual hygiene. Personal interviews were also carried out with selected participants to explore their individual stories and specific issues in more detail. The statistical analysis of the collected data was performed using the cohort component method<sup>[5]</sup> to assess whether the observed trends could hold true in the future, a key consideration in the study.

### Menstrual waste audit

Following the survey, a detailed audit of menstrual waste disposal methods was conducted to understand the environmental impact and identify gaps in waste management practices. Data collection methods included direct observation, where the team observed how menstrual waste was being disposed of in various settings such as homes, schools, and community areas. In addition, interviews were conducted with local authorities and waste management workers to gather information on current disposal practices and challenges.

### Level of awareness among village residents

This step focused on assessing the level of awareness about menstrual hygiene among village residents, including men and boys, to understand societal perceptions and knowledge gaps. Data collection methods involved distributing questionnaires to a wider audience in the village to gauge general awareness and attitudes toward menstruation. In addition, separate FGDs were held with men, boys, and community leaders to understand their perspectives and potential support for MHM initiatives.

### Educational intervention

Based on the findings, an educational intervention was designed to improve menstrual hygiene practices and waste disposal methods. Intervention methods included the development and distribution of educational materials, such as pamphlets and posters, covering topics such as the importance of menstrual hygiene, proper usage and disposal of menstrual products, and breaking cultural taboos. In addition, workshops and training sessions were conducted by professionals to educate women, girls, and the broader community on menstrual health and hygiene practices, proper disposal of menstrual waste, and general health and hygiene awareness.

### Implementation and monitoring

The implementation phase focused on ensuring the adoption of improved practices and providing continuous support to the community. Implementation methods included regular follow-up visits by the team to the village to provide ongoing support and reinforce educational messages. Additional reinforcement sessions and training discussions were conducted to address any emerging issues and reinforce key messages. Moreover, affordable and sustainable menstrual products were distributed to ensure that all women and girls had access to proper hygiene materials.

### Evaluation of effectiveness

To assess the effectiveness of the intervention, participants' feedback was collected and analyzed post-intervention. Evaluation methods included conducting FGDs and direct observations to gather qualitative data on the community's response to the intervention and any changes in behavior. In addition, participant feedback was collected to identify areas for improvement and ensure the sustainability of the practices implemented.

This comprehensive methodology aims to address menstrual hygiene issues in Aandhi village, providing a replicable model for similar rural areas. By following these steps, the study seeks to improve the health and well-being of women

and girls, reduce environmental pollution, and contribute to the achievement of the SDGs.

## RESULTS

The study aimed to comprehensively address MHM challenges in Aandhi village, Rajasthan, through a systematic and multi-step process. The results presented here are derived from the initial survey, menstrual waste audit, awareness assessment, health impact identification, educational intervention, implementation, monitoring, and evaluation of effectiveness.

### Initial baseline survey

The initial survey assessed menstrual hygiene practices, waste disposal methods, and awareness levels among menstruators in Aandhi village [Figure 3]. Data were collected using structured questionnaires, FGDs, and personal interviews with a random sample of adolescents, women, and older women.

The findings from Aandhi village, Rajasthan, underscored substantial challenges in menstrual health management, revealing critical areas that require immediate attention.

### Menstrual hygiene practices

The menstrual waste audit in Aandhi village, Rajasthan, provided detailed insights into the environmental impact and waste management practices in the area. Researchers observed that menstrual waste was frequently disposed of in homes, schools, and community areas without proper management, contributing significantly to environmental pollution and potential health hazards.

A significant portion of women (81%) in Aandhi village use menstrual pads. However, the disposal practices of these pads are alarming, with 75% of women disposing of them in open areas [Figure 4]. This practice indicates a glaring lack of proper disposal facilities and a deficiency in awareness regarding the environmental and health impacts of improper menstrual waste disposal. Open disposal of menstrual pads contributes to environmental pollution, creating breeding grounds for pathogens and posing severe health risks to the community.

### Challenges in waste management

Interviews with local authorities and waste management workers highlighted significant challenges in managing menstrual waste, including the lack of regular garbage collection services, which was reported by 87% of respondents as a major issue [Figure 5]. Without consistent waste collection, menstrual waste accumulates in open areas, exacerbating pollution and health risks. In addition, 66% of respondents reported difficulties in waste segregation, indicating that the community lacks the necessary infrastructure and knowledge to separate menstrual waste from general waste effectively. The village's waste management practices are also problematic, with a staggering 92% of the population disposing of their general household waste in open areas, reflecting the absence of an effective waste management system. Only 50% of households possess dustbins, further exacerbating the problem [Figure 6]. This indiscriminate disposal of waste leads to significant environmental degradation and health hazards, as waste accumulates and contaminates the soil and water sources.

### Sanitation practices

Sanitation practices in Aandhi village are poor, with 9% of the population practicing open-field defecation [Figure 7]. Around 80% of people discharge gray wastewater (sewage) into open grounds, leading to further contamination and unsanitary conditions [Figure 8]. These practices are detrimental to both public health and the environment, as they facilitate the spread of diseases and degrade the quality of the local ecosystem.

### Health and environmental implications

The improper disposal of menstrual waste and poor sanitation practices have dire health and environmental implications. Health risks include bacterial and fungal infections, reproductive health problems, and an increased burden of disease due to environmental contamination. Environmentally, the accumulation of menstrual waste and general refuse in open areas leads to soil and water pollution, adversely affecting local biodiversity and the community's overall well-being.



Figure 3: Initial baseline survey and menstrual waste auditing.



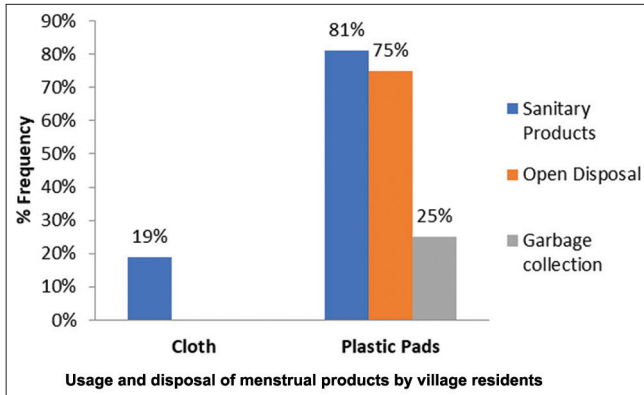


Figure 4: Usage and disposal of menstrual products by village residents.

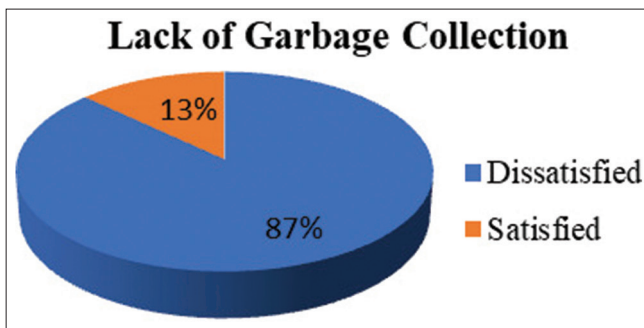


Figure 5: Challenges faced by villagers regarding general waste management.

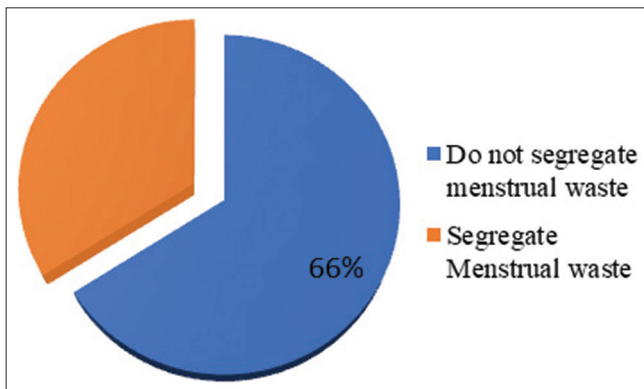


Figure 6: Challenges faced by villagers regarding menstrual waste management.

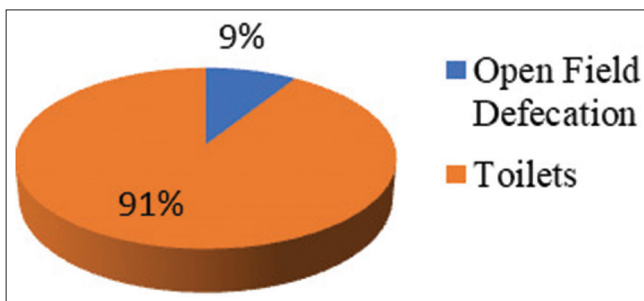


Figure 7: Current situation of sanitation in Aandhi village.

### Community readiness for improvement

Despite these challenges, the audit uncovered a strong willingness within the community to adopt better waste management practices. An encouraging 85% of respondents expressed readiness to segregate waste, and 84% were agreeable to paying a minimal fee for garbage collection services [Figure 9]. This willingness indicates a community readiness for improved waste management practices, provided that adequate infrastructure and support are made available.

The improper disposal of menstrual waste in Aandhi village leads to several health and environmental issues. The accumulation of menstrual waste in open areas creates unsanitary conditions that can cause infections and other health problems. Furthermore, the environmental impact of such practices includes soil and water contamination, which can affect local ecosystems and community health.

### Awareness about menstrual hygiene

The assessment of awareness levels about menstrual hygiene among village residents, including men and boys, revealed significant societal perceptions and knowledge gaps. The survey found that general awareness about menstrual health was low, and cultural taboos and stigma surrounding menstruation were prevalent. Separate FGDs with men, boys, and community leaders indicated that many had a limited understanding of menstrual hygiene issues and were often unaware of the challenges faced by women and girls. This lack of awareness contributed to the perpetuation of taboos and inadequate support for MHM initiatives.

### Educational interventions

Based on the findings, an educational intervention was designed to improve menstrual hygiene practices and waste disposal methods. Educational materials, including pamphlets and posters, were developed and distributed, covering topics such as the importance of menstrual hygiene, proper usage and disposal of menstrual products, and breaking cultural taboos. Workshops and training sessions conducted by healthcare professionals to educate women, girls, and the broader community on menstrual health and hygiene practices [Figures 10-14]. The intervention aimed to raise awareness, provide practical knowledge, and challenge prevailing cultural taboos.

### Implementation phase

The implementation phase ensured the adoption of improved practices and continuous support for the community. Regular follow-up visits by healthcare professionals and researchers

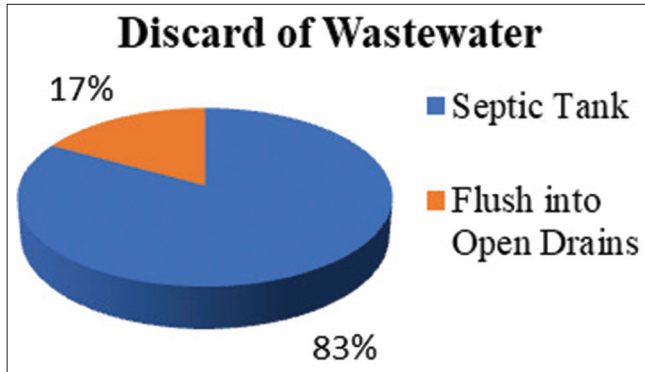


Figure 8: Current wastewater management in Aandhi village.

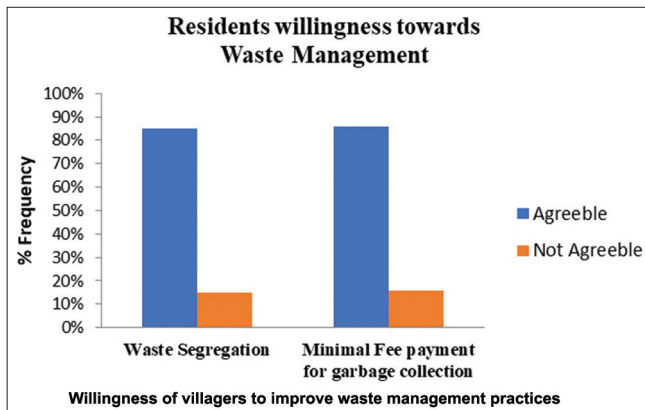


Figure 9: Willingness of villagers to improve waste management practices.

provided ongoing support and reinforcement of educational messages. Additional training sessions and discussions were held to address emerging issues and reinforce key messages. To support proper menstrual hygiene practices, affordable and sustainable menstrual products were distributed to ensure all women and girls had access to proper hygiene materials. Monitoring tools, such as follow-up surveys, FGDs, and direct observations, were used to track progress and evaluate the adoption of improved practices [Figures 15 and 16].

### Evaluation of effective implementation

The effectiveness of the intervention was evaluated by FGDs, and direct observations provided qualitative data on the community's response to the intervention and any changes in behavior.

The results of the study revealed significant improvements in menstrual hygiene practices among the women in Aandhi Village following the implementation of the initiative. Quantitative data indicated a marked increase in the use of hygienic menstrual products, with a reduction in the reliance on unhygienic alternatives such as cloth pads. Infection rates associated with menstrual hygiene decreased notably,



Figure 10: Awareness session on diabetes and healthy lifestyle by Dr. Arvind Gupta.



Figure 11: Awareness session on hand hygiene and sanitation along with soaps distribution at Government School, Aandhi.

reflecting enhanced health outcomes for the participants. Qualitative feedback gathered from FGDs and interviews further supported these findings, with many women expressing increased confidence in managing their menstrual health and a greater willingness to discuss these issues openly within their communities. Participants reported a positive shift in attitudes toward menstrual hygiene, emphasizing the value of education and access to sustainable products. Overall, these results underscore the effectiveness of the initiative in promoting better menstrual hygiene practices, improving health outcomes, and fostering a supportive community environment in Aandhi Village.

This comprehensive study and its outcomes provided a replicable model for addressing menstrual hygiene issues in similar rural areas. By improving MHM, the study aimed to enhance the health and well-being of women and girls, reduce environmental pollution, and contribute to the achievement of the SDGs.

### DISCUSSION

MHM is a critical aspect of women's health, particularly in low- and middle-income countries where access to menstrual products and facilities is limited.<sup>[6]</sup> Poor menstrual hygiene can lead to various health issues, including reproductive and urinary tract infections, due to the use of unclean materials and improper hygiene practices.<sup>[7]</sup> Menstrual disorders such





**Figure 12:** Session on menstrual hygiene at government senior secondary school, Mahatma Gandhi Public School (MGPS) and Anganbadi.



**Figure 13:** Menstrual Pads were distributed in Govt. School and private school.

as dysmenorrhea (painful periods), menorrhagia (heavy menstrual bleeding), and irregular periods can be exacerbated by poor menstrual hygiene. Furthermore, the stigma and lack of proper MHM can cause stress, anxiety, and depression among adolescent girls and women.<sup>[8]</sup> The inability to manage menstruation properly in public or social settings can lead to embarrassment and isolation. Poor MHM can cause girls to miss school during their periods, impacting their education and future opportunities. It also affects women's participation in the workforce and community activities, thereby limiting their potential and productivity. This trend was similarly observed in our study as well, where adolescent girls of Aandhi village frequently missed school during menstruation due to a lack of privacy and functional sanitation facilities.

Consistent with the global literature, our study highlights the significant health risks linked to the use of unsafe, makeshift menstrual materials, which often include clothes that are reused without proper cleaning due to economic constraints. This practice increases the risk of infections, such as urinary tract infections and reproductive tract infections, which are exacerbated by a lack of access to clean water and hygiene facilities. Echoing the findings of Jedynak *et al.*,<sup>[8]</sup> our study also emphasizes the psychological effects, including increased levels of anxiety, stress, and self-esteem issues among adolescent girls facing MHM challenges. Addressing these health implications through enhanced awareness, hygiene education, and improved infrastructure is essential for advancing women's health in rural areas.

In addition to social and health issues, the management of menstrual waste is becoming an increasingly significant environmental concern, particularly due to the growing use of disposable menstrual products. Disposable pads and

tampons are made from materials such as plastics, cellulose, and cotton blend, which are not easily biodegradable. This results in significant amounts of waste accumulating in landfills and the environment. The plastic components in pads and tampons can take hundreds of years to decompose, contributing to long-term plastic pollution. Improper disposal of menstrual products, such as flushing them down the toilet, can cause blockages in sewage systems, leading to sanitation issues. The production and disposal of disposable menstrual products have a considerable carbon footprint, from the extraction of raw materials to manufacturing, transportation, and waste management. Promoting sustainable menstrual products, such as menstrual cups, reusable pads, and biodegradable options, can significantly reduce the environmental impact. For example, menstrual cups can reduce waste from tens of thousands of tons per year to just a few tons, and they require less water for cleaning compared to reusable pads.<sup>[9]</sup> Our findings in Aandhi village show the adverse effects of improper disposal practices, such as soil and water contamination. Disposable menstrual products, often containing plastics and chemicals, contribute to long-term environmental degradation. Addressing this issue by promoting sustainable alternatives – such as menstrual cups and biodegradable sanitary pads – could mitigate waste accumulation and reduce the carbon footprint associated with menstrual products. However, achieving widespread adoption requires overcoming cost and cultural barriers, which calls for sustained educational outreach and financial support for eco-friendly alternatives.

Nonetheless, several key barriers hinder the enhancement of MHM practices in rural India. One of the primary challenges is the limited access to affordable and hygienic menstrual products. Furthermore, schools often lack adequate WASH facilities, with research indicating a pressing need for separate, functional toilets for girls, as well as access to water and soap for proper hand washing. The absence of such facilities hinders proper MHM practices among adolescent girls. Socio-cultural taboos and lack of awareness also play a critical role, as menstruation is still considered a taboo topic in many rural communities. Cultural barriers prevent open discussion, and a lack of awareness among girls and their families about menstrual hygiene contributes to poor practices. Capacity



**Figure 14:** Session on “Nutrition and Cooking Methods for Women and Children” at Anganbadi.



**Figure 15:** Free Health Check-up Campaign organized at Community Health Center (CHC), Aandhi.



**Figure 16:** Blood and urine sample collection and testing of 180 individuals at CHC, Aandhi.

gaps of frontline workers further exacerbate the issue, emphasizing the need to strengthen the knowledge and skills of Accredited Social Health Activist (ASHA), Anganwadi workers, and teachers to effectively deliver MHM education and support to adolescent girls and women.

Moreover, inadequate disposal mechanisms, such as the lack of incinerators or other eco-friendly disposal systems, pose a significant barrier to maintaining menstrual hygiene. Socioeconomic factors, including poverty, limited access to media, and low educational attainment, negatively impact MHM knowledge, attitudes, and practices. Addressing these barriers through a convergent, multi-stakeholder approach is crucial to improving MHM in rural India.<sup>[10-14]</sup>

By tackling these socioeconomic barriers, we can enhance MHM in rural India, which is pivotal for achieving several United Nations SDGs. This effort is closely linked to improving sexual and reproductive health and rights, as well as various other human rights that align with the SDGs.

This global perspective emphasizes the critical need to tackle specific local challenges, particularly in rural areas like Aandhi village in Rajasthan, India. Here, issues related to MHM are compounded by limited access to menstrual products, inadequate WASH facilities, and cultural taboos surrounding menstruation, significantly impacting the community.

A comprehensive study conducted in Aandhi village aimed to assess and enhance menstrual hygiene practices, revealing profound health risks for women and girls due to unhygienic materials and inadequate facilities. Adolescent girls often miss school during their periods, influenced by both the lack of adequate infrastructure and the stigma associated with menstruation. Improper disposal of menstrual waste further exacerbates environmental pollution and health hazards. Addressing these complex challenges necessitates a multifaceted approach involving raising awareness, destigmatizing menstruation through community education, ensuring affordable and sustainable menstrual products, providing safe and private WASH facilities, and implementing supportive policies. These efforts aim to significantly improve MHM, thereby enhancing the health, well-being, and educational opportunities for women and girls in Aandhi village while contributing to broader SDGs.

The study in Aandhi village, Rajasthan, systematically addressed the challenges of MHM through comprehensive surveys, waste audits, awareness assessments, and targeted educational interventions. Key findings highlighted critical gaps in practices and the improper disposal of sanitary products, contributing to environmental pollution and health risks compounded by cultural stigma.



Our analysis also explores the risks of soil and water contamination due to the non-biodegradable materials in commercial sanitary products, which, when improperly disposed of, can leach harmful chemicals into the environment. This not only poses a direct threat to public health but also has long-term impacts on the local ecosystem, including disruptions in soil fertility and water quality. By examining these environmental repercussions in greater detail, the study underscores the critical need to promote sustainable MHM practices, such as the use of biodegradable alternatives and the establishment of proper waste disposal systems.

This expanded focus on environmental hazards aims to strengthen the argument for integrating eco-friendly solutions into MHM programs. It also highlights the role that improved waste management infrastructure and community education can play in mitigating these risks, thereby contributing to both human and environmental health.

In the context of Aandhi village, the economic challenges surrounding MHM are particularly pronounced. As a rural area with limited financial resources, many households struggle to afford sanitary products, with the financial burden disproportionately affecting low-income families. The cost of menstrual hygiene products often competes with other essential household expenses, such as food, healthcare, and education. This financial strain can lead to women and girls using less hygienic, makeshift alternatives, which increase the risk of infections and discomfort.

Furthermore, the limited availability of financial resources in Aandhi village restricts access to health education and support systems that could help alleviate MHM challenges. Many families are unable to invest in sustainable products such as menstrual cups or reusable cloth pads, which, while cost-effective in the long run, have higher upfront costs. A more in-depth examination of these economic factors within Aandhi village highlights the urgent need for affordable menstrual products, government subsidies, and community-level financial support programs to overcome the financial barriers to proper MHM.

Educational initiatives, including workshops and sanitary product distribution, significantly enhanced community knowledge and practices. Regular follow-ups ensured the sustainability of these improvements. The intervention resulted in substantial gains in MHM practices and mental health indicators, establishing a successful and replicable model for similar rural contexts.

This research emphasizes the necessity of a multifaceted approach, integrating community education, infrastructure enhancement, and ongoing support. It aligns with the SDGs, particularly SDG 3 (Good Health and Well-Being) and SDG 6 (Clean Water and Sanitation). Future efforts should focus

on scaling these interventions to ensure all women and girls have access to adequate MHM, thereby improving their quality of life and fostering broader societal well-being.

The study in Aandhi village also analyzed several obstacles that hindered the effective implementation and sustainability of MHM interventions. Key challenges included resource limitations, such as inadequate access to affordable sanitary products and a lack of proper waste management infrastructure. Community engagement was another critical issue, as initial resistance to breaking cultural taboos around menstruation required persistent outreach and trust-building. The need for continuous training and education, especially for younger generations and community health workers, was evident to ensure the long-term impact of these interventions.

Moreover, we emphasized the importance of ongoing support from both local stakeholders and external organizations to sustain the positive changes observed. This support includes not only financial resources but also consistent monitoring, technical assistance, and policy advocacy. Addressing these challenges is essential to maintain the resilience of the interventions and to ensure that the progress made does not erode over time. By incorporating these considerations into future strategies, the study highlights the potential for scalable and sustainable improvements in MHM, ensuring that women and girls in similar rural settings have access to better health and well-being.

## CONCLUSION

The study highlights the critical need for improved menstrual hygiene management (MHM) in rural areas like Aandhi village, Rajasthan. By addressing key challenges such as limited access to hygienic menstrual products, inadequate waste disposal practices, and the stigma surrounding menstruation, the interventions achieved notable success in enhancing the health and well-being of women and girls. Educational programs and sustainable product distribution contributed to increased awareness and adoption of hygienic practices, resulting in reduced infection rates and better reproductive health outcomes. Moreover, the findings underscore the importance of a multi-faceted approach, integrating education, community engagement, and infrastructure development, as a replicable model for similar rural contexts. These efforts not only align with Sustainable Development Goals (SDGs) but also pave the way for a healthier, more inclusive future for rural women.

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New Delhi, which made this research on MHM in Aandhi village possible.

### Ethical approval

The research/study approved by the Institutional Review Board at Institutional Ethics Committee, Dr. B. Lal Institute of Biotechnology, Jaipur, number BIBT/IRSC/IEC/15-04-2022, dated 15<sup>th</sup> April 2022.

### Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent.

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### Conflicts of interest

There are no conflicts of interest.

### Use of artificial intelligence (AI)-assisted technology for manuscript preparation

The authors confirm that there was no use of artificial intelligence (AI)-assisted technology for assisting in the writing or editing of the manuscript and no images were manipulated using AI.

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