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RESEARCH ARTICLE

Menstrual health during COVID-19: How water, sanitation, and hygiene strategies can improve menstrual health and hygiene and foster gender equality

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Despite the fact that over 800 million women, girls, transgender, and gender nonbinary persons menstruate, menstrual health and hygiene (MHH) remains a taboo and under-resourced public health subject. Water, sanitation, and hygiene (WASH) insecurity, an issue made worse by the COVID-19 pandemic, plays a significant role in menstruators' abilities to safely manage their periods. COVID-19 has further revealed how a continued lack of access to WASH resources hinders an individuals' means to address their menstrual health with dignity. The impacts of COVID-19 have laid bare the many challenges associated with menstruation, intensifying existing inequalities for women, girls, and other menstruators. Mobility limitations and quarantining have created complex obstacles for menstruators while lockdown protocols, border closures, and panic buying have impacted the sanitary pad supply chain. Community and school closures have removed many of the routine ways in which menstruators access sanitary products. Our article seeks to understand how the pandemic and existing WASH systems exacerbated the ongoing challenges associated with MHH, highlighting opportunities for future crisis planning to advance MHH infrastructure, resources, and stigma reduction. A landscape analysis was used to understand how the pandemic affected those who menstruate. Academic, peer-reviewed literature as well as gray literature informed the authors' understanding of the dynamic nature of COVID-19 and WASH infrastructure on menstruators. From these insights, the authors were able to identify emerging themes and trends that they have highlighted in this article. Water and sanitation programs have the power to improve gender equality and equity, health, and education by investing in menstrual hygiene infrastructure, awareness creation, and stigma reduction. The diversion of resources, and in particular WASH resources, toward pandemic-related hygiene supplies and mobility restrictions, however, have exposed menstruators to sexual exploitation and physical and mental strain. It is critical to understand and address the pandemic's impacts on menstruators, drawing lessons from and creating opportunities to systematically advance MHH, thereby elevating gender equality.

Keywords: Menstrual health and hygiene, MHH, Gender, COVID-19, Water, sanitation, and hygiene, WASH, Gender equality

Introduction

Although roughly 300 million women, girls, transgender, and gender nonbinary persons menstruate daily [1], the issue of menstruation and its management is both a forbidden subject and a widely unmet need for many [2–4]. Any person who menstruates, regardless of gender identity, is considered a menstruator with menstrual health and hygiene (MHH) needs. Throughout this article, the terminology "women and girls" is used to encompass all menstruators and facilitate readability. MHH is a critical component to empowering women and girls across the globe and water, sanitation, and hygiene (WASH) insecurity plays a significant role in the safe management of menstruation. Menstrual hygiene management (MHM), as defined by the World Health Organization (WHO) and UNICEF Joint Monitoring Program for drinking water, sanitation, and hygiene, means that, "Women and adolescent girls are using a clean menstrual management material to absorb or collect menstrual blood, that can be changed in privacy as often as necessary for the duration of a menstrual period, using soap and water for washing the body as required, and having access to safe and convenient facilities to dispose of used menstrual management

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materials. They understand the basic facts linked to the menstrual cycle and how to manage it with dignity and without discomfort or fear [5]." MHH includes MHM as well as larger factors such as gender equity and equality, human agency and autonomy, and human rights. UNESCO summarizes these systemic factors to explicitly include access to sanitation and washing facilities [6]. Managing one's menstruation can often be an overwhelming task, especially for those who live in a less-resourced country, an internally displaced camp, are a refugee, or are disabled. The COVID-19 pandemic has not only created an added layer of complexity to MHM, but it has also created additional obstacles that impede women's and girls' abilities to manage their periods in safe, private, and dignified ways.

Our article examines how existing WASH systems failed to buffer the impacts of COVID-19 for menstruators and how the pandemic exposed and perpetuated the challenges that many women, girls, and others who menstruate experience daily. In particular, this body of work highlights and identifies areas of improvement for future crisis planning that would simultaneously contribute to systematically advancing MHH and gender equality.

Methods

We engaged in a landscape analysis beginning in March 2020 that extended into early 2021. Because of the nature of the evolving pandemic, our review of MHH and COVID-19 included gray literature in addition to peer-reviewed, academic articles. Specifically, we were interested in materials that highlighted the everyday, lived experiences of menstruators. This article is the outgrowth of our prior blogs for the Gender and COVID-19 Working Group and the Harvard School of Medicine. Through our research, we were able to identify themes and challenges linking WASH, MHH, and COVID-19. Using a feminist, gender-transformative approach facilitated a more robust and accurate understanding of the systemic and social complexities surrounding the intersection of these topics.

We employed a keyword search using search engines such as Google Scholar and PubMed, as well as Google to capture the gray literature. Including only English, peer-reviewed articles, and policy and guidance documents for all countries, we reviewed over 70 articles until we began to see themes and challenges emerge. Key words included COVID-19; water, sanitation, and hygiene; WASH; menstrual hygiene management; MHM; menstrual health and hygiene; MHH; gender; women; menstrual health; gender equality; pandemic preparedness; and women's health.

The current state of WASH and MHH

The subject of menstruation is often steeped in cultural taboos and stigma. In many cultures, menstrual blood is considered dirty or impure, with some societies forcing menstruators to isolate during their monthly cycle. While isolating, they are often not allowed to enter their homes, prepare meals, or attend religious gatherings; rather, they stay in separate areas of a home or in separate housing structures. Such practices, like those in mid- and far-western Nepal known as chhaupadi [7], potentially leave women and girls vulnerable to wild animals, weather, and sexual assault.

Social norms can further perpetuate secrecy around menstruation, contributing to a culture of shame and fear for women and girls. Being forced to hide their periods can lead many menstruators to fail to change their sanitary materials frequently enough, elevating their risk of infection. Difficulty changing sanitary products during the school day or workday can be exacerbated due to poor on-site WASH infrastructure which may not afford privacy, safety, or soap and water for individuals to clean themselves or wash and dry reusable products [4, 8, 9].

MHH needs are seldom considered during the development of community WASH infrastructure. Communal toilets and school latrines are often unsanitary, unsafe, lack privacy, soap and water, and do not provide reliable options for disposal of menstrual materials. In 2016, approximately 335 million girls went to primary and secondary schools where they did not have water and soap to wash their hands, bodies, and/or clothes when changing their sanitary pads [10]. This is a particularly critical issue for those who use cloths or other reusable sanitary products which require privacy, access to clean water, soap, and hygienic spaces to dry menstrual products. Without the ability to access safe, sterile WASH resources to sufficiently clean oneself, an individual's risk of infection increases as does their shame.

Roughly 2.2 billion people lack access to safely managed drinking water services[1] with women and girls bearing a disproportionate responsibility for collecting and managing household water; they are the first to suffer when access to safe WASH resources is compromised. Globally, according to UNICEF, women and children spend 200 million hours every day gathering water [12] and in parts of sub-Saharan Africa, women and girls can spend 40 billion hours per year collecting water [13]. As the primary water collectors, women and girls regularly must navigate the risks of sexual harassment and gender-based violence during water collection. Water access sites can often require walking long distances and can be in isolated areas, placing women and girls in vulnerable positions [14], especially during menstruation. In fact, according to a study conducted by the World Bank, a minimum of 500 million girls and women globally are unable to utilize sufficient facilities for their MHH needs [15]. Yet despite this burden that ties women and girls to water, they are seldom entrusted with water management roles. A UN Water report noted that fewer than 50 countries have laws for rural sanitation or water resources management that specifically mentions women's participation [16]. Lack of women's participation in WASH management means advocacy efforts and structural change for MHH often remain unvoiced.

Furthermore, women and girls are typically responsible for maintaining and cleaning household sanitation facilities, exposing them to viral and bacterial infections,

1. Safely managed drinking water services means water that is available on premises, free from contamination, and available as needed [11].

particularly when clean water is limited. Approximately 4.2 billion people lack safely managed sanitation services[2] with no consistent standards around how to classify menstrual waste, leading to differential, and not always efficacious, strategies for transporting and treating menstrual products [18]. Many women and girls have a deep fear of others seeing them dispose of any menstrual products, including collection by sanitation workers [19]. This fear of embarrassment contributes to their delayed use of sanitation and waste facilities, prompting many to hide their disposable sanitary products in walls, in rivers and forests, under roofs, and in yards. Disposal of sanitary products into communal latrines can lead to blockages in poorly maintained flush systems and, when present, sewage lines. Disposable sanitary pads do not biodegrade and can contribute to faster filling of pit latrines [9, 20]. Such practices can lead to contamination of the groundwater and environment and impact the health of women and girls by contributing to the spread of disease.

Findings on the impacts of COVID-19

The impacts of COVID-19 have reinforced the many challenges associated with menstruation, further intensifying existing inequalities women and girls experience. Many strategies designed to control the pandemic have instead hampered or exacerbated the already existing limitations around access to safe menstrual hygiene and WASH resources. The stress of coping with a global pandemic and menstruation can significantly impact an individual's mental and physical health [21], and contribute to limited social and economic opportunities. A May 2020 survey of Plan International professionals found that 75% thought COVID-19 may pose increased health risks for people who menstruate, as resources, like water, are diverted to other needs [22]. The following sections highlight strategies that were employed to control the pandemic; each strategy, however, significantly impacted MHH within the broader WASH framework.

Closures and mobility restrictions

Throughout the pandemic, communal centers, such as schools and health centers, were closed in an effort to curb the spread of COVID-19. These same structures, however, were often the facilities that provided free, or low-cost, menstrual management supplies to the women and girls who needed them. According to one study, nearly one-third of women and girls between 14 and 21 years of age had challenges affording or accessing sanitary products as a result of the lockdowns in the United Kingdom [23]. Without access to menstrual materials, some women and girls were forced to trade sex for supplies, or the money to buy supplies [24]. According to the executive director at Youth in Action, a youth-led organizational movement in Africa, the closure of schools in Kenya contributed to period poverty for many school-age girls and the worry that, "there will be a surge in teenage pregnancies due to a surge in sexual violence and transactional sex [25]." Period poverty is another way to define inadequate access to MHM materials and supports, including WASH infrastructure.

Information about MHH as well as sexual reproductive health is often provided by communal centers; their closures meant that misinformation could not be readily addressed, perpetuating the spread of false and misleading rumors and stereotypes. This stigma may be even greater for those who are already marginalized because of their race, religion, gender identity, social class, or disability status.

Restrictions around freedom of movement and mandatory quarantining forced many to remain at home where they were often unable to access sufficient supplies to manage their menstruation. Reports suggested that some women and girls utilized household goods, such as blankets, to make sanitary products when they were unable to access supplies outside the home. This practice, however, has been associated with increased domestic violence as it was viewed, not as a creative solution, but rather as a destructive act [24].

Quarantining and lack of privacy

Quarantining forced many women and girls to remain at home, often leaving them with little to no privacy. Menstruators in less-resourced countries, internally displaced camps, or refugees often share smaller, cramped spaces that frequently only have shared multiuser bathroom facilities. Because of the taboo nature of menstruation and the fear of having others see menstrual supplies and waste, women and girls often wait until late at night to visit the latrine. This elevates their risk of not only experiencing violence but also, contracting infections because of delays in changing their sanitary pads [26, 27].

Lack of financial resources and supply chain issues

COVID-19 has compounded MHH inequities due to border closures, panic buying, and stock-outs that have severely and significantly impacted the sanitary napkin supply chain and contributed to inflated prices [28]. Some small-scale sanitary product suppliers shifted to manufacturing face masks, an integral strategy used to contain COVID-19, contributing to supply issues [29]. This increased financial strain disproportionately impacts women and girls, who are frequently not in control of finances, an acute issue for those who use disposable products which require monthly purchasing. The repercussions of this on safe MHH can be drastic, with food or utilities prioritized over purchasing menstrual hygiene materials [25, 30].

Sanitation issues

Access to sufficient, reliable means of disposal for sanitary products, that takes into consideration social norms and taboos, remains an ongoing problem in many communities [18]. In 2019, the year immediately preceding the pandemic, approximately 367 million children attended schools where there were no sanitation services [31]. In communities with limited or no waste disposal systems,

2. Safely managed sanitation services refers to facilities that separate waste from human contact, including single-family facilities, and where waste is disposed of hygienically [17].

women and girls may bury or burn their sanitary materials at a distance from their homes. Restricting movement through lockdowns and quarantining forced this practice closer to menstruators' homes, increasing exposure to the harmful effects of smoke inhalation for them and their families. According to a Plan International survey of women and girls in the Pacific, "34% said they had trouble knowing where they could comfortably dispose of period products [32]." Furthermore, mobility restrictions and social distancing impacted the regularity with which garbage and waste was collected [33].

Special groups/considerations

The following special groups and environmental conditions were impacted in additional ways by COVID-19. While many of the same mitigating strategies were employed to address the pandemic, these populations/environments incurred added hardships due to the unique nature of their situations, contributing to increased challenges when coping with menstruation.

Frontline health workers and female coronavirus patients

One of the more significant issues surrounding MHH for frontline health care workers is the issue of personal protective equipment (PPE). This specialized equipment is not only cumbersome but also requires time and care when putting on and removing it, precluding quick changes of menstrual materials and potentially resulting in bleeding onto suits [4, 34]. Many women experience cramping and pain while menstruating; however, facility managers often overlook working women's menstrual health needs, compounding the physical and emotional stress of working during COVID-19 [4, 8]. Female COVID-19 patients may need assistance when changing sanitary materials while in hospital, requiring sensitive and educated caregivers so that an individual's dignity remains intact. Many hospitals face similar challenges presented in communities, notably a lack of safe, accessible, reliable, and private WASH facilities, a situation made worse throughout the pandemic.

Refugees and displaced persons camps

Those who have been displaced due to natural disasters or conflict frequently live in crowded conditions and in close proximity to men, which often fails to afford the privacy and sanitary facilities necessary to safely address menstrual hygiene needs. Reliance on communal water supplies, bathing and toileting facilities, and laundry spaces forces those who menstruate to continue hiding their needs, impacting their physical and emotional health. Shortages in cleaning supplies and soap, as well as staffing issues, all a result of the pandemic, heighten the health risks for women and girls [35].

Those living in displaced person camps receive limited distributions of essential nonfood items (NFIs) that often fail to consider menstrual hygiene supplies as necessary [4]. The supplies that are provided, like soap, must be shared with everyone in the household, often leaving women and girls with insufficient supplies for MHH.

Persons with disabilities

According to data from 34 countries, individuals with a disability are more likely to live in homes lacking access to basic water and sanitation [36]. Stereotypes and misinformation, such as being disabled is a contagious condition, further isolate and stigmatize disabled menstruators.

Individuals with disabilities can struggle with their menstrual hygiene due to mobility, vision, or other physical and mental limitations, inaccessible facilities, and/or a limited capacity to manage their periods independently. Similar to female coronavirus patients, disabled women and girls may need trained caregivers familiar with dignified, safe menstrual hygiene practices.

Water scarce regions

Although WASH is an essential strategy for mitigating and controlling the spread of COVID-19, roughly one-third of the global population lives in water-stressed areas [37]. Rationing water to cope with scarcity is a common practice, but one that forces competition between combating the pandemic's spread and the needs of menstruators. More often than not, MHM needs become secondary.

Discussion: Solutions and strategies to improve MHH policies

In order to address the lack of comprehensive, standardized MHH policies globally and to ensure that menstruators have safe, private, and dignified ways to manage their periods, MHH must be fully integrated into all current and future pandemic responses in order to achieve gender equity and equality. The following strategies and solutions (see Table 1) offer opportunities to strengthen MHH globally by both bolstering WASH infrastructure and future crisis planning.

Destigmatize menstruation and address social norms

Social norms and cultural taboos have a profound impact on women and girls. Secrecy and shame associated with menstruation are barriers that dramatically impact the social and economic time of menstruators. Rather than perpetuate stereotypes, it is critical to foster education and knowledge sharing, thereby demystifying and destigmatizing menstruation. Developing leaders who understand the

Table 1. Solutions and strategies to improve MHH policies

◇ Destigmatize menstruation and address social norms
◇ Address menstrual material supply chains
◇ Maintain and adapt MHH sanitation infrastructure
◇ Address safety concerns
◇ Maintain and adapt MHH sanitation infrastructure
◇ Prioritize financial strategies
◇ Plan for continuity of information
◇ Utilize transdisciplinary approaches to inform MHH policies and planning

essential, diverse needs of menstruators paves the way toward more inclusive, dignified, and safe approaches to manage menstruation. Some potential strategies to do this include:

- Recognizing that women and girls have valuable insights into their own needs. Respectful and culturally appropriate methods should be used to gather their insights, needs, and challenges to ensure that programs and policies will address and meet their MHH requirements.
- Educating community leaders, including health care workers and faith leaders, on the impacts of social norms and cultural taboos on menstruators' health.
- Educating boys and men on the impacts of social norms and cultural taboos on menstruators' health.
- Integrating MHH into educational programming at the elementary and higher levels, presenting the entire experience of menstruation including symptoms, pain management, and how to create supportive environments for women and girls.
- Providing opportunities to share knowledge and address cultural taboos with policymakers, engineers, and other key personnel who make, design, and manage WASH systems.
- Encouraging consideration and accommodations for those populations with specific needs, such as those with vision disabilities or those living in refugee camps, within the WASH system.

Address menstrual material supply chains

COVID-19 disrupted access to sanitary products, constraining the market and inflating prices. On average, girls and women use 7–10 disposable pads per month during menstruation [9] and an inadequate supply of materials, coupled with limited supplies, forces them to make difficult choices that have significant and deleterious repercussions for their health. Some strategies that could alleviate supply chain issues include:

- Creating localized supply chains for menstrual materials.
- Developing public–private partnerships to increase production of menstrual materials.
- Labeling sanitary products as necessary commodities to promote continued manufacturing of products throughout public health emergencies.
- Educating menstruators pre/post pandemics about ways to improvise menstrual supplies should they encounter future shortages of sanitary products.

Maintain and adapt MHH sanitation infrastructure

Women and girls are often responsible for maintaining and managing WASH infrastructure, exposing them to viral, bacterial, and other health and safety concerns. COVID-19 heightened this exposure in part by diverting funding and resources to mitigate the pandemic rather than shore up existing infrastructure, compounding difficulties associated with safe, reliable sanitary product disposal. Planning for the future, including new pandemics, should consider:

- Allocating dedicated budgets to maintain, service, adapt, and upgrade WASH facilities.
- Training sanitation workers on the need for safe, reliable, and regular servicing of disposal facilities to promote the health and safety of communities.
- Retrofitting existing infrastructure to address security concerns of women and girls, including installing locks, adding lightning, and building female-friendly toilets.
- Designing menstrual material disposal systems that are sensitive to women and girls' concerns and environmental considerations.
- Ensuring that WASH infrastructure is available and maintained to meet the needs of female health care workers, female working professionals and female patients in hospital settings.
- Developing and securing global standards for safe MHH disposal including how to categorize it.

Address safety concerns

Restrictions on movement and isolation guidelines imposed by COVID-19 have constrained menstruators' abilities to safely address their MHH needs. Decreased or restricted access to basic hygienic supplies like soap, water, and menstrual materials, as well as social distancing requirements, have exposed women and girls to increased risks of sexual assault and coercion. Lack of privacy during the pandemic, supply chain issues, and financial constraints have further compounded the risk of sexual assault and domestic violence for menstruators. To rectify these issues, it is imperative to consider implementing the following:

- Ensuring adequate sanitary supplies at minimal to no cost to prevent transactional sex.
- Fortifying WASH infrastructure to safeguard safe and reliable access to MHH materials and supports.
- Installing sufficient lighting on routes to both water collection sites and communal toilets as well as within female-friendly toilets.
- Educating boys and men about MHH as well as sexual assault to combat and shift social norms and destigmatize menstruation.
- Providing locking mechanisms on female-friendly toilets and spaces used for MHH.

Prioritize financial strategies

During the height of the pandemic, sanitary and water supplies incurred price inflation, and waste and sanitation infrastructure was not always sufficiently maintained. Women and girls often had to prioritize household and utility needs and expenses over MHH ones, sacrificing

their own health and dignity. Addressing these issues involves considering the following:

- Creating line-item budgets at the community, state, and national levels that allocate funding to maintenance of WASH infrastructure.
- Minimizing costs for MHH supplies to remove barriers to access for menstruators.
- Providing MHH kits, either separately or as part of the nonfood item allocations, to women and girls in displaced persons camps to remove barriers to safely managing their periods.
- Educating communities on MHH to shift social norms so women and girls don't have to choose between household and personal needs.
- Utilizing cost-benefit analysis to highlight the value of MHH friendly policies in schools and the labor market, both informal and formal, to prevent lost educational or employment opportunities and gains.

Plan for continuity of information

School and community health center closures impacted traditional ways in which menstruators, and especially adolescent girls, learned about MHH. Restrictions on movement and cultural taboos contributed to a decrease in information sharing. In order to plan for any future pandemics, it is vital that communities provide opportunities for women and girls to learn how to safely manage their periods. Some potential strategies include:

- Using alternative information sharing platforms like social media, television, and the radio to maintain access to accurate, reliable MHH information.
- Training community members, such as health workers, to provide education and information to menstruators.
- Ensuring that clear signposting is prominent in female-friendly toilets and spaces that outline MHH, including safe, hygienic disposal of sanitary materials.

Utilize transdisciplinary approaches to inform MHH policies and planning

The numerous strategies employed to address the pandemic often led to gaps in services and conflicting needs for women and girls. It is essential that WASH systems and policies are informed by a comprehensive understanding of MHH if they are to be successful and contribute to the overall well-being of menstruators. Failure to do so will only perpetuate shame and secrecy around menstruation and relegate women and girls to second-class status. Approaches that will fortify efficacy include:

- Involving women and girls in the decision-making process in order to fully understand all facets connected to MHH. This is especially valuable in communities with high levels of stigmatization of menstruation, water scarcity, and marginalized or disabled women and girls.
- Employing robust collection of gender-disaggregated data, where appropriate and/or possible, to gather a more holistic understanding of all menstruators' needs.
- Recognizing that diverse stakeholders are more likely to innovate solutions.
- Standardizing requirements for sanitary products globally to ensure products fully meet the needs of women and girls in areas, such as absorbency and use.

The way forward

The foundation of public health policy is a strong and robust WASH infrastructure. The COVID-19 pandemic has exposed and exacerbated the inequities within global WASH supply systems, deeply impacting women and girls. These impacts on MHH have been severe and swift causing redistribution of resources, market disruptions, and continued lack of access to safe WASH, placing women and girls in precarious and vulnerable positions. As communities move forward from the pandemic, it is vital that policies and protocols related to MHH be integrated into future planning for other pandemics, especially within vulnerable populations. WASH campaigns have the power to elevate and foster gender equality while diminishing the stigma of menstruation; it is imperative that this power be leveraged to promote and secure the human rights of each and every menstruator.

Data accessibility statement

The data that supports the findings of this study are available from the corresponding author upon request.

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Competing interests

The authors have no competing interests to declare.

Author contributions

RFI has made significant contributions to this work beginning with the conceptualization of the research question, formulation of the research criteria and methodology, data collection, data analysis, and data interpretation. She led the process of writing from the initial draft to the final draft of the manuscript. RFI edited and oversaw critical revisions of the manuscript, and provided project administration and supervision for the manuscript. KJ contributed to the conceptualization of the research question, formulation of the research criteria and methodology, and data collection. She provided significant critical revisions on the initial draft of the manuscript and made contributions to the overall quality of the manuscript. All authors read and approved the final manuscript.

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