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Sanitation challenges and menstrual hygiene management among female adolescents in an Islamic Boarding School: A qualitative case study

Hasna Laday [a], Lisda Oktavia Madu Pamangin [a*], Fajrin Violita [b], Fransina Alfonsina Izaac[a], Natalia Paskawati Adimuntja [c], Asriati [c]

[a] Department of Maternal and Child Health, Faculty of Public Health, University of Cenderawasih, Jayapura, Indonesia
[b] Department of Health Promotion, Faculty of Public Health, University of Cenderawasih, Jayapura, Indonesia
[c] Department of Epidemiology, Faculty of Public Health, University of Cenderawasih, Jayapura, Indonesia
* Corresponding author: lies_davia@yahoo.com

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ABSTRACT

Poor menstrual hygiene practices can increase the risk of reproductive tract infections among female adolescents. Adequate water, sanitation, and hygiene (WASH) facilities are essential to safe menstrual hygiene management (MHM), particularly in Islamic boarding schools, where students live communally, follow structured daily routines, and share sanitation facilities. This study explored how sanitation facilities influence menstrual hygiene management practices among female adolescents living in an Islamic boarding school in Jayapura, Indonesia. A qualitative case study was conducted between October and December 2024. Participants included seven female students as key informants and one teacher as a supporting informant. Data were collected through in-depth interviews and direct observations and analyzed using thematic analysis. Although access to clean water was generally adequate, the number of toilets was insufficient for the student population, resulting in long waiting times and limited privacy. The distance between dormitories and sanitation facilities also discouraged students from changing menstrual pads as frequently as recommended, with many reporting changing pads only two to three times per day. These environmental constraints negatively influenced menstrual hygiene practices, and many increase the risk of adverse reproductive health outcomes. The findings demonstrate that inadequate sanitation infrastructure is an important barrier to effective MHM in Islamic boarding schools. Strengthening WASH facilities, particularly by improving the availability, accessibility, and privacy of sanitation facilities, should be prioritized to support healthy menstrual hygiene practices among adolescent girls.

1. Introduction

Menstrual Hygiene Management (MHM) is an essential component of adolescent reproductive health. During menstruation, girls are encouraged to maintain proper menstrual hygiene, including changing sanitary pads every 4–6 hours, to reduce the risk of reproductive tract infections and other genital health problems [1–4]. Poor menstrual hygiene practices have been associated with symptoms such as vulvar pruritus, vaginal infections, and reduced well-being among adolescent girls. Adequate water, sanitation, and hygiene (WASH) facilities are fundamental to supporting safe menstrual

hygiene practices. However, the World Health Organization (WHO) reports that many adolescent girls are unable to manage menstruation appropriately at school because of limited access to clean water, private toilets, and suitable spaces for changing sanitary pads [5]. In Indonesia, sanitation facilities remain inadequate in many schools, particularly in eastern provinces such as Papua, West Papua, Maluku, North Maluku, and West Nusa Tenggara, where access to safe, private toilets remains limited [6].

Previous studies have consistently shown that inadequate sanitation facilities negatively affect menstrual hygiene management. Limited access to clean water, insufficient numbers of toilets, lack of privacy, and poor facility maintenance discourage girls from changing sanitary pads while at school [7–9]. For example, a study in Tangerang reported that nearly half of female students practiced poor menstrual hygiene due to sanitation-related barriers, whereas girls with access to private toilets were significantly more likely to practice good menstrual hygiene [10]. Similarly, qualitative research in Bali found that many students delayed changing sanitary pads until returning home because school sanitation facilities did not adequately support menstrual hygiene practices [8].

These challenges may be even greater in Islamic boarding schools (*pesantren*), where students live communally, share sanitation facilities, and follow structured daily schedules that limit opportunities for personal care. Previous studies in Indonesian *pesantren* have reported poor menstrual hygiene practices among female students, partly due to an insufficient number of bathrooms and long waiting times that discourage timely pad replacement [11,12]. Despite these findings, little is known about how the boarding school environment, particularly the availability, accessibility, and condition of sanitation facilities, influences menstrual hygiene management.

This study aimed to explore how sanitation facilities influence menstrual hygiene practices among female students living in an Islamic boarding school in Jayapura City, Indonesia. Understanding these contextual barriers is essential to inform WASH interventions and improve menstrual hygiene management in boarding school settings.

2. Method

This qualitative case study was conducted at an Islamic boarding school in Jayapura City, Indonesia, between October and December 2024. The study explored how sanitation facilities—including the availability of toilets, access to clean water, and the distance between dormitories and bathrooms—influence MHM practices among female students.

The boarding school was selected because it represents a communal living environment where students share sanitation facilities and follow structured daily routines with limited time for personal care. This setting provides a unique context for examining environmental barriers to menstrual hygiene management.

Participants were recruited using purposive sampling and included seven female students who resided in the dormitory and had experienced menstruation. One female teacher (*ustadzah*) was included as a supporting informant because of her familiarity with the students' daily routines and the boarding school's sanitation facilities. Student participants were coded as IU1–IU7, and the supporting informant as IP1.

Data were collected through semi-structured in-depth interviews (20–40 minutes) and direct observations of sanitation facilities. To enhance the credibility of the findings, both source and method triangulation were employed. All interviews were audio-recorded, transcribed verbatim, and analyzed using thematic analysis through manual coding to identify recurring patterns and themes.

Ethical principles were observed throughout the study. Before data collection, all participants received an explanation of the study's objectives, procedures, and their right to withdraw at any time

without consequences. This study did not obtain ethical clearance, but ethical considerations were addressed in the informed consent process and the protection of participants' privacy and confidentiality.

3. Results and Discussion

3.1. Results

Thematic analysis revealed two main themes: (1) the condition of sanitation facilities and (2) MHM practices among female students. Although the boarding school provided an adequate supply of clean water, participants consistently identified inadequate toilet capacity, poor accessibility, and long waiting times as barriers to maintaining appropriate menstrual hygiene. These constraints influenced students' hygiene behaviors, particularly the frequency and timing of sanitary pad replacement during menstruation.

Sanitation Facilities

The assessment of sanitation facilities focused on three components: the availability of bathrooms and toilets, access to clean water, and the accessibility of sanitation facilities from the dormitories. Findings were triangulated through in-depth interviews with students and a teacher (*ustadzah*) and direct observations.

Availability of Bathrooms and Toilets

Both interviews and observations indicated that the number of sanitation facilities was insufficient for the student population. The boarding school accommodated 135 female students but provided only 11 bathrooms and 7 toilets, resulting in frequent queues.

As explained by the supporting informant:

"There are 135 female students from grades 7 to 12, and we only have 11 bathrooms and 7 toilets. The capacity is indeed insufficient because the number of students is large, so queuing for the toilets happens frequently." (IP1)

Students consistently described long waiting times as a barrier to changing sanitary pads in a timely manner.

"There are many of us, but only a few toilets, so I often have to wait." (IU3)

One student explained that delays in accessing the toilet often caused discomfort during menstruation.

"There is often a long queue when I want to go to the toilet… the pad becomes full and itchy." (IU5)

Direct observations confirmed these findings, showing that the number of available bathrooms and toilets was not proportional to the number of students (Fig 1).

Fig 1. Sanitation facilities at the Islamic boarding school (11 bathrooms and 7 toilets)

Availability of Clean Water

In contrast, access to clean water was generally adequate. The boarding school relied on a bore-well water system that provided a reliable supply except during occasional power outages.

"Thank God, the water supply is adequate because we use a bore well. Occasionally, the water stops flowing when there is a power outage." (IP1)

Students similarly reported that the water supply was sufficient and that the bathrooms were cleaned regularly.

Accessibility of Sanitation Facilities

Although basic facilities were available, their location also created barriers to menstrual hygiene management. Bathrooms and toilets were located separately from the dormitory, requiring students on the upper floor to repeatedly use the stairs. Combined with long queues, this discouraged timely pad replacement.

"The toilets are downstairs while my room is upstairs, so I feel reluctant to go up and down the stairs. There is also often a queue… when my pad is already full, it becomes itchy and uncomfortable." (IU5)

Students suggested increasing the number of toilets and providing facilities on the upper floor to improve accessibility. Overall, while clean water was adequate, the limited number and accessibility of sanitation facilities created significant barriers to appropriate menstrual hygiene practices.

Menstrual Personal Hygiene Practices

All participants reported changing sanitary pads two to three times per day, with replacement primarily determined by the amount of menstrual flow or feelings of discomfort rather than recommended hygiene practices.

"I change my sanitary pad depending on the amount of bleeding, usually twice a day, sometimes three times." (IU1)

Similarly, another participant stated:

"I change my pad about two to three times a day… when I start to feel uncomfortable." (IU3)

Participants generally changed pads more frequently during the first two days of menstruation, when menstrual flow was heavier.

"I change my pad two to three times a day. I change it three times when the bleeding is heavy, like on the first or second day." (IU7)

These findings suggest that menstrual hygiene practices among female students were influenced more by perceived discomfort and environmental constraints than by health guidelines recommending changing sanitary pads approximately every four to six hours. Limited sanitation facilities and poor accessibility appeared to contribute to delayed pad replacement and suboptimal MHM.

3.2. Discussion

MHM is essential for protecting adolescent girls from reproductive tract infections and promoting their health and well-being [1,13]. Effective MHM requires access to adequate WASH facilities, including clean water, private toilets, and appropriate spaces for changing and disposing of menstrual materials [14,15]. This study found that although clean water was readily available, inadequate sanitation infrastructure—particularly the limited number of toilets, long waiting times, and poor accessibility from dormitories—created significant barriers to appropriate menstrual hygiene practices among female students living in an Islamic boarding school.

Most participants reported changing sanitary pads only two to three times per day, with replacement based primarily on discomfort rather than recommended hygiene practices. These findings suggest that environmental constraints, rather than individual preferences alone, influenced menstrual hygiene behaviors. This is consistent with Green's behavioral model, which identifies enabling factors, such as the availability of facilities and infrastructure, as prerequisites for adopting healthy behaviors [16]. Even when students understand the importance of menstrual hygiene, inadequate sanitation facilities may prevent them from practicing recommended behaviors.

The findings are consistent with previous studies conducted in Indonesia and other low- and middle-income countries. Studies in Ethiopia and Uganda reported that inadequate sanitation facilities, including insufficient toilets, lack of privacy, and limited access to clean water, discouraged girls from managing menstruation at school [17,18]. Similarly, studies in Indonesian Islamic boarding schools found that limited bathroom availability and strict daily schedules contributed to delayed sanitary pad replacement and poor menstrual hygiene practices [11,12,19]. Together, these findings highlight that boarding schools present unique environmental challenges because students share sanitation facilities while following highly structured daily routines.

The sanitation conditions observed in this study also reflect broader WASH challenges in Indonesian schools. Although access to clean water has improved, sanitation infrastructure remains insufficient in many educational settings, particularly where large numbers of students share limited facilities. The combination of overcrowded toilets, inadequate privacy, and long distances between dormitories and bathrooms may discourage timely sanitary pad replacement and increase the risk of menstrual discomfort and reproductive health problems [1,13,20].

The results of this study have important implications for MHM programs, particularly for the provision of comprehensive sanitation infrastructure in both quality and quantity. In Islamic boarding school settings, sanitation issues play a crucial role in students' personal hygiene practices. Menstrual personal hygiene and sanitation are closely interrelated and mutually influential.

These findings have important implications for school health policy and menstrual hygiene management programs. Improving the quantity, accessibility, and privacy of sanitation facilities should be prioritized alongside menstrual health education. In Islamic boarding schools, where communal living creates additional barriers, strengthening WASH infrastructure is likely to facilitate healthier menstrual hygiene practices and support the health, comfort, and educational participation of female students.

4. Conclusion

This study found that MHM practices among female students in an Islamic boarding school in Jayapura were suboptimal and were strongly influenced by inadequate sanitation facilities. Although access to clean water was sufficient, the limited number of toilets and bathrooms, poor accessibility, and the structured boarding school environment created barriers to the timely replacement of sanitary pads. These findings highlight the importance of adequate sanitation infrastructure as a key enabler of effective MHM in communal boarding school settings.

Improving WASH infrastructure should be a priority for policymakers and Islamic boarding school administrators. Expanding the number of sanitation facilities and improving their accessibility and privacy, alongside menstrual health education, may help promote healthier menstrual hygiene practices and improve the well-being of female students.

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Conflict of Interest

There are no conflicts of interest.

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