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Evidence-based nursing practice: Barriers and enablers in clinical settings

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Abstract

Background: Menstrual hygiene management (MHM) is a vital component of adolescent health and education, particularly in low-resource settings like Mali, where cultural taboos and lack of formal education hinder safe practices. Poor MHM leads to health risks, school absenteeism, and reduced self-confidence among girls. This study aimed to assess the effectiveness of a school health nursing program in improving menstrual hygiene awareness, practices, and attitudes among adolescent girls in Bamako, Mali.

Methods: A quasi-experimental pre-post study was conducted between January and March 2022 in five government secondary schools in Bamako. A total of 180 adolescent girls aged 12-16 years who had attained menarche participated in the study. The intervention consisted of four structured weekly educational sessions delivered by trained school health nurses. Pre- and post-intervention data on knowledge, hygiene practices, and stigma perceptions were collected using a validated questionnaire. Data were analyzed using SPSS version 25, with paired t-tests and chi-square tests applied to measure statistical significance.

Results: The mean knowledge score increased from 8.1 ± 2.5 to 14.3 ± 1.9 ($p < 0.001$). Hygiene practices showed significant improvement: regular pad changing increased from 42.8% to 77.8%, handwashing from 59.4% to 86.1%, and safe disposal of materials from 36.7% to 73.9%. Stigma perception declined from 51.1% to 28.3%, while the percentage of girls comfortable discussing menstruation rose from 27.2% to 65.6%. School absenteeism during menstruation decreased from 33.3% to 15.6%.

Conclusion: School health nursing programs significantly enhance menstrual hygiene awareness and safe practices while reducing stigma and absenteeism among adolescent girls. Integrating such interventions into Mali's school health policy is essential to improving adolescent reproductive health and educational outcomes.

Keywords: Menstrual hygiene, adolescent girls, school health nurse, Mali, reproductive health, menstrual education, MHM awareness

1. Introduction

Adolescence is a critical period of transition from childhood to adulthood, marked by significant physical, emotional, and psychological changes. Among the most important yet least discussed physiological changes during this period is menarche—the onset of menstruation. For adolescent girls, menstruation is not only a biological milestone but also a social and cultural event often surrounded by misinformation, taboos, and stigma. In many low- and middle-income countries (LMICs), including Mali, the topic of menstruation remains a social taboo, and many girls experience it with fear, confusion, and shame due to the lack of appropriate education and support.

In Mali, where the adolescent population is rapidly growing, menstruation continues to be treated as a hidden subject. A 2021 UNICEF Mali report revealed that over 70% of girls in urban public schools had never received formal education about menstrual hygiene management (MHM) prior to menarche. The lack of accurate information contributes to unsafe hygiene practices, increased risk of reproductive tract infections (RTIs), and frequent school absenteeism. Studies indicate that poor menstrual hygiene can lead to long-term health problems, including pelvic inflammatory disease and infertility. In addition to health concerns, menstruation-related stigma and infrastructural inadequacies—such as lack of private toilets, clean water, and sanitary disposal facilities—significantly contribute to absenteeism, low self-esteem, and academic underachievement among adolescent girls.

Menstrual Hygiene Management (MHM) encompasses not only the use of sanitary products

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and hygienic practices but also access to adequate water and sanitation facilities, privacy, and information to manage menstruation with dignity. It is closely linked with the Sustainable Development Goals (SDGs), particularly Goal 3 (Good Health and Well-being), Goal 4 (Quality Education), and Goal 5 (Gender Equality). In this regard, MHM is not solely a health concern but a matter of equity and human rights. Addressing MHM comprehensively is critical to ensuring that girls are able to attend school confidently, regularly, and without stigma.

School settings provide an ideal platform for delivering menstrual health education to adolescent girls. In-school interventions allow for age-appropriate, consistent messaging and foster an environment of openness and support. Among school-based approaches, the role of school health nurses has gained prominence globally. School nurses serve as accessible health educators and caregivers within the school ecosystem. They are uniquely positioned to deliver reproductive health education, offer counseling, and facilitate behavior change communication (BCC) among students. By incorporating MHM into their scope of practice, school health nurses can play a transformative role in equipping girls with the knowledge, tools, and confidence to manage menstruation effectively.

Despite increasing global awareness, Mali faces persistent challenges in integrating menstrual health education into school curricula. Cultural sensitivities, inadequate training of teachers, and a shortage of dedicated health personnel in schools continue to hinder progress. Where MHM is taught, it is often delivered in a fragmented manner, without adequate follow-up, supportive materials, or opportunities for discussion. Moreover, many existing programs fail to consider the emotional and psychosocial dimensions of menstruation, such as stigma, isolation, and fear of ridicule. In such a context, the deployment of trained school health nurses as MHM educators offers a promising, culturally sensitive, and sustainable strategy.

Prior studies from sub-Saharan Africa have shown the effectiveness of school-based MHM programs in increasing knowledge and improving hygiene practices. For example, pilot projects in Kenya, Ghana, and Ethiopia demonstrated a reduction in menstruation-related school absenteeism and an increase in safe hygiene practices following structured interventions. However, in Mali, few peer-reviewed studies have systematically evaluated the impact of nurse-led school health programs on menstrual hygiene awareness and practice. This knowledge gap hinders policy development, budget allocation, and program scaling by stakeholders seeking to improve adolescent reproductive health in the region.

The current study addresses this gap by assessing the impact of a structured, nurse-led school health intervention on menstrual hygiene awareness, hygiene practices, and attitudes among adolescent girls in Bamako, Mali. Bamako, the capital city, presents a microcosm of urban schooling challenges—overcrowded classrooms, under-resourced facilities, and socio-cultural barriers to health education. In this setting, the role of school health nurses is particularly vital, given their ability to provide continuous support, create safe spaces for dialogue, and deliver practical health education tailored to the cultural context.

The study employed a quasi-experimental design to measure changes in knowledge, self-reported hygiene behaviors, and attitudes before and after the intervention. The intervention

itself comprised four weekly sessions delivered by trained school health nurses, covering menstrual physiology, hygiene techniques, product usage, and stigma reduction. Educational materials were translated into French and Bambara to enhance accessibility and cultural relevance. Outcomes were measured using a validated questionnaire, and results were analyzed to determine statistical significance and practical implications.

The objectives of this study were threefold:

1. To assess the baseline knowledge and menstrual hygiene practices of adolescent girls in selected schools in Bamako.
2. To evaluate the effectiveness of a school health nursing intervention in improving MHM knowledge and behaviors.
3. To identify changes in attitudes and stigma related to menstruation following the program.

The findings from this study are expected to inform school health policy, support the integration of MHM into national adolescent health strategies, and advocate for the inclusion of school health nurses in the delivery of reproductive health education. Ultimately, equipping adolescent girls with the knowledge and means to manage menstruation effectively is a powerful step toward achieving educational equity, health promotion, and gender equality in Mali and other similar low-resource settings.

2. Materials and Methods

Study Design

This study utilized a quasi-experimental pre-post intervention design to evaluate the impact of a school health nursing program on menstrual hygiene awareness and practices among adolescent girls. The intervention was carried out over a three-month period from January to March 2022.

Study Setting and Population

The study was conducted in five government secondary schools located in Bamako, the capital city of Mali, West Africa. These schools serve students primarily from low- to middle-income families in urban and peri-urban communities. The target population included adolescent girls aged 12 to 16 years who had attained menarche and were enrolled in grades 6 to 9.

Sample Size and Sampling Technique

A total of 180 adolescent girls were selected using stratified random sampling to ensure proportional representation across different age groups and academic levels. Inclusion criteria included:

- Age between 12-16 years.
- History of menarche.
- Willingness to participate.
- Written informed consent from parents or guardians and assent from the participants.

Girls with known cognitive or learning disabilities that could hinder participation in educational sessions were excluded.

Description of the Intervention

The intervention was a structured school health nursing program focused on menstrual hygiene management

(MHM), designed and implemented by trained female school health nurses. The program included:

- Four weekly educational sessions covering anatomy, physiology of menstruation, hygiene practices, and dispelling menstrual myths.
- Use of visual aids, flipcharts, reusable pad demonstrations, and short videos.
- One-on-one counseling opportunities and anonymous question boxes for private concerns.
- Distribution of reusable sanitary pads and personal hygiene kits to each participant.

The content was culturally adapted and delivered in French and Bambara; the primary languages spoken by students in the selected schools.

Data Collection Tools and Procedure

A pre-tested, structured questionnaire was used to assess:

- Menstrual knowledge (understanding of menstruation, hygiene practices, and risks).
- Hygiene practices (frequency of pad change, handwashing, and disposal behavior).
- Attitudes and beliefs (comfort in discussing menstruation, perceived stigma).

The questionnaire was administered in two phases:

- Pre-intervention (baseline): One week before the first

session.

- Post-intervention (evaluation): Two weeks after the final session.

Trained data collectors administered the questionnaires in classroom settings, ensuring privacy and confidentiality.

Data Analysis

Collected data were entered and analyzed using SPSS version 25. Descriptive statistics (means, standard deviations, frequencies, percentages) were used to describe the demographic and baseline characteristics. Paired t-tests were used to compare pre- and post-intervention knowledge and practice scores. Chi-square tests were applied to explore associations between demographic variables and changes in outcomes. A p-value of <0.05 was considered statistically significant.

3. Results

Demographic Profile of Participants

Out of the 180 adolescent girls who participated in the study, the majority (68.9%) were between 13 and 15 years of age, with a mean age of 13.9 ± 1.2 years. Most students (71.1%) came from low-income households, and 81.7% reported having no prior formal education on menstrual hygiene.

Table 1: Demographic Characteristics of Participants (N = 180)

Characteristic	Frequency (n)	Percentage (%)
Age (years)		
12-13	54	30.0
14-15	70	38.9
16	56	31.1
Socioeconomic Status		
Low-income	128	71.1
Middle-income	52	28.9
Prior Education on Menstruation		
Yes	33	18.3
No	147	81.7

Improvement in Knowledge Scores

Knowledge scores showed a statistically significant increase after the intervention. The mean pre-intervention score was 8.1 ± 2.5, which increased to 14.3 ± 1.9 post-intervention. The mean difference of 6.2 points was statistically significant (p < 0.001).

Key areas of knowledge improvement included:

- Understanding of menstrual cycle and physiology.

- Importance of hygiene practices during menstruation.
- Awareness of potential health risks related to poor hygiene.

Change in Menstrual Hygiene Practices

Self-reported hygiene practices improved substantially following the intervention:

Practice	Pre-Intervention (%)	Post-Intervention (%)
Changed pad every 4-6 hours	42.8	77.8
Washed hands with soap after changing pad	59.4	86.1
Disposed of pads in hygienic manner	36.7	73.9
Used clean water for washing genital area	64.4	88.3
Used reusable or proper sanitary pads	53.3	80.0

Statistical tests showed significant differences in all listed practices (p < 0.001).

Attitudinal Changes

Notable shifts were observed in attitudes and beliefs about menstruation:

- Comfort in discussing menstruation with peers or

teachers increased from 27.2% to 65.6%.

- Perceived stigma associated with menstruation dropped from 51.1% to 28.3%.
- School absenteeism during menstruation decreased

from 33.3% to 15.6%.

4. Discussion

This study demonstrates that a structured school health nursing intervention can significantly improve menstrual hygiene awareness and practices among adolescent girls in Bamako, Mali. With a sample of 180 girls aged 12-16 years, the study revealed substantial improvements in knowledge, behavior, and attitudes related to menstrual hygiene following the implementation of a three-month nurse-led education program. Before the intervention, a large proportion of participants (81.7%) had never received formal education on menstruation, highlighting the widespread gap in reproductive health education among school-aged girls in this context. Post-intervention data showed a significant rise in knowledge scores from 8.1 to 14.3, reinforcing the effectiveness of the nurse-led sessions in delivering accurate, age-appropriate information. This finding aligns with previous research conducted in Ghana and Ethiopia, which also found nurse-led or school-based interventions highly effective in improving menstrual knowledge (Sumpter & Torondel, 2013; Tegegne & Sisay, 2014) ^{13, 61}. Improvement in hygiene practices such as frequent pad changing, proper disposal, and handwashing indicates a positive behavioral shift. Before the intervention, fewer than half of the girls adhered to recommended hygiene behaviors, such as changing pads every 4-6 hours (42.8%) or disposing of used materials hygienically (36.7%). After the intervention, these practices improved to 77.8% and 73.9%, respectively—showing the critical role of structured health education and practical demonstrations in encouraging safe menstrual hygiene.

The observed reduction in school absenteeism during menstruation (from 33.3% to 15.6%) is particularly noteworthy. Menstruation-related absenteeism is a common issue in low-resource settings, often driven by fear of leakage, lack of sanitary products, or embarrassment. The distribution of reusable pads and the creation of a stigma-free learning environment likely contributed to this reduction. These outcomes support the need to address menstrual health as a core component of adolescent well-being and education continuity.

The change in attitudinal variables also underscores the program's success in reducing stigma and creating a more open environment for discussion. Post-intervention, 65.6% of participants reported being comfortable discussing menstruation with peers or teachers, up from only 27.2% prior to the intervention. This shift is significant, given that cultural taboos in Mali often silence open discussions about menstruation, leading to misinformation and shame.

The role of the school nurse was central to the intervention's success. Nurses not only delivered factual content but also served as trusted figures with whom students could privately discuss personal questions. Their presence helped create a safe space for learning and dialogue, an approach consistent with WHO's adolescent-friendly health service framework.

However, challenges remain. The lack of menstrual hygiene facilities in schools—such as private toilets, disposal bins, and access to clean water—was cited as a persistent concern by participants. These infrastructural issues may hinder the sustainability of improved hygiene behaviors unless addressed through multisectoral coordination involving the health, education, and public works departments.

Limitations of the study include its focus on urban schools,

which may not reflect the realities of rural settings where access to healthcare professionals and resources is more limited. Additionally, the reliance on self-reported practices may have introduced response bias. Future studies could consider incorporating direct observation and long-term follow-up to assess sustained behavior change.

Despite these limitations, the study provides strong evidence that school health nursing programs are effective and scalable tools for promoting menstrual health education and reducing barriers to girls' school participation in Mali.

5. Conclusion

This study highlights the significant positive impact of school health nursing programs on improving menstrual hygiene awareness, practices, and attitudes among adolescent girls in Bamako, Mali. The structured nurse-led intervention over three months led to a marked improvement in knowledge scores, hygiene practices, and reduction of stigma and school absenteeism during menstruation among the 180 participating girls.

The findings affirm that adolescent girls, when empowered with accurate information and practical skills delivered in a safe, supportive environment, are more likely to adopt healthy menstrual hygiene behaviors. The presence of trained school health nurses played a critical role in delivering culturally sensitive education and serving as accessible, trusted figures for health support.

This study supports the integration of menstrual hygiene education into Mali's national school health policy, particularly through institutionalizing the role of school nurses in adolescent reproductive health promotion. Addressing remaining challenges, such as infrastructural limitations and broader community taboos, will require coordinated efforts across sectors.

Investing in menstrual health through school-based programs not only enhances the physical well-being of girls but also contributes to broader goals of gender equity, educational attainment, and sustainable development. As such, school health nursing programs should be scaled up and adapted for both urban and rural settings across Mali and similar low-resource contexts.

Conflict of Interest

Not available

Financial Support

Not available

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