Regis University
Regis College
Master of Development Practice

Advisor/Final Project Faculty Approval Form

Master's Candidate: Alison Suthers

Capstone Title: A Program to Promote Reusable Sanitary Pads in West Bengal, India: Recommendations for the FLūME Foundation

Presented in the MDP Community Forum on: May 6, 2024

I approve this capstone as partial fulfillment of the requirements for the Master of Development Practice.

Jean Parker
Advisor Signature
Name: Jean Parker, Ph.D
Date: May 19, 2024

Faculty Reader Signature
Name: Emily Van Houweling, PhD
Date: 5/21/24

Program Director
Name: Nina Miller, PhD
Date: June 3, 2024

A Program to Promote Reusable Sanitary Pads in West Bengal, India: Recommendations for the FLūME Foundation

Alison Suthers

Master of Development Practice

Regis University

Advisor

Dr. Jean Parker

May 20, 2024

Table of Contents

Personal Statement

I first learned about the local partner in India around 2012 when a friend was recruiting volunteers for a medical camp there. My husband, Mark, who died in 2019, was a dentist, and though I very much wanted to go to India in 2012, I judged that his skills would be more in demand, so I encouraged him to go instead. He reluctantly did, and came back exhausted from two weeks of nonstop extractions. For the next several years, I considered my contribution to the local partner as supporting Mark's growing interest in providing dental care in low-resource contexts. When he died in 2019, we were exploring starting our own nonprofit group to support sustainable dental care in West Bengal, and Mark was planning a golf tournament to raise money for a school in rural West Bengal where he had worked through the local partner and the FLŪME Foundation. While Mark's death ended work on starting our own organization, his golf tournament celebrated its fifth anniversary in 2023. I am gratified that the area around the school where Mark worked will be a site for this menstrual health program.

Meanwhile, over the last several years, I have pursued my own interest in international development by serving as a board member for small nonprofits supporting international work, including the FLŪME Foundation. I perceived a need to develop simple structures for accountability that were tailored to the capacity of small organizations trying to do good work with very limited resources. I started the Master of Development Practice program at Regis University hoping I could use the capstone project as a way to explore how grassroots NGOs on the ground in low-resource contexts can structure their work to provide useful feedback to drive learning (and fundraising) without having the resources of a large organization. An opportunity for this arose when I learned that the FLŪME Foundation was considering a program with the

local partner to produce reusable sanitary pads. As I expected, the project was a productive opportunity to explore simplified monitoring and evaluation because it has involved much improvising around the kind of data that can realistically be collected given the capacity and interests of the local partner organization.

The project also appealed to my feminist sensibilities as a white woman from the Global North. I want to help improve the status of women and girls in a context where menstruation is taboo. Although this feminist viewpoint is often alien to my colleagues in India, that viewpoint also informs the worldview I bring to this proposal to be submitted for a degree at a U.S. academic institution. For example, like most American and European academic writers, I will use the term "menstruator" to acknowledge that not all menstruators are women and not all women menstruate, although this language may seem foreign in the context of an Indian-initiated project to improve lives of women and girls.

I also wanted to explore how I could contribute to such a project as an outsider and catalyst with no on-the-ground experience (my trip to India for this project was my first) but with the perspective of a funder concerned with accountability. For this reason I have structured this project as a consulting report, containing recommendations for the FLŪME Foundation and the local partner based on my research. This perspective acknowledges that I am not in a position to have a day-to-day role in the implementation of this project.

Finally, I want to acknowledge this project has prompted reflections on my own experiences as a menstruator, which have been influenced by cultural stigma in the U.S. As a younger woman I internalized the necessity of hiding menstruation without even thinking to interrogate this response. When discussing this project with family and friends, I repeatedly

encountered grown men, and even fathers of daughters, who loudly objected to the mention of menstruation in their presence. This project has encouraged me to promote in my own circle of influence and with my own daughter, in accordance with the recent 2021 comprehensive definition of menstrual health, “a positive and respectful environment in relation to the menstrual cycle, free from stigma and psychological distress” (Hennegan et al., 2021, p. 32).

Executive Summary

Menstrual Health and Hygiene ("MHH") is an increasing focus for the development sector because of the potential to improve the lives of women and girls by empowering them to understand and care for their bodies and to overcome the shame and stigma associated with cultural taboos around menstruation that exist all over the world. In West Bengal, India, embarrassment and secrecy surrounding menstruation, which is commonly considered an impurity, means that many menstruators do not understand the biological causes of menstruation, and many do not share information about their experiences managing menstruation and its impact on their daily lives. In addition, managing the waste generated by disposable sanitary pads has become a policy focus in India. This program uses reusable sanitary pads, an environmentally-friendly and cost-effective alternative to the disposable version, as a grassroots entry point to promote community discussion and education about menstruation. Activities to develop a market for affordable reusable sanitary pads are expected to provide opportunities for members of the target communities to learn about menstruation, make informed choices, and improve their economic circumstances by saving money on menstrual materials and earning money from sales activities.

Literature Review

Introduction

At any given moment, about 800 million people in every corner of the world are menstruating. Around 1.8 billion people menstruate every month, and most of these people will menstruate for more than half of their life (Rohatgi & Dash, 2023). This has been happening since the beginning of humanity.

Although billions of people menstruate, and menstruation is a normal and healthy physiological process, menstruation is also treated with embarrassment and secrecy in most cultures and in countries of all income levels. Because this shame and secrecy is associated with patriarchal power systems, increased attention for MHH in the development sector is associated with promoting the human rights of women and girls. This literature review will first examine how attention to MHH promotes sustainable development and will provide a brief overview of the MHH context in India. Then it will discuss how the four "pillars" of MHH—social support, menstrual materials, accurate knowledge about menstruation, and supportive facilities—can inform MHH programming that positively impacts the lived experiences of menstruators and improves the lives of women and girls in India.

Global Challenges for MHH and Sustainable Development

Across cultures, the stigma associated with menstruation creates challenges for menstruators who need strategies to manage their blood flow and incorporate menstruation into their daily activities. These challenges are specific to each context but often include barriers to accessing absorbent materials, a lack of privacy and clean water needed to wash and change absorbents, and difficulty cleaning or disposing of menstrual materials (Rohatgi & Dash,

2023; Bobel et al., eds., 2020). The systemic devaluing of menstruators' voices in patriarchal power structures means that menstruators often lack power to make their needs a priority in governments, institutions, communities, and individual families (Sukumar, 2020; Wood, 2020). Medically, doctors have documented the negative impact of menstruation-related challenges on patients' overall health, well-being, and productivity (Critchley et al., 2020; Schoep et al., 2019). While MHH-focused efforts have been concentrated in low-income countries globally, increasing efforts target the needs of disabled and transgendered menstruators, as well as vulnerable populations in higher income contexts, such as unhoused and incarcerated people (Lane et al., 2022; Gruer et al., 2021; Bobel et al, eds., 2020; Wilbur et al., 2019).

An evolving definition of MHH

In 2021, the Terminology Action Group of the Global Menstrual Collective published this new comprehensive definition of menstrual health as a joint effort of multidisciplinary stakeholders with the goal of supporting coordination and evidence-based advocacy and programming (Hennegan et al., 2021, p. 32):

> Menstrual health is a state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity, in relation to the menstrual cycle. Achieving menstrual health implies that women, girls, and all other people who experience a menstrual cycle, throughout their life-course, are able to:
>
> - access accurate, timely, age-appropriate information about the menstrual cycle, menstruation, and changes experienced throughout the life-course, as well as related self-care and hygiene practices.
> - care for their bodies during menstruation such that their preferences, hygiene, comfort, privacy, and safety are supported. This includes accessing and using effective and affordable menstrual materials and having supportive facilities and services, including water, sanitation and hygiene services, for washing the body and hands, changing menstrual materials, and cleaning and/or disposing of used materials.

- access to timely diagnosis, treatment and care for menstrual cycle-related discomforts and disorders, including access to appropriate health services and resources, pain relief, and strategies for self-care.
- experience a positive and respectful environment in relation to the menstrual cycle, free from stigma and psychological distress, including the resources and support they need to confidently care for their bodies and make informed decisions about self-care throughout their menstrual cycle.
- decide whether and how to participate in all spheres of life, including civil, cultural, economic, social, and political, during all phases of the menstrual cycle, free from menstrual-related exclusion, restriction, discrimination, coercion, and/or violence.

This definition is significant for several reasons. First, it aligns with the World Health Organization's definition of health to include mental and social as well as physical well-being (Hennegan et al., 2021). To that end, it recognizes the multitude of factors that affect menstruators' experiences, including stigmatized social environments, as well as access to facilities, services, products, and health care. Second, it also focuses on the experiences of menstruators, prioritizing participation, agency, and choice, consistent with a human rights lens (Winkler, 2021). Third, it expands on a definition of "menstrual hygiene management" that was developed in 2012 as part of advocating for the inclusion of menstruation in the United Nations Sustainable Development Goals ("SDGs"). This earlier definition had been criticized for reinforcing the idea that menstruation is "dirty" and "impure" because of the correlation with "hygiene" terminology, so the new definition attempts to correct that focus (Hennegan et al., 2021). Fourth, the definition also reflects a recognition that MHH reaches into multiple development sectors, including education, gender, and public health, beyond its initial placement in the water, sanitation, and hygiene ("WASH") sector. Accordingly, the definition reflects an evolving and broadening understanding of the importance of MHH in sustainable development.

Connection of MHH to the SDGs

MHH was not explicitly included in the SDGs in 2012, but activists and researchers aiming to raise the profile of MHH have argued that it plays a central role in several goals (Sommer et al., 2021a).

- No Poverty: MHH promotes the goal of SDG 1 to end poverty everywhere. The development targets collected under SDG 1 recognize the gendered nature of poverty and the link between fighting poverty and improving access to basic services, like the assets and spaces needed to effectively manage menstruation (Loughnan et al., 2020).
- Good Health and Well-being: SDG 3 focuses on healthy lives and well-being for all. Healthy menstruation is of utmost importance to women's health and SDG 3's more explicit focus on reproductive health (Loughnan et al., 2020). In addition, health problems like urinary and reproductive tract infections can result from unclean and poor-quality menstrual materials.
- Quality Education: SDG 4 focuses on equitable education. The United Nations considers menstruation to be the pubertal change that most influences the experience and quality of education. Accordingly, attention to MHH at school can remove barriers to education for girls (Loughnan et al., 2020).
- Gender Equality: SDG 5 focuses on gender equality, and unmet MHH needs are a symptom of persisting inequality (Loughnan et al., 2020). The common cultural link between menarche and child marriage also means that reconceptualizing the cultural meanings of menstruation is tied to SDG 5's target of ending child, early, and forced marriage (Loughnan et al., 2020; Scott et al., 2013).

- Clean Water and Sanitation: SDG 6 focuses on sustainable management of water and sanitation. This sector has historically been the sector most associated with MHH because of the connection with improving access to toilet and washing facilities (Loughnan et al., 2020).

MHH-focused programming therefore has the potential to advance multiple SDGs.

How MHH Advances Sustainable Development

Scholars have proposed two rationales for focusing on MHH in the pursuit of sustainable development: the first is as an aspect of basic human rights and dignity for women and girls; the second is as a means of improving health, education, and economic outcomes (Sommer et al. 2016a).

MHH and Human Rights

Winkler (2021) argues that through a human rights lens, addressing MHH must take a structural and intersectional approach. This means programming should focus on the lived experiences of menstruators in different contexts, while looking beyond products and facilities to address stigma and socio-cultural influences. She argues this discussion should be centered around the human rights principles of (1) non-discrimination and substantive equality, (2) participation, voice, and agency, and (3) accountability, with a focus on the responsibility of governments and institutions to lead efforts to incorporate MHH into policies.

Winkler (2021) also argues that, to elevate human rights, MHH-focused programming must account for cultural and religious meanings of menstruation in the local context without undermining them. She and others caution against applying the norms of the Global North to

how people menstruate around the world, and instead put the focus on agency—creating freedom to allow all menstruators to manage menstruation as they choose (Winkler & Bobel, 2021; Patkar, 2020).

This human rights focus requires a flexible view of what the literature describes as menstrual "restrictions"—cultural and religious practices that dictate activities during menstruation. For example, while dominant voices in the literature decry these restrictions as indistinguishable from stigma, others acknowledge the voices of menstruators who experience cultural and religious restrictions on activity during menstruation as a source of power, rest, or as a way to form community with other women (McCarthy & Lahiri-Dutt, 2020; Hawkey et al., 2020). In a study from Nepal of how menstruators feel about menstrual restrictions, most reported that they did not want to change menstrual restrictions: only 50% of women reported that they would like to enter the kitchen during menstruation, and this was the practice menstruators were most likely to want to change (Mukherjee et al., 2020, p. 8). 41.4% of women said they would like to stop the practice of avoiding the temple during menstruation, and only 28.8% said they wanted to change the practice of not touching plants while menstruating (Mukherjee et al., 2020, p. 8). The authors argue this study highlights the deeply-rooted cultural and religious beliefs associated with menstruation, but it also illuminates the complexity of the human rights lens (Mukherjee et al., 2020). Perhaps the vast majority of women would not want to maintain certain menstrual restrictions if they really felt the power to choose.

An echo of this human-rights focus on the voice and agency of menstruators is found in the health-care sector's efforts to use patient-reported measures to evaluate abnormal

menstrual bleeding. This approach focuses on patients' lived experiences because "objective" measures, like measuring the volume of menstrual fluid discharged, fail to adequately capture the impact on quality of life (Matteson, 2017; Matteson et al., 2015).

MHH and Health, Education, and Economic Outcomes

A strong base of qualitative work over the last decade establishes that women and girls associate MHH challenges with negative impacts on their overall well-being, including school attendance (Sommer et al., 2021b; Haver, 2018; Miiro et al., 2018; Hennegan, 2017; Oruko et al., 2015). But the evidence base is still lacking to fully support and describe this intuitive connection (Sommer et al., 2021b; Hennegan, 2020; Hennegan & Montgomery, 2016). Research so far has failed to definitively establish the causal connection between improvements in MHH and health, educational, or economic outcomes (Sommer et al., 2021b; Hennegan et al., 2019). This failure is largely due to the complexity of factors that influence the opportunities available to girls and women, which makes it difficult to isolate menstruation; it is also due to the complexity of factors influencing the experience of menstruation itself (Sommer et al., 2021b; Hennegan et al., 2019). Development practitioners nevertheless believe that inadequate attention to MHH has significant economic and social costs when women and girls miss work and school because of lack of access to absorbent materials and safe, hygienic WASH facilities at schools, factories, markets, and transportation hubs (USAID, 2019; Sommer et al., 2016b).

Many studies attempting to quantitatively describe the connection between MHH and education outcomes have been inconclusive (Hennegan, 2020). For example, a study in South Africa found no statistically significant difference in school attendance between girls who said

they had sufficient access to menstrual materials and those who said they did not (Crankshaw et al., 2020). A study in Kenya similarly found neither pad provision nor sexual health education had a significant effect on school attendance (Austrian et al., 2021). Other studies have shown promising results, with inevitable methodological weaknesses. For example, a study in Uganda found equivalent improvement in school attendance whether students received an education intervention, free reusable pads, or both, but the study also did not account for the large number of girls who dropped out of school entirely during the study period (Hennegan, 2020; Montgomery et al., 2016).

Disagreement exists about what outcomes are meaningful. Quantifiable outcome measures that studies commonly attempt to capture, like school enrollment, fail to capture things like whether girls are learning or participating. Benshaul-Tolonen et al. (2020) and Haver (2018) argue that "soft" metrics like self-esteem, stress, self-efficacy, and enjoyment are the most relevant impacts of improved MHH, though these things are difficult to measure. Caruso et al. (2020) tested a quantitative index measurement of "menstrual insecurity" in India that attempts to capture "the suite of social, environmental, and biological concerns and negative experiences resulting from menstruation" (p. 17). They found greater "insecurity" was associated with lack of access to a functional latrine, lack of an enclosed bathing space, lack of water at home, and reusing cloth as an absorbent But they also acknowledge that some "soft" measure of experience is essential for adequate evaluation of programs because a menstruator's perception of her experience mediates how conditions like new menstrual materials will impact health and education outcomes. To better capture the experiences of target populations, development stakeholders such as the Dutch Development Corporation are

advancing more flexible approaches to evaluation such as “Feminist MEL” that account for non-linear and complex change processes, reduce reporting burdens, and account for power imbalances (Partos, 2024).

Nevertheless, a link between menstruation and education is clear. Evidence globally shows that inadequate MHH negatively impacts girls’ education, even if specific declines in educational outcomes have not been directly tied to menstruation (Sommer et al., 2021b; Haver, 2018; Miiro et al., 2018; Hennegan, 2017; Oruko et al., 2015). In India, a study of 600 mostly middle-class school girls in Delhi found that 40% of girls missed at least one day of school during menstruation (Vashist et al., 2018, p. 167). Girls were most likely to miss school if their school did not have a separate girls’ toilet (Vashist et al., 2018). Most girls said they missed school due to menstrual pain, but others missed due embarrassment or anxiety about soiling clothes, and a few were barred from attending school by their parents (Vashist et al., 2018). Girls were more likely to miss school if they used traditional cloth as a menstrual absorbent or if their mothers were illiterate (Vashist et al., 2018). 65% of the girls said that even when they attended school during menstruation, their participation and performance was negatively affected (Vashist et al., 2018, p. 165). This data does not include girls who stop attending school altogether after menarche for a variety of reasons, including the common fear that menstruating girls will get pregnant if left unsupervised. Some studies suggest more than 23% of girls in India drop out of school after menarche (Garg & Anand, 2015, p. 185). Educational equality is a focus of SDG 4 because of the positive impact of education on escaping poverty (UN, n.d.). Thus, inadequate MHH can be considered a barrier to achieving quality education and the positive economic outcomes associated with education.

The effort to measure the impact of MHH on health, education, and economic outcomes is still evolving. Some argue the field still needs a fully-developed theoretical framework to understand the connection between menstruation and desirable development outcomes (Hennegan et al., 2020b; Hennegan et al., 2019; Hennegan & Montgomery, 2016; McCarthy & Lahiri-Dutt, 2020). Scholars and activists are focusing on developing common outcome indicators and standardized data collection mechanisms that will enable future study and comparison across contexts (Uninhibited, 2024; WHO/UNICEF, 2021; Phillips-Howard et al., 2016). Because ways of speaking about menstruation can differ widely, this absence of common terminology can also hamper standardized data collection (Hennegan et al., 2020b; Haver, 2018). Some scholars also argue that insufficient attention has been paid in this academic effort to unintended harms that research can inflict due to the complex mediators of a menstruators' individual experience, such as subjecting menstruators to harmful attention, and even early marriage, by "outing" them, or undermining menstruators' pride in current menstrual practices (Hennegan et al., 2016; Scott et al., 2013).

Context for MHH in India

Historically and culturally, menstruation has been a taboo topic in India (Patkar, 2020). Widely-held perceptions about menstruation include that it is the expulsion of "dirty blood," which renders menstruators impure (Chakravarthy et al., 2019; Garg & Anand, 2015). Traditions vary widely even within the same communities and caste groups, but some menstruators are required to isolate themselves from their families, refrain from touching food, eating specific foods or entering the kitchen, or refrain from washing during menstruation (Chakravarthy et al.,

2019; Garg & Anand, 2015). Violating these socio-cultural restrictions on menstruation is commonly understood to result in infertility (Garg & Anand, 2015).

Across studies, the most commonly-followed restriction on menstruators in India is refraining from participating in religious activities (van Eijk et al., 2016). Garg and Anand (2015) and Cohen (2020) note that these beliefs about menstruation are deeply rooted in India's Vedic traditions and predominant Hindu faith. For example, the foundational Hindu text the Manu Smriti provides codes of conduct primarily directed at protecting Brahmin men from a variety of impurities, including "a menstruating woman" (Cohen, 2020). Predating the Manu Smriti, the Vedic story of the god Indra killing the Brahmin Vicvarupa links sin and menstruation because women agree to take on Indra's guilt for Brahmanicide, and menstruation is an enduring symbol of that guilt (Cohen, 2020). Because of this religious context, menstrual restrictions in India tend to be more strongly adhered to in higher caste families (Mukherjee et al., 2020). Islamic traditions that have cultural influence in West Bengal also commonly include restrictions on menstruators attending mosque and praying during menstruation, although the basis for these restrictions in the Qu'ran is debated (Hawkey et al., 2020; Gottlieb, 2020). Menstruators in India also commonly believe that physical activity during menstruation can aggravate menstrual pain (Garg & Anand, 2015).

MHH has been growing in prominence as an issue in Indian national policy since 2012 (Patkar, 2020). Patkar's (2020) early efforts to introduce MHH programming in government-sponsored WASH events revealed a strong desire for accurate information about menstruation from Indians of all ages and genders. In the last decade, India has deployed a number of national policies and programs that Patkar (2020) argues have prompted a "trickle

down" of MHH awareness to governments at local levels. India has been proactive in promoting an international menstrual health day on May 28 each year and has a Menstrual Health Alliance whose members undertake nation-wide advocacy, research, and learning (UNICEF, 2020). Some government-supported initiatives have included efforts to ensure all schools have adequate WASH facilities—including water, soap, private space, and disposal facilities—as well as efforts to make sanitary pads available through trained Accredited Social Health Activists (ASHAs) and through school vending machines (UNICEF, 2020; Sinha & Paul, 2018). Every school in India is supposed to have two school health ambassadors with training in MHH (UNICEF, 2020). Local governments in the Indian states of Maharashtra, Gujarat, Uttar Pradesh, and Bihar have made efforts to incorporate MHH in school curricula (UNICEF, 2020). All Indian states have recently been ordered by the supreme court to develop menstrual hygiene policies that ensure school children have access to free sanitary pads and toilets segregated by gender (The Economic Times, 2023). The NGO Uninhibited (2024) notes that there are more published research papers about MHH in India than any other country in the world.

Given the size and diversity of India's population, the implementation of MHH policies appears to have been inconsistent geographically. India as a whole does appear to have achieved some success over the last decade promoting the use of disposable sanitary pads, which have been widely adopted even in low-resource contexts, particularly in urban areas (UNICEF, 2020; Garikipati & Boudot, 2017; Garg et al., 2022; Garg et al., 2001). Because of this relative success, there is also a current policy focus in India on waste disposal to accommodate these products (UNICEF, 2020; Garikipati & Budot, 2017).

Some have criticized India's national policies as focusing too narrowly on hygiene and management at the expense of a more holistic view of health, and of endorsing cultural beliefs that stigmatize menstruation (Manorama & Desai, 2020). Activists argue for a more comprehensive policy that focuses on gender equality, including comprehensive sexual health education, advocacy campaigns to challenge stigma, and an overall focus on economic empowerment for women (Seth, 2023).

MHH Programming: The Four Pillars

In the last five years, large international NGOs such as Save the Children, UNICEF, and the Red Cross/Red Crescent have developed guidance based on their experience implementing MHH programming in low-resource contexts, particularly in schools and emergency settings (Save the Children, 2022; Sommer et al., 2021b; UNICEF, 2020; UNICEF, 2019a; UNICEF 2019b). Although international guidance is important for elevating MHH in the global conversation, Sommer et al. (2021b) suggest that country-level guidance may be most appropriate because of differing cultural contexts that affect MHH programs.

The program guidance that has been developed acknowledges existing research on the complexity of factors mediating individual experiences of menstruation by identifying four "pillars"—aspects of each menstruator's life that influence MHH practices. The guidance suggests MHH programs need to incorporate an understanding of each pillar in the relevant context even if the program will not address that pillar directly (Hennegan et al., 2019). These pillars are commonly described as (1) social support for menstruators, (2) menstrual materials, (3) accurate knowledge about menstruation, and (4) supportive facilities (UNICEF, 2019a;

UNICEF, 2019b). Regardless of the focus of an intervention, awareness of all pillars is crucial to account for their influence on expected outcomes (Hennegan et al., 2019).

Pillar One: Social Support for Menstruators

The social support pillar incorporates the community and cultural understandings of menstruation that influence how a menstruator interacts with her family, teachers, supervisors, co-workers, and the wider world. As a result, some frameworks describe social support not as an individual pillar, but as an overarching consideration that interacts with the other three pillars (IFRC, 2019; Sommer et al., 2018).

A lack of social support is connected with cultural stigma around menstruation that can interfere with a menstruator's agency and capacity to manage menstruation in the way that best meets her needs. Accordingly, the social support pillar requires building an enabling environment of support for menstruators in all aspects of their lives—at home, at work, at school, and in their communities. Weaknesses in this enabling environment, such as lingering taboos and myths around menstruation, affect how menstruators interact with the other pillars of MHH programming, like how menstruators choose and use materials, how they receive and act on knowledge, and how they use WASH facilities. For example, the stigma surrounding menstruation can prevent menstruators from receiving and sharing accurate knowledge about the biological cause of menstruation and hygienic strategies for managing it.

Weaknesses in the social support environment are likely to affect how community members interact with interventions. For example, Garg et al. (2021) found that teachers implementing a sanitary pad distribution program in Delhi made efforts to distribute sanitary

pads clandestinely to maintain secrecy. Garikipati and Boudot (2017) decided to change their planned research method from focus groups to interviews due to the taboos they encountered discussing menstruation with women in Hyderabad and still found many women unwilling to discuss the topic. An education intervention in Zimbabwe had to abandon plans to teach girls to track their cycle using bracelets, because some families associated the bracelets with satanism (Foulds et al., 2021). Sommer et al. (2018) found that staff implementing an MHH toolkit in emergency settings needed direct support and coaching in addition to written guidance due to discomfort discussing menstruation. More examples of how stigma and the social support environment interact with the other three pillars are discussed in the following sections.

The social support environment also incorporates the practice of menstruation-related restrictions on daily activities and how menstruators experience them. These restrictions can vary widely by religion, geography, caste, education, and individual families (Sumpter & Torondel, 2013). Studies that cover menstrual restrictions in India generally do not identify these restrictions as specific to religion or caste, but Sukumar's (2020) personal essay about her experience of menstruation as an urban Dalit Christian in contrast to her more restricted upper caste Hindu peers suggests the wider literature glosses over important drivers of menstruators' individual experiences. A study in Nepal that looked at menstrual practices by caste found that higher-caste women feel the most cultural pressure to adhere to menstrual restrictions, particularly around religious participation (Mukherjee et al., 2020).

Interventions Incorporating Social Support

While many MHH programs do not address social support directly, they must influence the social support environment to generate sustainable change. Interventions also may need to acknowledge that, to be adopted initially by menstruators in the target context, the intervention itself may reinforce social stigma around menstruation, such as designing toilet facilities and menstrual materials that enable menstruators to effectively hide menstruation. Some advocates argue interventions should not attempt directly to address the shame and stigma associated with menstruation, because this makes it more politically palatable for local and national governments to assume ownership of the problem (Sommer et al., 2015).

On the other hand, Patkar (2020) argues that traditional MHH interventions focused on product provision or WASH facilities are an important way to start community conversations that will ultimately influence the social environment. But, she argues, product and facility interventions must be combined with broader advocacy efforts to move the cultural conversation toward a more supportive enabling environment. An assessment by the Nepal Fertility Care Center (2015) of the progress toward ending the practice of chhaupadi (isolating menstruators in outdoor huts with often difficult living conditions) argues that deeply-rooted cultural ideas about menstruation and impurity can only change with community-led collective learning, not outside pressure. They found communities that successfully changed social norms around the practice of chhaupadi did so after an extended period—approximately a year—of concerted community focus on the issue through meetings, awareness campaigns, trainings, door to door education, and protests by individual women.

In the absence of this collective learning, directly challenging widely-held perceptions about menstruation may undermine a program's success. A study of an education intervention in Uganda noted that girls expressed stress when what they heard in the program differed from what they heard from other respected authority figures (Hennegan et al., 2017). An education intervention in Zimbabwe concluded that some myths common among participants were beyond the ability of the intervention to address (Foulds et al., 2021).

Mukherjee et al.'s (2020) finding that being barred from the kitchen was the menstrual restriction women themselves most wanted to change suggests that menstruators are most willing to abandon beliefs that directly impact their daily activities. Reviewing studies about the impact of interventions on restrictions, Sumpter and Torondel (2013) hypothesize that menstruators are more likely to change behaviors that are considered individual in nature and will not be perceived as affecting or "polluting" others. The Nepal Fertility Care Center (2015) calls this focus on the practices that most affect menstruators' daily lives a "harm reduction strategy" that centers on promoting community discussion about social norms.

National policies and advocacy campaigns are significant drivers of the social support environment. Mukherjee et al. (2020) argue "[m]enstruation-related socio-cultural practices have become significantly less stringent in the past few decades with initiatives from the Nepalese government and other [NGOs]" (p. 6). Hennegan (2020) believes that mass media and community-wide programming will be necessary to shift social norms. Analysis of national survey data in India shows that better MHH practices do correlate with exposure to mass media (Singh et al., 2022a, 2022b; Ray & Dasgupta, 2012). Berthault et al. (2023) also attribute improved MHH awareness in India to popular films like "Pad Man," released in 2018, about an

Indian entrepreneur who became famous for inventing a low-cost and small-scale sanitary pad manufacturing machine. MHH advocacy in India has incorporated social media campaigns, such as the campaign to allow menstruating women to enter the Sabarimala Temple in Kerala, India (#happytobleed), but these campaigns impact more socio-economically advantaged populations who have access to the internet (Cohen, 2020; UNICEF, 2020).

Including the Whole Community to Improve Social Support

Even in smaller-scale interventions that do not include advocacy as a primary focus, steps toward changing the social support environment can include starting a community conversation about menstruation that includes men and boys (Armour et al. 2021; Nalugya et al., 2020; Tellier et al., 2020; Gundi & Subramanyam, 2019; IFRC, 2019; Mahon et al., 2015). This strategy acknowledges the impact that fathers, brothers, teachers, coworkers, bosses, WASH engineers, and other male community members and leaders can have on menstruators' experiences (Hennegan, 2020; Coast et al., 2019). For example, Mason et al. (2017) found in a small qualitative study in three Indian states that giving boys more information about menstruation made them more supportive of their menstruating peers and less likely to tease them. Garg et al. (2021) gathered information about the implementation of a free disposable sanitary pad distribution scheme in Delhi, India and reported that when free menstrual pads were distributed openly at schools, teachers perceived that the boys in class were more sensitized to the challenges faced by their female classmates. Nalugya et al. (2020) reported that when boys in Uganda received education about menstruation and were involved in a drama skit at school, participants perceived a more supportive social atmosphere around menstruation. Others have noted that fathers, husbands, and male teachers are critical parts of

the social support environment because they often make decisions about resources and activities that affect a menstruator's experience (Mahon et al., 2015). Tellier et al. (2020) describe the importance of identifying "role model men" in Ugandan communities who can take the lead in normalizing community discussions about menstruation.

A number of possible strategies geared toward changing the community support environment can be incorporated into smaller-scale interventions. Gundi and Subramanyam (2019) suggest including all community members in parent groups to discuss menstruation in Maharashtra. They also suggest participatory theater projects to promote community discussions around menstruation Other examples of participatory projects targeted at the social support environment are photo and video voice projects that allowed menstruators to share their challenges in the context of a community conversation in Nepal (Baumann et al., 2020). Mahon et al. (2015) suggest games and film projects. Others promote local activities such as workshops and focus groups simply designed to make space for conversation (Mahon & Fernandes, 2010). The NGO WoMena developed an "ecological model" of intervention in Uganda designed to open conversation about menstruation at the community level by providing training to key local supporters (Tellier et al., 2020).

Pillar Two: Menstrual Materials

Menstruators use a wide variety of materials to manage menstrual blood flow, including new or reused pieces of cloth, disposable sanitary pads, reusable sanitary pads, tampons, and menstrual cups. Studies have identified the following factors menstruators consider when choosing materials: cost, access, ease of use, disposal, available facilities for changing and washing, and environmental impacts (van Eijk et al., 2021). Barriers to accessing desired

menstrual materials have been documented as detrimental to the health and well-being of menstruators, for example in a commonly-cited study that found girls in Kenya exchange sex for sanitary pads (Mason et al., 2013). Some caution that interventions focusing on improving access to menstrual materials fail to address the scope of the issue by ignoring the importance of the other pillars (Sommer et al., 2015). For example, a study among school girls in Kenya found that a pad provision program did not improve attitudes about menstruation unless it was accompanied by a sexual and reproductive health education program (Austrian et al., 2021).

UNICEF's (2019b) guidance describes that an appropriate goal of a materials-focused intervention is to expand exposure and access to a range of options to ensure freedom of choice and dignity, consistent with the human-rights-centered view of MHH. Berthault et al.'s (2023) menstrual product market analysis supports this approach: they found that given a full suite of options, many menstruators will prefer a mix of solutions to manage a single menstrual cycle and will pick different solutions in different life stages. Commonly, menstruators will use home-made materials at home and commercial products when they leave the house and will adapt solutions as their budget allows (Berthault et al., 2023).

This section will describe some programming considerations related to common menstrual materials: menstrual cups, cloth, disposable sanitary pads, and reusable sanitary pads. It will focus on reusable sanitary pads because that is the material chosen by the local partner for this project. This section will not cover tampons because they are not often mentioned in MHH interventions in low-resource contexts.

Menstrual Cups

Menstrual cups have not been widely used in India, but they have been introduced with some success in low-resource contexts in Africa (Berthault et al., 2023; Tellier et al., 2020; van Eijk et al., 2020; van Eijk et al., 2018). The organization Ruby Cup has documented high adoption rates for its donated cups in Africa, with 60% of menstruators adopting the cup after one training session and 82% adopting the cup after two refresher sessions over nine months (Berthault et al., 2023, p. 41). Another study in Uganda found that 90% of menstruators who received a cup in 2015 were still using it in 2019 (Berthault et al., 2023, p. 41). While the initial investment in a cup is relatively high, cups can be reused for ten years, and hygienic use requires only boiling the cup in water at the end of each menstrual cycle. These characteristics make the cup the least expensive solution per menstruation over time and an attractive option even where WASH facilities are limited (Tellier et al., 2020).

Nevertheless, the menstrual cup has not been widely adopted in India. In a study of 300 women working in health care in Mangalore, India, 82% knew about menstrual cups but only 8 women had ever used one, which indicates low levels of acceptability for menstrual cups even among educated women (Ballal & Bhandary, 2020, p. 4). But the Indian feminine hygiene brand Sirona, which focuses on internet marketing, has sold one-million menstrual cups since 2015, with 400,000 sold in 2022 (Berthault et al., 2023, p. 41). Berthault et al. (2023) believe Sirona's experience shows that menstruators in India will adopt menstrual cups if sufficient programming supports familiarization with how to use them. Sirona provides this support inexpensively with digital tactics like online tutorials, but these are available only to consumers with internet access (Berthault et al., 2023). The necessary support without widespread

internet access is likely more costly and not commercially feasible (Berthault et al., 2023). The more acute need for access to private space for changing and washing when using a menstrual cup is another reason menstrual cups have a higher potential for adoption in socio-economic circumstances where privacy is easier to find (Berthault et al., 2023). Nevertheless, potential users of menstrual cups live even in places where cups are traditionally considered culturally unacceptable: Berthault et al. (2023). found that among 198 semi-urban menstruators in Bangladesh, Kenya, Pakistan, and Senegal, 33% ranked a menstrual cup as part of their first-choice product management method when fully informed about usage and cost.

Some organizations in India have found ways to incorporate menstrual cups into programming for low-income contexts. One Indian menstrual cup company donates cups to community health workers, who then sell cups to others while teaching menstruators to use them (Berthault et al., 2023). The same company also sells to factory owners who buy cups for their employees with the goal of reduced absenteeism and saving money on plumbing costs due to improper sanitary pad disposal (Berthault et al., 2023). An NGO that promotes access to menstrual cups in low-resource contexts has also found that having discussions with women about unfamiliar menstrual materials such as menstrual cups, even if women are not likely to adopt them, can be an effective way to open a larger conversation about menstrual taboos (Fahs & Perianes, 2020).

Traditional Cloth

The traditional menstrual absorbent in most low-resource contexts, including India, is cloth (UNICEF, 2019b). Cloth pieces can be either purchased or recycled pieces of old clothing (UNICEF, 2019b). They can be used once or reused many times (UNICEF, 2019b). While most

MHH studies from India dismiss cloth as "unhygienic," others acknowledge that cloth can be used hygienically as a menstrual absorbent if it is washed with soap and dried in the sun (Samanta & Sarkar, 2022; UNICEF, 2019b; Santra, 2017; Sarkar et al. 2017; Das et al., 2014). These authors caution that traditional use of cloth should not be dismissed out of hand by program planners, because many women find cloth to be an adequate and affordable way to manage menstruation (UNICEF, 2019b). Some authors also note that the private sector has a capitalist motive to support a consumer market for menstrual products by promoting the perception that traditional methods for managing menstruation are unacceptable or unhygienic (Punzi & Werner, 2020; Sommer et al., 2015).

Studies have documented that some menstruators using cloth in India do not wash their cloth using soap, perhaps due to lack of access to soap or appropriate washing facilities (van Eijk et al., 2016). It is also common to dry cloth indoors, where others cannot see it, or to store it in hidden places, such as under mattresses, without drying it thoroughly (van Eijk et al., 2016). This behavior can increase the risk of urinary and reproductive tract infections.

Disposable Sanitary Pads

Recent studies have identified high levels of disposable pad use both in urban slum and rural communities in India, although disposable pad use is less prevalent in rural areas (Amin et al., 2022; Samanta & Sarkar, 2022; Achuthan et al., 2021; Paul et al., 2020; Manna et al., 2019; Singh et al., 2019, Garikipati & Boudot, 2017; Mishra et al., 2017; Santra, 2017; Sarkar et al., 2017; Taklikar et al., 2016; Bhattacharyya et al., 2015; Das et al., 2014; Bhattacherjee et al., 2013). A 2020 study in Delhi found high adoption rates for disposable pads that were offered through government-supported free and subsidized programs, though disposable pads

remained unaffordable for some if they were not free (Garg et al., 2022; Sinha & Paul, 2018). A meta-analysis of MHH studies in India noted that use of disposable pads appeared to be more prevalent than often-cited government survey data suggests (Majeed et al., 2022). Berthault et al. (2023) estimate that the market penetration for disposable pads in India among 18 to 24-year-olds is 78% (p. 9). Notably, market penetration for disposable pads in Bangladesh, neighboring West Bengal, is significantly lower, which Berthault et al. (2023) attribute to stronger social taboos around menstruation.

MHH studies in India typically contrast use of disposable pads with use of cloth as a menstrual material, with the study authors regarding disposable pads as the "hygienic" option and reusable cloth as the "unhygienic" option (Amin et al., 2022; Boral et al., 2020; Paul et al., 2020; Samanta & Sarkar, 2022; Santra, 2017; Sarkar et al. 2017; Bhattacharyya et al., 2015; Das et al., 2014; Ray & Dasgupta, 2012). Demonstrating popular acceptance of this view, most menstruators in both rural and urban contexts in India view disposable pads as the ideal material for menstrual hygiene, and those who do not use them report that they would do so if they were accessible (Amin et al., 2022; Manna et al., 2019; Santra, 2017; Thakur et al., 2014; Bhattacherjee et al., 2013). Using national survey data, Ram et al. (2020) confirmed that disposable pad use in India is associated with urban living, higher education levels, and being general caste. Because of high levels of disposable pad use among new menstruators, disposable pad use will continue to increase in India without further intervention (Sinha & Paul, 2018; Garikipati & Boudot, 2018; Elledge et al., 2018). Marketing efforts around disposable pads also tend to capitalize on and reinforce the social imperative to keep menstruation secret (Punzi & Werner, 2020).

Waste generation is a significant drawback of disposable pads. Estimates are that disposable pads generate 113,000 tons of waste per year in India (Achuthan et al., 2021; Sinha & Paul, 2018). Although this is only a tiny portion of the total solid waste generated in India, proper disposal of these sanitary pads is still a national challenge (Berthault et al., 2023; Sinha & Paul, 2018). The Indian government promotes incineration as the appropriate disposal method, but many menstruators do not have access to incinerators. India also lacks standards and oversight to ensure that incinerators meet design and emissions standards, which could create additional safety and pollution concerns (Elledge et al., 2018; Sinha & Paul, 2018). Particularly in rural areas, menstruators who use disposable pads bury, burn, or throw them into pit latrines (Achuthan et al., 2021). Disposal practices are heavily influenced by cultural norms related to menstrual blood, such as the belief that if menstrual blood is observed, burned, or found by animals, the menstruator will become infertile (Elledge et al., 2018). Buried disposable pads can negatively impact soil quality (Achuthan et al. 2021), and cities in Tanzania and Kenya have reported frequent sewer blockages due to disposable sanitary pads (Elledge et al., 2018). Proper disposal of single-use sanitary pads requires particular attention to supportive facilities (Elledge et al., 2018). Recent developments in disposable pads have focused on biodegradable options (Berthault et al., 2023).

Programs focused on supplying free or affordable disposable pads often face sustainability problems due to inconsistent supply (Chakravarthy et al., 2019; Wilson et al., 2014). For example, India's government program to launch a biodegradable disposable pad brand has been plagued by this problem (Singh et al., 2022b). Programs to decentralize disposable pad production with small machines to make disposable pads have faced barriers

from high costs due to insufficient economies of scale and inconsistent quality (Berthault et al., 2023). A study also found inexpensive disposable pads in India often contain chemicals that can cause rashes and discomfort (Berthault et atl., 2023).

Reusable Sanitary Pads

Reusable sanitary pads have been proposed as a more environmentally-friendly alternative to disposable pads because they can be reused (Ramesh, 2024; Elledge et al., 2018). There are several social enterprises and NGOs in India involved in the production and sale of reusable pads (Punzi & Werner, 2020). Some of these programs include elements to improve the economic condition of women by providing opportunities to make reusable pads with locally-sourced materials and to sell them through women-run microenterprises (Punzi & Werner, 2020; Chakravarthy et al., 2019).

The few studies involving reusable pads have found that menstruators in low-resource contexts who are introduced to reusable pads find them more comfortable more absorbent than traditional cloth (Achuthan et al. 2021; Hennegan, 2020; Sommer et al., 2018; Hennegan et al., 2017; Shah et al., 2013). However, in one of these studies in Uganda, reports of soiling clothing and missing activities did not differ between reusable pads and traditional cloth, raising the possibility that general responses about the reliability of reusable pads may have been affected by desirability bias (Hennegan et al., 2016). A systematic review found menstruators' worries about discomfort, movement, and odor were generally the same whether they used reusable pads, disposable pads, or traditional cloth (van Eijk et al., 2021).

Barriers to uptake of reusable pads include the perception that they are not hygienic, and the need to thoroughly wash and dry the pad. In this sense, reusable pads do not offer an advantage over traditional cloth, because they must be cared for in a similar way. The high initial cost of reusable pads can also be a barrier, even when long-term cost savings is evident (van Eijk et al., 2021)

-Perception of Reusable Sanitary Pads: Hygiene

An intervention providing reusable sanitary pads in India will likely have to confront the perception that reusable menstrual materials are unhygienic. As a corollary to the common belief that disposable sanitary pads are the ideal menstrual hygiene material, many menstruators associate reusable (cloth) sanitary pads with the traditional practice of reusing cloth as an absorbent, which they view as unhealthy and un-modern (Amin et al. 2022; Achuthan et al. 2021; Scott et al., 2013). In some studies in India, even menstruators who used traditional cloth perceived that it was unhygienic to reuse it, a perception that could extend to reusable pads as well (Kansal et al., 2016).

The literature lacks a consensus about how to combat the perception that reusable products are not hygienic. Global health data is lacking to standardize what constitutes a "good" menstrual health practice, including preferred absorbents or frequency of washing and changing (Coast et al., 2019; Hennegan, 2017; Phillips-Howard et al., 2016; Sumpter & Torondel, 2013). Generally, studies that consider reusable cloth pads as a hygienic option specify that they must be washed with soap and water and dried in sunlight (Samanta & Sarkar, 2022; Ha & Alam, 2022; UNICEF, 2019b; Santra, 2017; Sarkar et al., 2017; Das et al., 2014; Sumpter & Torondel, 2013). While these care requirements are intuitive, definitive data is lacking to

establish a connection between particular menstrual materials and negative health outcomes like infection (UNICEF 2019b; Garikipati & Boudot, 2017; Santra, 2017; Sumpter & Torondel, 2013). For example, Santra (2017) found no statistically significant difference in infections rates in a Kolkata slum between old cloth and disposable pad users but did find fewer infections among menstruators who washed more often and washed with soap. In a systematic review, van Eijk et al. (2021) found that self-reported measures of itching and burning were more common with single-use than reusable pads. Achuthan et al. (2021) found that a reusable pad made from banana fiber that had been used for three years had a similar microbial load to an unused banana fiber pad, suggesting that reusable pads can be hygienically used if appropriately cared for. On the other hand, Bhattacharyya et al. (2015) found fewer infections in adolescent girls in a Kolkata slum among girls who used disposable pads exclusively rather than cloth, and Das et al. (2015) and Torondel et al. (2018) found infections were more prevalent with cloth absorbents in hospital-based studies in Odisha, India. Torondel et al. (2018) found infections were associated with drying materials inside and storing materials in a "toilet compartment" (Torondel et al. 2018). Whatever health risks are posed by traditional cloth will also be posed by reusable pads, and their hygienic use will depend on proper care (UNICEF, 2019b).

- Perception of Reusable Sanitary Pads: Care and Use

Menstruators have cited the burden of washing and drying reusable pads as a reason not to adopt them, when they perceive disposable pads as more convenient (Achuthan et al. 2021; UNICEF 2019b). On the other hand, in a Thailand study, menstruators found it easier to wash reusable pads than to find a place to dispose of single-use pads (van Eijk et al., 2021).

Thakur et al. (2014) found most young women who used disposable pads in a Mumbai slum washed them before disposal because they feared infertility if the used pad was found by an animal. These kinds of existing practices around washing disposable pads could support wider adoption of reusable pads.

High levels of secrecy and shame around menstruation can contribute to improper care of reusable materials when menstruators are embarrassed to wash or dry pads where others can see them (Achuthan et al. 2021; UNICEF, 2019b; Caruso et al., 2017; Sinha & Paul, 2018; Mason et al., 2013). Studies have found barriers to proper washing of cloth menstrual products such as reusable pads if menstruators lack access to sufficient supplies of water and soap (van Eijk et al., 2021; Wilson et al., 2014). Due to social pressure to conceal menstruation, menstruators in India may dry cloth absorbents indoors or keep them in places where they do not dry thoroughly, such as in drawers or under mattresses. Samanta and Sarkar (2022) found that only 22% of their sample of Muslim adolescent girls in a rural area of West Bengal dried their reusable materials outdoors in sunlight (p. 182). McCarthy and Lahiri-Dutt (2020) describe a case study of a woman who refused to reuse cloth materials because she lacked a private place to wash and dry them in a crowded Delhi slum. In a study in neighboring Bangladesh, where menstruators may face similar pressures to menstruators in West Bengal, Ha and Alam (2022) found that 7% of urban and rural adolescent girls who reused cloth as a menstrual material did not use soap to wash it (p. 12). They also found that 40% of urban girls and 54% of rural girls did not dry their cloth in an open, sunny place (Ha & Alam, 2022, p. 8). In a study of a reusable pad intervention in Uganda, girls were comfortable washing pads at home, but felt embarrassed to dry pads in the open (Hennegan et al., 2017). Girls in the study commonly

covered the pad with another cloth while drying, which the authors speculated contributed to an unexpected finding in the quantitative analysis that drying the pad outside resulted in poorer discharge and odor outcomes (Hennegan et al., 2017). In India, monsoon season can also negatively impact menstruators' ability to thoroughly dry reusable pads (van Eijk et al., 2021; Caruso et al., 2017). Wilson et al. (2014) suggest that product designs that are not immediately identifiable as menstrual products could mitigate perceived constraints on drying products outdoors. They also suggest drying menstrual materials in a container on the roof to conceal them from public view.

When menstruators are provided with free pads, they may still lack practical knowledge about how to use them hygienically (Garg et al., 2022; Garg et al., 2021; Tellier et al., 2020). Pad provision projects must therefore be accompanied by training to ensure that menstruators use the products properly and the products have the intended effect of improving menstrual self-efficacy (Austrian et al., 2021; Ntuyeko, 2021; Tellier et al., 2020).

-Perception of Reusable Sanitary Pads: Environment and Acceptability

Authors that have studied the acceptability of reusable pads in India have identified affordability and environmental sustainability as factors promoting the uptake of reusable pads by study participants (Achuthan et al. 2021). Berthault et al. (2023) found the appeal of the environmental case for reusable products significantly weaker than the affordability case among low-income menstruators.

Many studies show that menstruators are likely to adopt reusable pads as part of a cost-savings strategy. For example, Achuthan et al. (2021) found women in urban areas of India

who were provided with reusable pads used them at night but continued to use disposable pads during the day, with 74% of urban menstruators saying they would continue to use reusable pads as part of their menstrual health strategy (p. 11). Globally, van Eijk et al. (2021) found high levels of uptake of reusable pads by study participants when they were offered, although uptake was lower in populations that already used disposable pads at high levels. Studies in Africa have found high acceptability for reusable pads once menstruators are educated about the cost-savings, environmental benefits, and manner of use (Nelson, 2023; Miiro et al., 2018; Scott et al., 2013). Berthault et al. (2023) found that when low-income menstruators from Kenya, Senegal, Bangladesh, and Pakistan were fully informed about cost, 47% would incorporate reusable pads into their first-choice menstruation management strategy. In India, Garikipati and Boudot (2017) identified the target market for reusable pads in Hyderabad as women who had not adopted disposable pads due to cost, comfort, or cultural beliefs but who were willing to consider changing absorbents, which was 57% of women who were still using traditional cloth (p. 44). Reusable pads may be more popular in rural areas of India: Achuthan et al. (2021) found that 62% of rural menstruators who were introduced to reusable pads planned to use them exclusively in the future, while 88% said they would continue to use reusable pads as some part of their menstrual health strategy (p. 9).

To promote acceptance of reusable sanitary pads, UNICEF (2019b) advises consideration of thickness, color, absorbency, softness, and drying time in product design. Designs that resemble disposable sanitary pads may appeal to younger menstruators who want a modern menstrual absorbent. On the other hand, foldable pads used more like traditional cloth may be more comfortable and familiar for older menstruators, who may also appreciate that these

designs blend in more easily with other laundry. Shah et al. (2013) found that menstruators in a rural area of Maharashtra who gave up traditional cloth for reusable flannel sanitary pads found them more comfortable and liked that the red color of the cloth hid stains.

-Market Potential for Reusable Pads

Although they are more expensive than disposable pads, reusable cloth pads can represent a significant cost savings over time because they can be reused for one to three years (van Eijk et al., 2021). The mean reported lifespan for reusable pad brands is 2.9 years (van Eijk et al., 2021). Women may be more willing to pay more for reusable pads after having the opportunity to handle and feel the product (van Eijk et al., 2021). Typical reusable pad interventions provide menstruators with between 4 and 9 pads and expect menstruators to wash pads during a single cycle (van Eijk et al., 2021). But Berthault et al. (2023) advise that market-based distribution strategies should sell reusable pads in smaller packs of one or two, which allows menstruators to try the pads with less financial risk and incorporates the reality that low-income menstruators are likely to combine different materials into their menstruation management strategy.

Reusable pads have not yet been successful commercially on a large scale (Berthault et al., 2023). Institutional donors buy more than 80% of the reusable pads that manufacturers sell (Berthault et al., 2023, p. 53). Berthault et al. (2023) believe private sector investment has been limited because the reusable nature of the pads limits the size of the market compared to disposable products, which must be purchased again and again. The absence of repeat business is also a barrier to convincing small shopkeepers to stock reusable pads (Berthault et al., 2023). They also believe underinvestment in reusable products is tied to the complexity of MHH, which

requires not only exposure to a range of products for different needs but also education to address taboo and stigma, before menstruators are willing to pay for new products and engage in word-of-mouth marketing (Berthault et al., 2023).

Successful small-scale marketing strategies for menstrual products build on existing distribution networks of related health products or informal channels such as women's self-help groups (Berthault et al., 2023). Companies have not found it cost-effective or attractive to sales agents to create sales networks specifically for menstrual supplies (Berthault et al., 2023). Berthault et al. (2023) also argue that decentralized production of reusable pads often leads to lower-quality, more-expensive products in the name of providing income for a few women (Berthault et al., 2023).

Walson Industries in India has developed small-scale markets for disposable pads with a three-stage strategy: first, having door-to-door promoters give free packs; then returning in the next two months to sell packs at a discounted price; and finally offering packs through shops once consumer interest has been established (Berthault et al., 2023). Other inexpensive disposable brands provide incentives to shopkeepers to sell the product (Berthault et al., 2023). Adapting these marketing strategies for reusable pads would have to account for the lack of repeat purchases that comes with reusable products.

Pillar Three: Accurate Knowledge About Menstruation

Worldwide, studies document that menstruators lack accurate knowledge about menstruation (Chandra-Mouli & Patel, 2020; Shah et al., 2019; van Eijk et al., 2016). Particularly in low-resource contexts in India, where cultural taboos are strong and school curriculums are

inconsistent, menstruators commonly lack basic knowledge about how and why bleeding occurs (Chandra-Mouli & Patel, 2020; Chothe et al., 2014). A growing evidence base supports a conclusion that although menstruators traditionally learn about menstruation in the family, they do not always receive knowledge sufficient to confidently and pragmatically manage menstruation; and they are not always provided with the materials they need, for cultural or economic reasons (Sommer et al., 2015). This research has helped to create a consensus that public institutions, including schools, need to take on a greater role in providing public health guidance (Sommer et al., 2015).

Effect of Education on Stigma and Restrictions

The research on knowledge deficits generally assumes that accurate knowledge will reduce the stigma that researchers associate with behavioral restrictions around menstruation (Hennegan et al., 2021). But the evidence supporting this presumed outcome is mixed. Studies do generally find that whatever the study identified as "good" menstrual hygiene consistently correlates with a mother's education level as well as with socio-economic status (Samanta & Sarkar, 2022; Ha & Alam, 2022; Boral et al., 2020; Sarkar et al., 2017; Das et al., 2014). In some studies, higher education levels and greater knowledge about menstruation have been associated with lessened stigma around menstruation (Amin et al., 2022; Hennegan & Montgomery, 2016). But Hennegan et al.'s (2017) study among Ugandan school girls reported no improvements in shame, self-confidence, or insecurity measures after MHH-focused education (Hennegan & Montgomery, 2016). Notably, however, qualitative follow-up in the same study reported that even though quantitative shame and stigma measures were not affected by education, education did increase the comfort of participants discussing

menstruation with family and peers, which could be expected to lead to decreased shame and stigma over time (Hennegan et al., 2017). Hennegan (2020) notes that education alone is unlikely to change behavioral norms around menstruation, and broader advocacy efforts will be necessary. Manorama and Desai (2020) argue that the assumption "that awareness of menstruation as a natural physiological process will remove silence, stigma and shame is simplistic and grossly inadequate" (p. 519).

Studies of education interventions have generally reported improvements in knowledge about menstruation at short-term follow-up, but some have raised doubts about the persistence of knowledge over time without reinforcement (Majeed at al., 2022; Light et al., 2021; Ntuyeko, 2021; Pal et al., 2017; Hennegan & Montgomery, 2016). The studies also commonly fail to connect improved knowledge with behavior change or psychosocial outcomes (Light et al., 2021; Hennegan, 2017; Hennegan & Montgomery, 2016). There are some exceptions, notably involving more intensive education interventions: Pal et al. (2017) associated a significant reduction in self-reported symptoms of infection with a weekly education program provided over six months; Austrian et al. (2021) found a 25-session sexual and reproductive health curriculum improved the perception of norms around gender equality and sexual health knowledge among Kenyan school girls. Reviewing studies, Sumpter and Torondel (2013) found general support for a conclusion that education can support positive behavior change like bathing more, using pads, and caring for reusable materials hygienically.

In India, a study comparing the effect of school-based interventions in three Indian states also had mixed results. The study looked at several schools, some of which had been the focus of WASH in Schools/MHH interventions supported by UNICEF ("model schools") and

others that had received no intervention. The model schools provided menstruation and puberty education as well as in-school WASH facilities and access to menstrual materials. In all three states, girls had better knowledge about menstruation in model schools and were more likely to cite their teachers as a source of information. However, while the model schools intervention was associated with fewer menstrual restrictions being practiced in the studied schools in Maharashtra and Tamil Nadu, there was no difference in restrictions being practiced between the schools that received the intervention and those that did not in the less developed state of Chattisgarh (Sivakami et al., 2019). This result suggests that additional social and cultural factors, such as socioeconomic status or exposure to mass media, may also affect how effective education can be as a factor in changing deeply-rooted practices and beliefs.

Content of Education

Most education interventions focus on knowledge about puberty and how the human body functions. Many argue governments are responsible for ensuring this type of basic reproductive health education is provided to all children in schools, but that proposition has been controversial in India (Muralidharan & Singhania, 2022; Sommer et al., 2015). Although the Ministry of Health and Family Welfare launched a School Health and Wellness program in 2020 that incorporates components of MHH, national policies in India can be inconsistently implemented. Muralidharan and Singhania (2022) argue that "menstrual hygiene" and menstrual products nevertheless can be an effective entry point for general reproductive health education in India, particularly among adolescents, because "hygiene" is relatively less controversial than similar topics addressed as "sexual health."

Accurate knowledge can also allow menstruators to use menstruation as an indicator of their own health. Fertility and reproductive health are the most important practical applications of accurate knowledge for menstruators and their families. UNICEF (2020) has proposed that the key indicator of MHH knowledge for purposes of monitoring program efficacy is the connection between menstruation and fertility, as measured by correctly identifying the time a woman is most likely to get pregnant in relation to her menstrual cycle. Accurate knowledge about menstruation is also important to help menstruators avoid normalizing their own experiences and suffering pain and heavy bleeding without seeking help (Armour et al., 2021).

Several products exist to support MHH education. EcoFemme (n.d.) sells crocheted models of the female reproductive system and external genitalia for use in this type of education. Most written educational materials covering MHH are targeted at adolescent girls (Straight Talk Foundation, n.d.; Grow and Know, n.d.; Menstrupedia, n.d.; WASH United, n.d.). For the Indian context, Menstrupedia's and WASH United's books have been developed in Hindi, Bengali, and other languages (Menstrupedia, n.d.; WASH United, n.d.).

Education can also expose menstruators to a variety of menstrual materials. Lack of exposure to choices is one reason menstruators fail to adopt environmentally-friendly options like reusable pads. As part of their study in India, Achuthan et al. (2021) conducted "usage orientation workshops" to introduce menstruators to a variety of menstrual absorbents and how to care for them before providing reusable pads. This study ultimately found that 62% of rural users and 23% of urban users planned to switch to reusable pads exclusively (even though the majority had started out using disposable pads) and the vast majority in each category

planned to continue to use reusable pads in some way (Achuthan et al. 2021, p. 9). EcoFemme has developed a participatory workshop to allow menstruators to discuss the benefits and drawbacks of different materials—including cloth, disposable pads, reusable pads, menstrual cups, and tampons—as an introduction to the use of their reusable pads. Chakravarthy et al. (2019) faulted workshops like these for exposing menstruators to products that are not available to them, but other programs have found that exposure to different kinds of menstrual materials, regardless of availability, is an effective way to open space for conversation about taboos (Fahs & Perianes, 2020). This appears to be the spirit of the EcoFemme workshop, which they believe promotes the human rights principles of choice and agency over promoting a specific product. Interventions to teach menstruators to make home-made reusable cloth pads have had mixed results, due to lack of materials and sewing equipment, at least in the absence of menstruators organizing themselves into cooperatives to share resources (Hennegan et al., 2017; Wilson et al., 2014).

Hennegan (2020) proposes that any education effort to improve knowledge around menstruation include not only basic biological education, but also practical menstruation management strategies, such as pain management and cycle tracking (Hennegan et al., 2017). Participants in an intervention in Uganda indicated that non-medication pain management strategies and tools for tracking the menstrual cycle were useful skills introduced in training (Nalugya et al., 2020). The same intervention, though it offered pain medication vouchers, was ineffective in countering popular perceptions that pain medication causes cancer and infertility. Kannan and Claydon (2014) reviewed the efficacy of menstrual pain relief strategies and identified two effective strategies, heat and yoga, that can be taught in low-resource contexts

when pain medication is unavailable or undesirable for other reasons. Studies suggest that menstruation-related pain can be a significant barrier to participating in daily activities, so knowledge of pain management strategies has the potential to make an immediate positive impact in menstruators' lives (van Eijk et al., 2016).

Pillar Four: Supportive Facilities

Worldwide studies document that menstruators lack access at school, at work, and at home to facilities that support hygienic menstruation (Lane et al., 2022; Alexander et al. 2014). Supportive facilities require, at a minimum, water and soap, private spaces to clean and change, and places to dispose of or wash and dry used menstrual materials (Lane et al., 2022; Alexander et al. 2014). Low-resource contexts in India particularly lack supportive facilities (Chakravarthy et al. 2019; Caruso et al., 2017). In a recent review of toilet facilities in West Bengal, Ganguly and Satpati (2022) found that most menstruators do not feel comfortable using public and workplace toilet facilities because they are not clean or secure, which likely contributes to work absences and discomfort during menstruation. Similarly, school girls report absences during menstruation due to the lack of supportive facilities at school.

Open defecation is common in India due to the scarcity of adequate toilet facilities (Panda et al., 2024). Having to manage toilet functions in the open has additional detrimental impacts on menstruators, such as a higher risk of sexual violence and dehydration caused by minimizing water intake in order to limit the need to urinate. Caruso et al. (2020) found in testing their menstrual insecurity index in Odisha, India, that lack of access to a functional latrine, an enclosed bathing space, and a water source at home were some of the major contributors to a negative menstrual experience. Panda et al. (2024) found a similarly

detrimental correlation between open defecation and menstrual hygiene. Das et al. (2014) found that lack of access to a private toilet was a primary reason menstruators in West Bengal reported self-confinement during menstruation, although tradition was also a contributor. Conversely, access to a latrine at home correlates with better menstrual hygiene (Ray & Dasgupta, 2012).

Global efforts are focused on promoting designs for "female-friendly" toilets through participation of the people who will be using them (Schmitt et al., 2021; Schmitt et al., 2018). This effort started with crisis situations and refugee camps and is occasionally used at schools (Schmitt et al., 2021). Common recommendations include incorporating a discrete means for sanitary pad disposal, such as dustbins with lids or a tube connected to a covered bin outside the building (Schmitt et al., 2021; Schmitt et al., 2018, Elledge et al., 2018). The use of these facilities should be described with clear signage appropriate for the user population (Elledge et al., 2018).

Studies have documented that the socio-cultural imperative to conceal menstruation can significantly impact whether and how menstruators will use WASH facilities. For example, even when toilet facilities are available, menstruators may refuse to use them during menstruation due to fears of staining the toilet with blood (Schmitt et al., 2018). Menstruators consulted on facility design often express a preference for multi-use facilities so that others cannot identify whether a user is accessing the facility for menstruation-related or other purposes (Schmitt et al., 2021; Sommer et al., 2018). Furthermore, many menstruators associate using toilet facilities with safety risks, including harassment and sexual assault, so

participatory design processes commonly focus on security measures like lighting, secure doors, and interior door latches (Schmitt et al., 2018).

Both in public spaces and at home in India, men are likely to make decisions about the design and function of toilet spaces (Mahon et al., 2015). Sensitizing male decisionmakers to the needs of menstruators therefore may be important to improving the capacity of these facilities to meet menstruators' needs (Schmitt et al., 2021).

Introduction to Community and Context

The FLŪME Foundation is a U.S. 501(c)(3) that provides funding and guidance for the local partner, including oversight and initial funding for this project. The local partner is an NGO based in Kolkata, West Bengal. The local partner has had activities in several urban informal settlements in Kolkata since 2007 where it currently operates community schools and tailoring schools. In this capacity it employs community workers and teachers who work daily in their assigned communities. It also has a social enterprise tailoring and handicraft company in Kolkata that completes custom jewelry and textile projects. The employees of this enterprise come from surrounding slums in Kolkata and have the skills to manufacture the reusable sanitary pads for this project. The local partner also runs a school in a rural village area of West Bengal. In this capacity the local partner employs teachers and other school staff and has community contacts through students, alumni, and their parents.

For many years prior to the COVID 19 pandemic, the local partner ran annual medical camps to bring health care to the urban and rural communities it serves. These camps offered ad hoc MHH education as volunteer interest and availability permitted. A U.S.-based medical camp volunteer brought a small number of reusable sanitary pads to one camp, and the positive reaction to these pads inspired the local partner to pursue this project.

This project will initially target the rural and urban communities in West Bengal where the local partner has existing contacts. The project will use the local partner's existing staff and infrastructure to implement the project as an integration into current activities. Official data

about the population of these communities is limited, and the following descriptions are based on the observations and experience of the local partner and the FLŪME Foundation.

Rural Area of West Bengal

The rural village area targeted by this project is approximately 150 kilometers from Kolkata, and it can take approximately four hours to travel there by car. The population typically lives in extended family groups in compounds made of earth buildings. These compounds typically include a pit toilet in a separate building. The local partner's school has running water and flush toilets.

Agriculture is the primary occupation of the people, who grow crops, primarily rice and potatoes, for themselves and to sell at local markets. Women are primarily responsible for the home, though they may also work in the fields as necessary. Education levels and literacy are extremely low generally but are likely to be higher among those in contact with the local partner's school. The socio-economic circumstances of the surrounding area are likely to be associated with poor menstrual knowledge and hygiene (Sarkar et al., 2017; Ray & Dasgupta, 2012).

The population mainly comes from India's scheduled tribes. Scheduled tribes are officially-designated people groups outside of the traditional Hindu caste system. They are recognized as among the most socio-economically disadvantaged groups in India and receive some official protections. They may be culturally influenced by Hindu beliefs and may have other spiritual practices rooted in local animist beliefs.

Access to formal health care in the area is extremely limited. The nearest ill-equipped government hospital is approximately fifteen miles away, and motorized transportation is limited. Women likely seek traditional medicines to treat sexual and gynecological problems, including menstruation-related symptoms (Modak et al., 2015). Many medical issues go untreated (Panda et al., 2024). Mishra et al. (2017) found that girls in a rural area of West Bengal reported having more untreated gynecological problems than girls in an urban area.

Urban Informal Settlements of Kolkata, West Bengal

Residents of informal settlements in Kolkata, colloquially known as slums, come from different geographic areas and may cluster with migrants from the same area. Many are migrants from Bangladesh. Informal settlements are under the control of a powerful boss to whom rent is paid and who makes decisions about life in the settlement. Toilet and washing facilities are often communal.

The urban slum communities where the local partner works likely include more practicing Hindus than the rural area. They are likely lower caste but may be higher caste and poor. There also may be more practicing Muslims. More women in urban informal settlements may earn money to support their families, such as by working as hired help in wealthier households. Their time to participate in programming can be extremely limited due to their obligations to employers and their duties managing their own households.

Formal education levels are low, but the population has likely been exposed to more mass media, commercial products, and other life experiences than rural residents, which may affect their knowledge and understanding of menstruation. One study from a Kolkata slum

found that friends were the primary source of information about menstruation (Bhattacherjee et al., 2013), but other studies still identified mothers as the primary source (Taklikar et al., 2016; Santra, 2017). These contrasting studies suggest more varied sources of information about menstruation in urban contexts.

Urban residents are physically closer to medical care but may be unable to access it for economic reasons, so instances of untreated medical conditions are likely still quite high. Pal et al. (2017) found that more than half of adolescent girls in their study in a Kolkata slum reported symptoms of untreated reproductive or urinary tract infections.

Stakeholder Analysis

Type of Stakeholder	Name of person/org and short description	Relationship to project	Incentives, motivations, risks	How to engage
NGO	Local partner; Social enterprise tailor associated with local partner	Implementer	Conceiver of project; competing priorities and projects; focus on income generation and market potential; competing focus with school operating needs	Build credibility; explain recommendations; tailor recommendations to market focus i.e. why education is important for marketing
NGO	FLŪME Foundation, Director	Funder; connection to local partner; medical/public health adviser	Limited funding; interested in health data and connection to SDGs	Consult at every stage; plan for funding; include public health focus
NGO	Others working on MHH in India, i.e. EcoFemme, Menstrupedia, WASH United	Source of ideas, learning	Increasing network and co-learning possibilities; potential competitors	Technical assistance; curricula; share learnings
NGO	Members of local partner's business network	Source of potential business	Potential interest in incorporating MHH into programs and need for materials source	Create and share promotional video
Government	Political leaders	Activities depend on approval	Maintaining influence and power	Rely on judgment of local partner
Community	Religious and other local leaders	Activities depend on approval	Maintaining influence and power	Rely on judgment of local partner
Community	Male community workers employed by local partner	Invite women to participate in training; connect women with local partner	Discomfort with topic; social stigma; lack of motivation; disinterest in perceived women's issue	Provide informational training on MHH and product to demonstrate importance

Type of Stakeholder	Name of person/org and short description	Relationship to project	Incentives, motivations, risks	How to engage
Community	Female teachers employed by local partner	Direct beneficiaries of free pads; potential customers; potential entrepreneurs	Expectation of benefit; discomfort with topic; social stigma may prevent sharing information; potential for additional income	Received free pads, training
Community	Women and girls who have participated in community partner's other programs such as community school or tailoring program	Direct beneficiaries of free pads; potential customers; potential word of mouth marketers; potential entrepreneurs	Expectation of benefit; discomfort with topic; social stigma may prevent sharing information; potential for additional income	Received free pads, training
Community	Women and girls who do not have a relationship with local partner	Potential customers	Distrust; expectation of free benefit; discomfort with topic; social stigma inhibiting communication; feeling excluded	Conduct additional training and product orientations; reach with community workers
Community	Men	Observing project; may provide funds for product purchase	Expectation of free benefit; possible disinterest in/opposition to topic; distrust	Discussion; engagement by male community workers employed by local partner
Community	Adolescent boys	Observing project	Expectation of free benefit; possible disinterest in/opposition to topic	Future training; engagement by male community workers employed by local partner
Community	Community health workers (both government and other NGOs)	Observing project	Need to align; may see project as threat to authority; demands on time/resources	Identify these workers, inform and seek feedback; keep updated
Community	Shopkeepers	Observing project	May see project as threat to income; possible business partners	Inform; ask about products/supplies

Needs Assessment

The local partner held two small discussion groups in the rural area in June 2023 to introduce the idea of reusable sanitary pads. A further needs assessment was conducted in February 2024 in conjunction with introductory MHH workshops and free reusable pad distribution. The assessment collected information about menstrual behaviors and attitudes in the target communities through group discussions at workshops, individual interviews, a multiple-choice survey, observations, and market analysis activities.

Methods

Two group discussions were held in the rural village area in conjunction with introductory MHH workshops at the local partner's school. The first involved 15 adolescent girls, and the second involved 33 women in their 20s and 30s who were mothers of children at the school. In Kolkata, group discussions were held in two urban informal settlements, SM Colony and Sardarpara, in conjunction with a workshop. The SM Colony workshop was attended by 17 women in their 20s and 30s associated with the local partner's tailoring school. The Sardarpara workshop was attended by 30 women and girls with a wide range of backgrounds and ages from teenagers to post-menopausal. Sessions were conducted with a Bengali translator.

Two group discussions were held with teachers to introduce reusable sanitary pads without an accompanying workshop. In the rural area, nine teachers at the local partner's school attended. Another discussion group was held with 15 teachers in an urban Kolkata elementary school associated with the local partner. These discussions were held in English.

Five interview subjects were selected for convenience: one adolescent girl who could stay to talk after dark in the rural area because she lived nearby; two daughters-in-law from the same household in the rural area agreed to be interviewed because they wanted to talk to a U.S. doctor who was visiting with the project team; and two women in SM Colony and Sardarpara who were available because they did not have other obligations after a workshop. All interviews were conducted with a Bengali translator.

Topics for data collection were guided by program monitoring guidance from the WHO and UNICEF (WHO/UNICEF, 2018; UNICEF, 2020), as reflected in a proposed survey that was incompletely implemented for this needs assessment, as described below. A copy of the proposed survey is included as Appendix A. Participants in the four MHH introductory workshops also completed a 12-question multiple choice test based on Menstrupedia's guidance for post-workshop evaluation, which also informed this needs assessment. A copy of the test provided is included as Appendix B.

Challenges Implementing the Needs Assessment

Experience adapting planned data collection methods to on-the-ground conditions offers some guidance for designing future evaluation instruments. The proposed survey at Appendix A was originally designed to be conducted verbally in one-on-one conversations with open-ended questions that could be qualitatively analyzed. This process was expected to require approximately 15 minutes per survey conducted by a female Bengali speaker, with additional assistance of a Bengali speaker/reader for translation and coding. This data-collection approach proved beyond the capacity of the project team due to time, personnel, and language constraints.

An attempt to give the survey in writing to the first workshop conducted with 15 teenagers in the rural area proved of limited usefulness although the girls could read and write. Based on observation and responses received, the Bengali translation of the survey did not appear to capture the sense of the original questions, and many participants expressed confusion. Based on observation, the detail participants provided in responses was also limited by the time it took participants to write, their embarrassment with the topic, and the inability to ask follow-up questions to clarify responses. The translation of responses to English categorized all but three surveys as providing the same responses, which could be due in part to participants sharing answers with each other and in part to the translator omitting nuanced differences in responses. This method would be of even more limited usefulness with less literate populations.

In subsequent workshops, data was gathered by verbally asking questions of the group, with a combination of volunteered oral responses and raised hands. While responses to this method were susceptible to the influence of others, it did provide a general sense of prevalent behaviors and attitudes relevant to the needs assessment. However, this method is unlikely to yield information helpful to future development of the program, which will require more detailed and individualized feedback about whether and how recipients are using the reusable sanitary pads they received and their impressions of the product.

The test based on Menstrupedia's materials included as Appendix B was translated to Bengali and provided to workshop participants to complete in writing after the workshop. At two workshops (one rural and the other in SM Colony), all participants were literate. At the other rural workshop, the questions were read aloud to assist those who could not read. At the

Sardarpara workshop, those who could not read did not complete the questions. While the test results provide useful generalizable information, it is likely that many participants relied on others' answers.

This experience highlights a difficulty gathering actionable data about attitudes and behaviors surrounding menstruation with written instruments in the target context, given language, literacy, and the sensitivity of the topic. Future evaluation efforts are more likely to provide actionable data to the local partner if they incorporate short, verbal conversations with project beneficiaries centered on indicators most relevant to the local partner's goal of developing a market for reusable pads. This method is consistent with the movement to develop flexible evaluation methods for complex contexts that prioritize storytelling and qualitative data (Partos, 2024).

Knowledge

Recent descriptive studies from low-resource contexts in both rural and urban areas of West Bengal indicate that menstruators commonly lack accurate knowledge about the cause of menstruation (Amin et al., 2022; Samanta & Sarkar, 2022; Boral et al., 2020; Paul et al., 2020; Manna et al., 2019; Santra, 2017; Sarkar et al., 2017; Taklikar et al., 2016). Commonly-reported misconceptions include that the blood comes from the urinary tract and that menstruation is the expulsion of impure blood or a divine curse (Paul et al., 2020; Manna et al., 2019; Santra, 2017; Sarkar et al., 2017; Das, 2014; Bhattacherjee et al., 2013).

In this needs assessment, all workshop participants who answered the question "Are periods healthy or unhealthy?" said they viewed menstruation as healthy. Only three of 95

respondents said menstruation was a curse and one said menstruation was a disease. One girl in a rural workshop said she had thought periods were a curse before a previous discussion with a representative from the local partner. All other respondents agreed that menstruation is a natural process. While these responses may reflect a desirability bias, they may also reflect improving education about menstruation in the target populations.

In both urban and rural areas, younger women in workshops reported receiving education about periods in school and being targets of other MHH interventions. Some girls in the rural area had received education at school before receiving a free pack of disposable pads. A few younger and more well-educated women in workshops expressed strongly positive attitudes about menstruation. Levels of knowledge appeared more mixed among older women. In the rural area, a woman in her 30s who had completed class 10 had learned about the biology of menstruation in a science class, but her younger sister-in-law, who had only completed class 9, first learned about the biology of menstruation from the workshop. Other reports of when girls learn about menstruation in school ranged from class 5 to class 11.

Prior to workshops, the vast majority of participants appeared confused by questions about how menstruation relates to fertility. At all workshops, participants were noticeably attentive to the information in the Menstrupedia video, which was played in Bengali. However, even immediately after the workshop, only 73% of respondents to the Appendix B test understood they could predict the date of their next period and only 61% understood when pregnancy is most likely to occur in relation to menstruation. Given the observed high levels of sharing answers among participants, it is likely that fewer women actually understood these concepts.

In both rural and urban contexts in West Bengal, menstruators are likely to learn about menstruation from their mothers (Boral et al., 2020; Paul et al., 2020; Mishra et al., 2020; Santra, 2017; Sarkar et al., 2017; Taklikar et al., 2016; Das et al., 2014). However, the information received may be extremely limited (Chandra-Mouli & Patel, 2020; Chakravarthy et al., 2019). The studies do not report consistent results about whether menstruators are likely to learn about menstruation prior to menarche, with some studies reporting that most girls do receive some early information about menstruation (Amin et al., 2022; Samanta & Sarkar, 2022; Boral et al., 2020; Santra, 2017; Das et al., 2014). None of the individual interviewees in this needs assessment knew about menstruation prior to menarche and expressed having been very surprised and afraid. One woman in the SM Colony workshop said she believed her twelve-year-old daughter was too young to learn about menstruation even though she described that her daughter was already experiencing signs of puberty. A few women in the SM Colony who appeared more highly-educated said their mothers talked to them before menarche. In the rural area, all teachers said they did not know about periods before menarche but thought that their students should be better informed.

Dealing with menstrual pain was a common topic of concern in all discussion groups. Many women took pain-relieving medication and knew about applying a hot water bag or towel to the abdomen as a pain relief method. Only a few participants were aware of yoga poses or exercise as a pain relief method prior to the workshop.

Materials

In studies published since 2020, use of disposable pads by rural menstruators in West Bengal has been relatively high from 45% reported by Boral et al. (2020, p. J11) to 80% reported

by Amin et al. (2022, p. 16). This needs assessment verified that menstruators in the rural village area do have access to disposable pads. All 15 of the young women in the first rural workshop said they used a combination of both reusable cloth and disposable pads. Of the 33 older women in the second rural workshop, 21 said they used disposable pads, 8 said they reused cloth, and 8 said they used single-use cloth, with some women answering to more than one method. To emphasize the availability of disposable pads, the project team found two different brands for sale at a small shop on a path in the rural area well off a main road, displayed in the shop's glass case.

The workshop participants in the urban informal settlements all insisted that they used disposable pads exclusively and expressed visible distaste for cloth and particularly for reusing cloth. But in an interview, one of these women acknowledged that she sometimes uses cloth when she cannot afford disposable pads, so responses in the group discussion may reflect aspiration more than reality. It also became clear during the workshop that many of the participants had tried the local partner's reusable pad but did not initially acknowledge ever having used anything other than a disposable pad. This is consistent with findings by Bhattacherjee et al. (2013) and Santra (2017) that nearly all menstruators in the studied Kolkata slums viewed disposable pads as the preferable menstrual absorbent, though it may also be due to translation weaknesses related to contrasting disposable and reusable sanitary pads. The studies do reflect that menstruators in Kolkata are more likely to use disposable sanitary pads than rural menstruators (Mishra et al., 2017). The most recent available studies on sanitary pad use in urban slum areas of Kolkata range in publication date from 2013-2017 and report that between 60% and 70% of urban menstruators in informal settlements used disposable sanitary

pads (Bhattacherjee et al., 2013, p. 88; Bhattacharyya et al., 2015, p. 346; Taklikar et al., 2016, p. 61; Santra, 2017, p. 711). Giving increasing use of disposable pads in India generally, this number is likely to be higher currently, confirming the likelihood that the women in the target communities do use disposable pads most of the time despite their cost (Sinha & Paul, 2018; Garikipati & Boudot, 2018; Elledge et al., 2018). The women who did discuss using cloth either said they did not reuse it or reused it only a few times before throwing it away.

The needs assessment also verified that disposable pad use is associated with higher education levels (Manna et al., 2019). All of the teachers involved in discussion groups in both urban and rural areas used disposable pads. In an interview, a community teacher in Sardarpara described that she began using disposable pads when she went to college and was spending more time out of her home. She expressed some reluctance to give up the convenience she associated with disposable pads.

More teachers had used or heard about menstrual cups than participants in other workshops. Many menstruators were curious about the cup the team brought to the workshop and wanted to examine it more closely. Menstruators in Sardarpara had the strongest negative reaction to the cup, likely because this workshop involved more older and less educated women.

Some participants in the rural workshops and the SM Colony workshop had previously received the first version of the reusable pad produced by the local partner. No other women indicated they had previously heard about reusable sanitary pads, with the exception of two urban teachers who said their daughters had received reusable sanitary pads at school

approximately five years ago. Menstruators who had previously received reusable sanitary pads were satisfied and described them as comfortable and effective. A few said the product needed to be longer for adequate coverage. This suggestion had already been incorporated into new designs. One woman in SM Colony affirmed that a reusable pad worked to absorb a heavy flow all day.

Some women who had not used the reusable pads were skeptical that they could absorb a sufficient amount of blood and thought they might be difficult to dry. Discussion participants particularly appreciated two features of the demonstrated product: (1) the storage pouch for used pads until they could be washed, which addressed concerns about convenience when away from home, and (2) the drying cloth, which can conceal the pad while drying and which one participant noted would also protect the pad from dust and dirt prevalent in Sardarpara due to the adjacent railroad.

Facilities

Ganguly and Sapati (2022) reported on the general lack of public toilet facilities in rural West Bengal. In studies from rural West Bengal that report access to a latrine at home, anywhere from 36.5% to 71.6% of study participants lacked access (Boral et al., 2020, p. J11; Sarkar et al., 2017, p. 585; Ray & Dasgupta, 2012. p. 296). A recent study from rural areas in neighboring Odisha found 54.3% of women used a pit latrine, 41.4% used open ground, 2.4% used flush toilets, and 1.8% used community pit latrines (Panda et al., 2024, p. 5). Santra (2017) found that 74% of Kolkata slum residents said that they had an adequate bathroom facility (p. 710).

Discussion groups did not yield much information on available facilities. The question from the Appendix A survey about menstruators' ability to wash and change in privacy while at home yielded answers about disposing of sanitary pads, which suggests the translation was inadequate. Based on observation, most family compounds in the rural area appeared to have an outhouse-style pit toilet. Das et al. (2014) found that lack of access to a private toilet, in addition to tradition, was a significant reason why menstruators in rural West Bengal isolated themselves during menstruation, but it is unclear from the needs assessment how common this situation might be in the target population. The local partner's school has washrooms with Western-style toilets and running water. In Sardarpara, all participants said they changed menstrual materials in the "washroom" and disposed of sanitary pads in the "dustbin." Based on observations and anecdotal descriptions of life in urban informal settlements, these responses likely gloss over many inadequacies of available facilities. The project team passed a four-stall shared toilet facility while walking to the location of the Sardarpara workshop. This shared toilet appeared relatively clean, but the team did not observe it being used by women.

Based on observation and discussion group responses, menstruators in both the rural and urban areas have adequate access to water and soap for washing. This is consistent with Santra's (2017) finding in a Kolkata slum environment. Everyone in the rural area who admitted to reusing cloth said they washed it with soap. Most women who reused cloth in the rural area said they understood it was important to dry the cloth outside in the sunlight to kill germs. Only three said they dried cloth inside to keep it hidden. Availability of drying facilities was not discussed in urban workshops because the participants did not acknowledge reusing cloth.

Two rural women were shown the written English instructions for washing and drying that the local partner developed to include in each pack of reusable pads. Despite the pictures included in the instructions and having received verbal instructions the day before, the women were not able to interpret the instructions, with the exception of a picture showing a pad drying on a clothesline.

Social Support

In West Bengal, menstruation is commonly associated with a wide variety of restrictions on the activities of women and girls, with differing levels of consequence, from restrictions on diet to religious activity (Samanta & Sarkar, 2022; Sarkar, 2017; Taklikar et al., 2016; Das et al., 2014; Bhattacherjee et al., 2013). Mishra et al. (2017) found that whether menstruators lived in an urban or rural area of West Bengal was not a significant predictor of the restrictions practiced.

Workshop participants and interviewees involved in this needs assessment universally agreed that menstruators should not participate in religious activities. This is consistent with studies showing that by far the most common practice in West Bengal is that menstruators do not participate in religious activity during menstruation (Amin et al., 2022; Boral et al., 2020; Sarkar et al., 2017). Otherwise, information gathered in the needs assessment generally confirmed published studies that show restrictions can vary widely based on family, geographic, religious, and other individual factors (Behera et al., 2015). For example, Boral et al. (2020) found in a rural area of West Bengal that less than 20% of menstruators practiced restrictions in areas other than religious activities (p. J12). On the other hand, Amin et al. (2022) found that 85% of menstruators in a rural area of West Bengal did not go outdoors during menstruation,

75% did not do housework, and 58% did not work in the kitchen (p. 17). Sarkar et al. (2017) found menstruators in rural West Bengal commonly restricted their diets or restricted hair washing during menstruation. Participants in workshop discussions commonly mentioned not eating sour foods. More complicated practices may be common in SM Colony, where an interviewee mentioned not being able to leave home on certain days and bathing before entering the kitchen. In the Appendix B test, nearly half of respondents said that you should not bathe during your menstruation, though some workshop participants and interviewees mentioned particular bathing requirements during menstruation.

The studies generally do not address how menstruators experience these restrictions. Two interviewees in this needs assessment expressed sadness at being excluded from family religious activities during menstruation, but many participants appeared confused by questions on this topic. For example, interviewees would say that life does not change when a girl gets her period, or that there is nothing she cannot do while menstruating, then describe not being allowed to participate in worship activities. This suggests that these behaviors are viewed as an integral part of life, and not conceived of as a "change" or "restriction." One rural interviewee felt that she wanted to rest more during menstruation but had to keep working. Misha et al. (2017) found restrictions were fewer with increase in age of the menstruator, mother's education level, and monthly household income, but the needs assessment did not gather any data to evaluate this in the target population.

Several circumstances related to the needs assessment point to potential weaknesses in the social support environment. Many women reported a physical incapacity during menstruation, and one woman said to general agreement, "nothing is good on those days."

This suggests women do generally perceive that menstruation interferes with their ability to participate in enjoyable activities. The majority of discussion group participants in both rural and urban areas generally endorsed a belief that menstruation should be kept secret, though in each group a small number of younger women emphatically insisted the opposite. Even when women felt they could discuss menstruation with trusted women, they felt uncomfortable discussing the topic with men and boys, and many girls felt uncomfortable discussing menstruation with friends. The local partner is reluctant to involve men and boys in educational activities for fear that alerting men to the content of information being provided to women will result in negative attention. In carrying out introductory MHH workshops and interviews, local translators were often embarrassed by words used for female anatomy or were unfamiliar with Bengali words for female anatomy. Participants and translators appeared to avoid using some words, including "period," which is a cognate in Bengali usage, instead relying on context to convey meaning. In Sardarpara, it appeared that some participants were not aware of the topic of the workshop before attending, which suggests that community workers for the local partner may have been uncomfortable communicating the reason for the workshop. The project team was told that the women making the prototype reusable pads initially did not know what they were making and thought they were making a new kind of cloth mask, which suggests male members of the local partner team may not be comfortable talking about menstrual products. On the other hand, participants, particularly in the teachers' groups, appeared to enjoy the opportunity to talk about periods and share experiences. Teachers had generally experimented with more management strategies and were curious about other options. This suggests that

creating spaces to discuss menstruation without shame has the potential to improve the social support environment.

Market Information

The project team purchased a six-pack of regular absorbency Stayfree disposable pads at the big-box-style Metro Market in Kolkata for 31.50 rupees. This appeared to be on the low end of what menstruators generally pay for disposable pads in West Bengal. In the urban discussion groups, the reported cost of a six-pack of disposable pads was between 40 and 60 rupees. Women in the rural area reported spending between 36 and 70 rupees for a pack of six disposable pads. The high-end of this range was identified by an interviewee as the "high quality" pads her parents purchased from a local doctor's office. In the isolated shop the project team visited in the rural area, the two brands available were marked by the manufacturer as selling for 25 and 35 rupees, but the team was unable to determine the cost asked by the seller due to the language barrier. Participants reported using between one and three six-packs of pads per month. Teachers in urban Kolkata reported that biodegradable pads are available for 50-60 rupees for one pad.

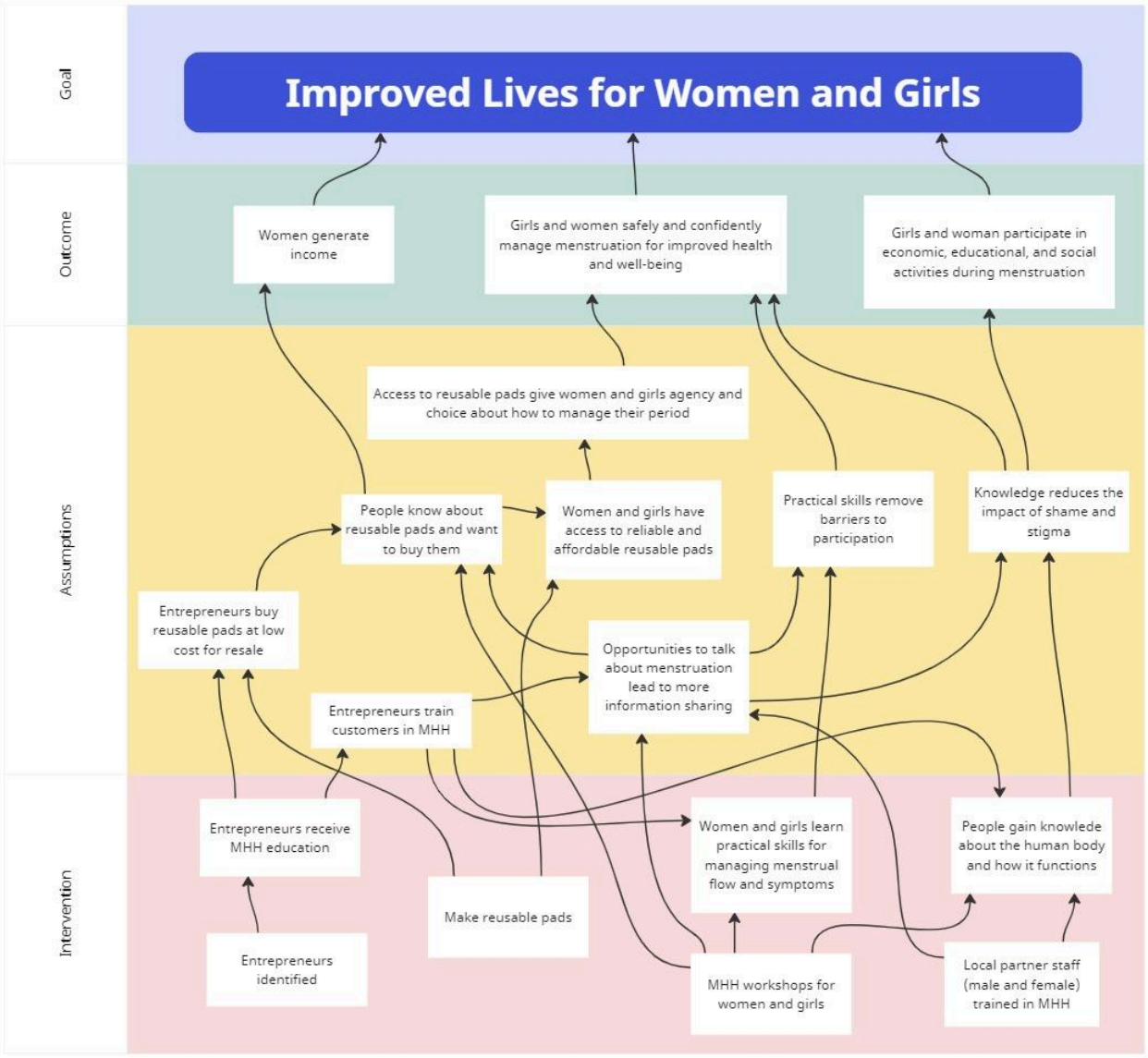
No discussion participants reported purchasing reusable pads, and the project team did not find any for sale in the wide selection available at Metro Market. EcoFemme appears to be the most prominent online seller of reusable pads in India. They offer a pack of four reusable pads online for 740 rupees (for a "light flow" pack) to 1140 rupees (for a "heavy flow" pack). A single pad costs 259 rupees. EcoFemme pads are available at retail outlets elsewhere in India, but their website does not list any retail locations in West Bengal. Days for Girls (n.d.), an international NGO that promotes reusable pads, lists New Life Charitable Trust (n.d.) as a

partner enterprise in Kolkata, but no additional information was available on either website or a wider internet search about a Days for Girls reusable pad program in West Bengal.

Teachers interviewed for the needs assessment appeared to recognize the environmental benefit of reusable pads as compared to disposable ones. One teacher viewed the availability of biodegradable pads as environmentally equivalent to reusing pads. Other discussion participants appeared more concerned with cost savings of a reusable product and wanted to know how much reusable pads would cost.

A Sirona menstrual cup was available at Metro Market for 200 rupees. Four teachers in discussion groups (1 rural and 3 urban) reported having used a menstrual cup. No one in the workshop discussion groups said they had used a cup. By those who used them, menstrual cups were seen as valuable when traveling because they can be worn for a longer period. Women who used them also described them as difficult to get used to. The vast majority of women were uncomfortable with the idea of a menstrual cup even if they expressed curiosity.

Theory of Change



This program to promote reusable sanitary pads expects that improved access to reusable menstrual materials and information will improve the lives of women and girls in the target communities by reducing menstruation-related barriers to full participation in educational, social, and economic life, thereby leading to better educational, employment, and overall health outcomes (Hennegan et al., 2019). Menstruation-related barriers to participation

will be addressed by the program's focus on improving menstruators' confidence in their own ability to manage menstruation effectively. Confidence will be improved with a focus on two pillars of MHH programming: (1) access to and knowledge about how to use reusable menstrual pads; and (2) knowledge about the biological causes of menstruation to disconnect behavior during menstruation from externally-driven shame and stigma. The focus on these pillars will ultimately improve the social support environment for menstruators by promoting community and family awareness of menstruation. The local partner's plan to recruit local women to sell reusable sanitary pads will also provide some women with the opportunity to earn income, thereby improving economic opportunities.

Each individual's menstrual health is the result of a complex interaction among antecedents—including social support, behavioral expectations, knowledge, physical environment, and product availability (Hennegan et al., 2019). The program aims to indirectly influence social support, behavioral expectations, and the physical environment by directly focusing on knowledge about menstruation and product availability. However, factors related to the social support environment, behavioral expectations, and the physical environment that are outside of the program's control may also hamper its effectiveness. For example, menstruators may not want to adopt reusable sanitary pads because changing, washing, and drying them is not possible, comfortable, or convenient in the facilities to which they have access. Even if some menstruators like reusable pads, they might not share information with friends due to taboos surrounding menstruation, which would hamper efforts to market the product. Changes in behavioral expectations, the social support environment, and the physical environment would be expected to occur gradually over time in conjunction with the program's activities.

Program Description and Recommendations

Goals and Objectives

Activities to promote reusable sanitary pads will empower individual menstruators with knowledge to make informed choices that will improve overall MHH practices in the community. The objective of the program is to use reusable sanitary pads as a starting place to open space for community conversations about menstruation that will improve the social support environment in the target communities so that, over time, menstruators will feel empowered to participate in their communities as they choose during menstruation (Patkar, 2020). As an intermediate objective, improved knowledge about menstruation and access to reusable sanitary pads will improve menstruators' self-confidence and self-efficacy during their menstrual period.

Activities

Reusable Pad Design and Production

In 2023, the local partner designed a reusable sanitary pad from locally-sourced materials that can be produced by a partner social enterprise that employs men and women from nearby slums in Kolkata to do sewing and tailoring work. Tests of the design showed it can absorb approximately four teaspoons of liquid. The reusable sanitary pad has a soft microfiber upper layer for comfort, two middle absorbent layers of organic cotton, and an outer layer of laminated cloth for waterproof leak protection. The local partner can produce a pack of four pads with a leak-proof carrying bag, a black cloth to cover the pad while drying, and clothespins to hang the pad for a production cost of 200 rupees.

The local partner gave the prototype product for testing to 17 women and girls in the rural area and ten women and girls living in urban informal settlements. In response to feedback from these users, the local partner modified the design to be longer and to include two snaps to better stay in place. In response to the literature review, the local partner purchased dark-colored microfiber material to better hide any staining. The local partner produced 600 reusable sanitary pads to prepare for the next phase of distribution at a cost to the project of $800. This initial production was funded by a grant from the FLŪME Foundation.

The local partner also designed packaging for retail sale of 4-pad packs. The packaging includes the value propositions of comfort, durability, environmental friendliness, and ease of use, with an insert describing instructions for using the pads. The initial run of packaging was designed in English. The local partner plans to produce future packaging with Bengali text.

MHH Workshops and Reusable Pad Distribution

The project team conducted four MHH workshops between February 11 and February 17, 2024 concurrent with the needs assessment activities discussed previously. Two workshops were conducted in the rural area using classrooms at the school operated by the local partner. Two workshops were conducted in informal urban settlements in Kolkata. All workshops were facilitated by a volunteer U.S. premedical student with the assistance of a female volunteer Bengali interpreter from the local partner. Male representatives of the local partner were present before and after the workshops.

All workshops were based on the Menstrupedia educational video “Hello Periods” Bengali language version (English version available at https://www.youtube.com/watch?v=qUNTtn1WPEw) with modifications as described below.

The workshop covered the three openings of the female genitalia, female reproductive anatomy, the uterus as the source of menstrual blood, and the menstrual cycle. The goal of this portion of the training was for participants to understand their bodies and see menstruation as an indicator of fertility. This portion of the training also attempted to decrease inhibitions by encouraging participants to speak aloud words referring to female anatomy, such as uterus and vagina, as suggested by Menstrupedia training materials. Non-medicinal pain relief techniques such as hot water bags and yoga poses were also reviewed.

The second portion of the workshop introduced reusable sanitary pads. Participants learned how to attach the pads to underwear, how to wash used pads by soaking the pad in cold water before washing with soap, and to dry the pads thoroughly outside before reuse. Participants were also able to see and feel the reusable sanitary pads, disposable pads, and a menstrual cup. Participants then received a pack of four reusable sanitary pads. Their names and phone numbers were collected, and they were told they would be contacted for feedback about the reusable pads. In total, 95 menstruators received a pack of free reusable pads during this phase of the project.

The first workshop in the rural area was conducted with 15 adolescent girls who were recruited by word of mouth through contacts of the local partner. The Menstrupedia “Hello Periods” Bengali language version was shown to the participants on a large screen with the school’s audio-visual system. The video shown was approximately 18 minutes long and was paused intermittently as recommended by Menstrupedia to allow further discussion. In a post-workshop survey (Appendix B), all of the girls understood that menstruation is healthy, but only a third understood that it is possible to predict the dates of the next period, and only a

third understood when they are most likely to get pregnant during the menstrual cycle. These results may reflect the participants' relative inexperience with menstruation, their disinterest in pregnancy due to youth, the irregularity of periods in the years after menarche, or the inexperience of the teaching team. Results from subsequent workshops reflected greater understanding of these areas. All participants who responded to the question understood the need to change a pad regularly and that their period did not require them to leave school.

The second workshop in the rural area was conducted with 33 women mostly in their 20s and 30s who were mothers of children at the local partner's school. The full "Hello Periods" Bengali language version was shown to the participants on a large screen with the school's audio-visual system. About half of the participants could not read and write. The project team attempted to assist their participation in the post-workshop survey (Appendix B) by reading the questions, but the lack of literacy likely led to many answers being copied or shared among participants. All women who answered the question understood it was possible to predict their next period and 93% who responded correctly answered that they were most likely to get pregnant halfway between two periods. All were also able to name yoga poses and a hot water bag as pain relief techniques.

The third workshop was conducted in the SM Colony informal settlement with 17 women in their 20s and 30s who were associated with the local partner's tailoring school. All participants could read and write Bengali and several were also literate in English. At the request of the local partner, due to the participants' limited availability, the project team prepared a shortened version of the Menstrupedia "Hello Periods" video that omitted an overview of puberty, information on nutrition and anemia, and the portion of the video

covering menstrual materials. The project team showed portions of the video covering anatomy and the menstrual cycle, and the facilitator gave information about menstrual materials and reusable sanitary pads. The video was shown on an iPad. In the post-workshop survey (Appendix B), 81% of the participants who answered the question understood it is possible to predict your next period, and 92% of those who answered correctly identified that they are most likely to get pregnant halfway between two periods. All were also able to name yoga poses and a hot water bag as pain relief techniques.

The fourth workshop was conducted in the Sardarpara informal settlement with 30 women with a wide variety of ages and education levels. There was insufficient space for all participants to sit comfortably and high levels of background noise outside the building. The shortened version of the Menstrupedia "Hello Periods" video was shown on an iPad, and the facilitator demonstrated reusable sanitary pads. Only participants who could read Bengali completed the post-workshop survey (Appendix B), and ten surveys were returned completely blank. Of those who responded, 75% understood it is possible to predict the dates of your next period. Fourteen participants answered the question about when they are most likely to get pregnant and all of them correctly identified the most fertile time as halfway between two periods.

Participants in all workshops were keenly attuned to the information in the Menstrupedia video despite external distractions. Despite an inability to prevent shared answers and to adequately modify the testing mechanism for illiterate participants, the post-workshop survey results generally support the workshop's effectiveness in transmitting accurate knowledge about the menstrual cycle in the short term.

Recommendations

These recommendations for future activities are focused on the local partner's central motivation to develop a retail market for reusable sanitary pads in the communities it serves in West Bengal with the assistance of the FLŪME Foundation.

Evaluation and Learning

The evaluation and learning strategy for this program should focus on simple ways to collect feedback directly relevant to product usage and marketing among the target population. While MHH program monitoring guidance from the WHO and UNICEF (WHO/UNICEF, 2018; UNICEF, 2020) offer a wide variety of metrics focused on different aspects of menstrual health, the local partner likely has little time or motivation to directly measure aspects of MHH over which it has no control, such as access to facilities, or "soft metrics," such as confidence. Furthermore, intangible concepts like "confidence" pose translation difficulties when many members of the local partner team do not speak Bengali as a mother tongue. A small number of evaluation questions should therefore focus on product usage. Responses can provide indirect indicators of knowledge, attitude, and behavior change relevant to MHH as described below.

Based on experience during the needs assessment, information from project beneficiaries and potential customers should be collected in a verbal conversation with a guided list of topics in order to provide the most actionable data. These conversations could be conducted individually, or in small groups of friends or family who will encourage each others' honest feedback. This method is important to allow the data collector to ask follow-up questions that address any embarrassment about menstruation, respond to concerns, or

identify reluctance to provide what the user might perceive as negative feedback. Data collectors should be female Bengali speakers who are sensitized to be comfortable discussing menstruation. They should feel comfortable improvising an informal conversation to follow up on issues raised by the potential customer, rather than following a strict script. Data collection should take place in person or by phone call, using the phone numbers collected during MHH introductory workshops.

The first follow-up data collection should take place at least four months after product distribution to ensure sufficient experience with the product to provide relevant information. Subsequent follow-up should take place approximately 18 months after product distribution to capture information about the durability of the product. The local partner may wish to conduct intermediate follow-up approximately one year after product distribution. If capacity does not permit follow-up with all recipients of reusable pads, sampling should be sufficient to gather a variety of perspectives from people most relevant to the markets the local partner deems most promising.

Follow-up data collection should address the following topics:

TOPIC	**GUIDED QUESTIONS**	**RATIONALE**
Product usage	-During your last menstrual period, did you use a reusable pad? -If yes, did you use it with other products during the same cycle?	This topic area measures the uptake of reusable pads. A high level of use on first follow-up is expected as an indicator of program feasibility and potential impact. (Question source: WHO/UNICEF, 2018) Follow-up questioning should provide marketing guidance based on how users integrate reusable pads into their menstrual management strategies (i.e. disposable pad during day, reusable pad at night;

TOPIC	GUIDED QUESTIONS	RATIONALE
	-If you did not use the reusable pad, why not? -How could we improve our reusable pad?	menstrual cup with reusable pad as leak protection, etc.) (Berthault et al., 2023). Follow-up questioning about why users did not use a reusable pad should also illuminate barriers to project success outside of the project's control that can help to guide resource allocation to avoid markets where barriers may be insurmountable. These include stigma and facilities limitations, such as discomfort washing and drying the pad in the spaces available for that purpose. Follow-up questioning should also gather information about unintended public health impacts if menstruators are associating reusable pads with symptoms of reproductive or urinary tract infection (Das et al., 2015; EcoFemme, n.d.). Verbal and personal conversations will be essential to collect actionable data on these topics. Follow-up on continued use of the product at 18 months will provide information about the durability of the product and the value proposition vis a vis disposable products.

TOPIC	GUIDED QUESTIONS	RATIONALE
Word-of-mouth	-Have you recommended reusable pads to others? -Why/why not? -To whom did you recommend?	The local partner expects information to spread about the product by word-of-mouth. Negative responses on this topic would undercut a key assumption of the marketing program. Effective word-of-mouth marketing likely also depends on sharing with a wide circle, beyond the family. Follow-up questioning on this topic will illuminate weaknesses in the social support environment that inhibit the spread of information. It can also provide guidance for future marketing activities to address barriers to information-sharing. Responses on this topic can also provide indirect evidence of attitude and behavior change if respondents begin more freely discussing MHH in their circles of influence.
Product value	-How much would you pay for a reusable pad? OR Would you pay 350 rupees for a pack of 4 reusable pads? -Did you need the included items (carrying bag, drying cloth, clothespins) -Would you or your friends want to buy individual reusable pads?	The local partner has designed an initial marketing strategy around selling packages of four reusable pads with accessories. This topic will measure the feasibility of that strategy given the relatively high initial investment and provide guidance for future marketing efforts (Berthault et al., 2023).

Potential Impact Indicators

Should the FLūME Foundation wish to gather longitudinal measures of knowledge, attitude, and behavior change, follow-up data collection could include selected questions proposed by UNICEF's (2020) monitoring guidance, as follows:

Indicator	**Rationale**
% of menstruators surveyed who can correctly describe the connection between menstruation and fertility (Appendix B, Question 8)	This indicator measures accurate knowledge about menstruation. The connection between menstruation and fertility was a key learning of introductory MHH workshops. We expect accurate knowledge is a preliminary step toward improving the social support environment for menstruators (Hennegan et al., 2021). (Question source: UNICEF, 2020). Initial data indicated that 61% of introductory MHH workshop participants correctly answered that a woman is most likely to get pregnant about halfway between two periods. This number will likely be lower if asked individually in a follow-up phone survey and not immediately after an MHH workshop. Asking the question over time could measure the spread of knowledge in the target population, if marketing efforts continue to include basic MHH education.
% of menstruators surveyed who disagree or strongly disagree that menstruation should be kept secret (Appendix A, Question 8)	An increase in this indicator would indicate the program is having a positive impact on the social support environment as community members openly share information about menstruation. (Question source: UNICEF, 2020)
% of menstruators surveyed who agree or strongly agree that they feel confident during their menstrual period (Appendix A, Question 9)	An increase in this indicator would indicate the program is having a positive impact on the social support environment as menstruators' self-confidence and self-efficacy improves. (Question source: UNICEF, 2020)

Marketing

To Women

The local partner plans to make its reusable pads available for sale to women in the target communities directly through its representatives and through intermediary entrepreneurs who will earn a commission on each sale. The literature review and needs assessment for this project identified the following considerations for this marketing plan.

-Cost and target market

The needs assessment affirmed that the primary product competition for these reusable pads is disposable sanitary pads. The high rate of adoption of disposable pads indicated in the needs assessment demonstrates that menstruators in the target markets are willing and able to pay some amount of money for menstrual products. Although some users may be swayed by the environmental benefit of reusable menstrual products, the vast majority, especially low-income menstruators, are most likely to be motivated by cost (Berthault et al., 2023). This means that to be marketable, the cost of reusable pads must beat the cost to the menstruator of disposable pads.

The local partner's reported cost of production of a 4-pack of reusable pads, with packaging, carrying bag, drying cloth, and hanging clips, is 200 rupees. The local partner plans to sell this 4-pack for a retail cost of 350 rupees. Currently, the local partner is communicating that reusable pads should be replaced every 12 months, with the goal of stimulating repeat business. Taking the average cost of reusable pads as 30-40 rupees for a six-pack of pads, and assuming a menstruator uses one pack of pads per month, the cost to the menstruator for one

year of disposable pads is 360-480 rupees. This is likely an underestimate because this average cost is on the low end and many menstruators will require more than six pads per cycle. But menstruators with a heavy flow might also require more than four reusable pads per cycle. Follow-up data collection from the recipients of reusable pads will be essential to determine whether the cost savings offered by the local partner's reusable pad as currently marketed is sufficient to support their adoption by menstruators, given the larger up-front cost and the loss of convenience likely to be perceived in giving up disposable pads. Data supporting a conclusion that the reusable pads can be used up to three years would reduce the cost to the menstruator of the local partner's reusable pads to 116 rupees per year, which could be represented as a more significant cost savings over disposable pads. Of course, the cost of production of reusable pads will be subject to market fluctuations in the cost of materials, which may necessitate pricing reevaluation. Nevertheless, pricing should always seek to offer significant savings over the cost of disposable pads.

Given that disposable pads have been positioned in the Indian market as the ideal menstrual product, menstruators who can afford them are likely to continue to use them. This means the most productive target market for reusable pads may be those menstruators who struggle to afford disposable pads but who dislike having to use cloth as an alternative when disposable pads are out of reach. However, the high up-front cost of a full pack of pads may be a barrier to effectively reaching this cost-conscious market.

The cost barrier could be addressed by offering reusable pads in single or double packs at a lower cost to allow menstruators to gradually build a supply of reusable pads as they can afford it (Berthault et al., 2023). This market would include women who originally received or

bought a four-pack and would like additional pads to adequately cover a menstrual cycle. The local partner should also consider that it may be attractive to menstruators to purchase one or two reusable pads to reduce their reliance on disposable pads, without eliminating disposable pads from their menstrual management strategy entirely (Berthault et al., 2023). Follow-up data collection about product use patterns should therefore explore this aspect of the potential market, which is likely to be very important for market viability (Berthault et al., 2023).

-Value propositions

The key value proposition for reusable pads against disposable pads is lower cost over time, with a secondary value proposition being the environmental benefit. While the environmental benefit of reduced waste is intuitive, the local partner can also promote greater understanding of environmental benefits by cultivating greater knowledge among menstruators about the industrial manufacturing involved in the production of disposable sanitary pads, including an awareness of the chemicals and plastics involved. An example of this is the product analysis workshop conducted by EcoFemme (available at https://www.youtube.com/watch?v=9YNIWl5QtSg&t=14s). During the needs assessment period, the project team reviewed this video with two female members of the local partner's staff, who indicated it gave them a greater understanding of the value of the local partner's product.

Marketing reusable pads also requires identifying value propositions as compared to cloth, because menstruators must be convinced to spend money on a product that must be cared for in much the same way as cloth. Based on information gathered in the needs assessment, the key advantages of the local partner's reusable pad over cloth are (1) the

leak-proof layer should result in fewer leaks than cloth; (2) the leak-proof layer and accompanying carry-bag enable the user to fold and store the pad until it can be washed, making the reusable pad easier to use while out of the house than cloth; and (3) the design attaching to underwear means the pad can be more securely attached than cloth. The design mimicking a disposable pad can also appeal to menstruators who idealize disposable pad use.

-Characteristics of entrepreneurs

Berthault et al.'s (2023) market analysis reviewed information about existing markets for menstrual materials in low- and middle-income countries and did not identify any market-based distribution plans that have effectively developed sales networks specifically for menstrual supplies, due to an inability to provide sufficient incentives to sellers. The local partner proposes selling its four-pad packs to entrepreneurs for 300 rupees, allowing entrepreneurs to keep a 50-rupee profit per pack. Because reusable products do not generate monthly repeat business, this offering should not be expected to provide sufficient income, standing alone, for the entrepreneur, and is more likely to create a useful supplement to existing income.

Berthault et al.'s (2023) research suggests marketing strategies should focus on adding reusable menstrual products to existing distribution networks. The needs assessment did not identify any existing product distribution networks with which the local partner has contacts and did not identify any existing contacts with local health care workers. The local partner's history bringing in outside volunteers for an annual medical camp suggests it may not be well connected with existing health care networks in the target communities. On the other hand, it does have contacts with other community members who already interact with a wide variety of community members, including visiting homes. These potential alternative distribution

networks include teachers who teach students at a central location and often provide individual tutoring services, tailoring students who are already developing clients in the community, and other community service providers or community support groups. Women involved in these networks may be willing to sell reusable pads to supplement other income. The local partner could also cultivate new contacts with community health workers and other local women's self-help or savings groups as a source of potential entrepreneurs.

To generate business, entrepreneurs should be well-respected in the local community. They should also be well-educated about menstrual health and menstrual products, which can be supported by additional training from the local partner, as described below.

To Businesses

Berthault et al.'s (2023) analysis of the global market for menstrual products found that institutional donors, for example refugee or disaster relief agencies, buy the vast majority of reusable pads that manufacturers sell. The local partner is part of a network of small businesses and social enterprises that may provide a small-scale alternative to institutional marketing. These businesses may be encouraged to purchase reusable pads to supply to beneficiaries as a part of their existing programming or to provide to employees to support reduced absenteeism and improved menstrual health. To begin to explore this potential market, the local partner plans to create a short promotional video to circulate to this network.

Training and Education

Local partner staff

Effective word-of-mouth marketing for menstrual products will require a culture of openly discussing menstruation. To the extent that the local partner staff reinforce the perception that menstruation is shameful or secret, consumers will not feel empowered to share information about the product with others. The local partner is a grassroots operation whose team members work in a variety of different capacities. Observations during the needs assessment phase suggested that different team members had different levels of knowledge about the reusable pad product and efforts to introduce it to the target population.

The local partner could take a first step in improving the social support environment around menstruators by including men from its own team in MHH sensitization and education, even if it remains reluctant to include men and boys from target communities in MHH education. Male team members will necessarily be involved in marketing efforts for reusable pads and can serve as "role model men" for their support of menstrual health (Tellier et al., 2020) . For example, during the initial workshop and product distribution phase, male team members helped to manufacture pads, to design packaging, and to organize workshops. Male team members who understand the purpose and the context of their efforts can contribute to an environment where menstruation is openly discussed, which is essential to the word-of-mouth marketing the local partner wants to promote. On the other hand, if male team members communicate embarrassment or a lack of knowledge of the topic, this reinforces a perception that menstruation should be secret. Secrecy ultimately inhibits the kind of open communication necessary for grassroots marketing.

Accordingly, both male and female team members from the local partner should receive MHH education. This should include, at a minimum, a demonstration about how to use and clean the reusable pad, the Menstrupedia "Hello Periods" video in an appropriate language, and, for English speakers, the EcoFemme product analysis video so that all team members understand the value of the product.

All team members, particularly women, should also be sufficiently sensitized to speak about menstruation and related topics without embarrassment or avoidance. If female team members are embarrassed or reluctant to use direct words while communicating with menstruators about the product, this also communicates secrecy that will inhibit effective grassroots marketing. During the needs assessment, teachers in particular appeared to appreciate the opportunity to share stories and experiences in a discussion group. Female team members from the local partner could begin to develop more comfort discussing menstruation by organizing groups among themselves to discuss experiences as part of planning additional marketing activities.

Entrepreneurs

Grassroots entrepreneurs selling reusable pads must be sufficiently knowledgeable to provide accurate information about menstruation and menstrual products, answer menstruators' questions, and explain the value offered by reusable sanitary pads. At a minimum, they should have access to the Menstrupedia "Hello Periods" video in an appropriate language, at least one copy of a Menstrupedia comic book in an appropriate language, the MHM Resource Book from WASH United in an appropriate language which can serve as a reference material, and the EcoFemme product analysis video. This information can be

provided in a training session specifically targeted at motivated entrepreneurs and designed by the local partner.

Entrepreneurs should also be trained to conduct their own MHH workshops as part of their marketing activities with the model of Menstrupedia or WASH United ("Ruby's World"). Both Menstrupedia and WASH United provide guidance on how to conduct workshops and how to conduct train-the-trainer sessions.

Customers

All first-time recipients of reusable sanitary pads should at a minimum receive a demonstration of how to care for the product and information about the expected life of the product (as determined from follow-up data collection). The needs assessment indicated that even menstruators who are accustomed to reusing cloth likely throw it away after just a few uses. This is consistent with the finding of Panda et al. (2024) about cloth use in neighboring Odisha. To realize the intended cost savings of reusable sanitary pads, menstruators must understand that they may use reusable pads longer than they might expect to reuse cloth. This information could be conveyed by an entrepreneur or a representative of the local partner in a sales session. The needs assessment demonstrated that the English instruction insert developed for the initial product distribution is likely insufficient to convey the required information. Any insert developed in Bengali or other languages should be tested with the target population to ensure effectiveness. Because of literacy barriers, a verbal demonstration is likely to be most effective.

The local partner should also conduct additional education sessions as a marketing tactic. The needs assessment indicated most menstruators view menstruation as secret and may not be inclined to share information about reusable pads with others, even if they begin using them themselves. Creating safe spaces to discuss menstruation will help to facilitate the kind of word-of-mouth product promotion the local partner hopes to generate and overcome limitations on information-sharing about a taboo topic. These trainings can take place at the local partner's schools or other community spaces. Workshops of the type conducted during the needs assessment, using the Menstrupedia "Hello Periods" video may be appropriate for groups that have not already been reached. The local partner can also develop additional workshop topics that may be of interest to women and girls for repeat exposure. The following possibilities are based on existing materials identified by the literature review:

- A participatory comparative analysis of the costs and benefits of menstrual materials, based on EcoFemme's example. This type of workshop could help menstruators better understand the value of reusable pads, especially in comparison to disposable ones (Ramesh, 2024). Discussing products for internal use also provides an opportunity to reinforce education about female anatomy, such as why you can urinate while wearing a tampon, and how the cervix prevents a menstrual cup from getting lost inside the abdomen.
- A workshop based on the "Ruby's World" materials developed by WASH United. This workshop focuses on the social support environment around menstruation and continued participation in activities rather than on aspects of anatomy and biology, so it

adds to rather than duplicates the Menstrupedia materials. It is targeted at school-aged girls.

- A workshop focused on cycle tracking, using a small calendar that would be inexpensive to produce. The needs assessment found that many menstruators, particularly younger ones, may not understand that their menstrual cycle is predictable. This type of workshop would also empower menstruators to identify when they are most and least likely to get pregnant, spot any irregularities, and get information about when to seek medical care.

Additional Funding

The FLŪME Foundation can raise funding for the project's early market development activities by soliciting its donors for menstrual health "sponsorships," which would be available on the organization's website. Each $30 sponsorship would provide the following:

- subsidized reusable sanitary pads to five women, meeting their menstrual needs for 2-3 years, to support the local partner's ability to sell pads at a reduced cost to spur market development
- menstruation education by subsidizing the local partner's marketing activities, to include MHH education workshops for reusable pad entrepreneurs and buyers
- business experience that helps a marginalized woman to earn income and support her family, by supporting the program's efforts to identify and support entrepreneurs who can successfully sell reusable pads

New sponsors will be recruited at a program kickoff party in Denver and at the FLŪME Foundation's annual golf tournament in fall 2024.

REFERENCES

Achuthan, K., Muthupalani, S., Kolil, V. K., Bist, A., Sreesuthan, K., & Sreedevi, A. (2021). A novel banana fiber pad for menstrual hygiene in India: A feasibility and acceptability study. *BMC Women's Health*, *21*(1), 1–14. https://doi.org/10.1186/s12905-021-01265-w

Alexander, K. T., Oduor, C., Nyothach, E., Laserson, K. F., Amek, N., Eleveld, A., Mason, L., Rheingans, R., Beynon, C., Mohammed, A., Ombok, M., Obor, D., Odhiambo, F., Quick, R., & Phillips-Howard, P. A. (2014). Water, Sanitation and Hygiene Conditions in Kenyan Rural Schools: Are Schools Meeting the Needs of Menstruating Girls? *Water*, *6*(5), Article 5. https://doi.org/10.3390/w6051453

Amin, F. F., Samanta, A., & Ghosh, S. (2022). Menstrual hygiene practices, social taboo and attitude towards it: A community-based cross-sectional study among young women in a rural area of West Bengal, India. *Journal of Clinical and Diagnostic Research*, 16(2), LC14-LC21. https://doi.org/10.7860/JCDR/2022/52939.16012

Armour, M., Hyman, M. S., Al-Dabbas, M., Parry, K., Ferfolja, T., Curry, C., MacMillan, F., Smith, C. A., & Holmes, K. (2021). Menstrual Health Literacy and Management Strategies in Young Women in Australia: A National Online Survey of Young Women Aged 13-25 Years. *Journal of Pediatric and Adolescent Gynecology*, *34*(2), 135–143. https://doi.org/10.1016/j.jpag.2020.11.007

Austrian, K., Kangwana, B., Muthengi, E., & Soler-Hampejsek, E. (2021). Effects of sanitary pad distribution and reproductive health education on upper primary school attendance and

reproductive health knowledge and attitudes in Kenya: A cluster randomized controlled trial. *Reproductive Health*, *18*(1), 179. https://doi.org/10.1186/s12978-021-01223-7

Ballal K., S., & Bhandary, A. (2020). Menstrual cup: awareness among reproductive women. International Journal of Reproduction, Contraception, Obstetrics and Gynecology, 9(4), 1382+.

Barrington, D.J., Robinson, H.J., Wilson, E., Hennegan, J. (2021). Experiences of menstruation in high income countries: A systematic review, qualitative evidence synthesis and comparison to low- and middle-income countries. PLoS ONE 16(7): e0255001. https://doi.org/10.1371/journal.pone.0255001

Baumann, S. E., Lhaki, P., & Burke, J. G. (2020). Collaborative Filmmaking: A Participatory, Visual Research Method. *Qualitative Health Research*, *30*(14), 2248–2264. https://doi.org/10.1177/1049732320941826

Behera, D., Sivakami, M., & Behera, M. R. (2015). Menarche and Menstruation in Rural Adolescent Girls in Maharashtra, India: A Qualitative Study. *Journal of Health Management*, *17*(4), 510–519. https://doi.org/10.1177/0972063415612581

Benshaul-Tolonen, A., Zulaika, G., Sommer, M., & Phillips-Howard, P. A. (2020). Measuring Menstruation-Related Absenteeism Among Adolescents in Low-Income Countries. In C. Bobel, I. T. Winkler, B. Fahs, K. A. Hasson, E. A. Kissling, & T.-A. Roberts (Eds.), *The Palgrave Handbook of Critical Menstruation Studies* (pp. 705–723). Springer Singapore. https://doi.org/10.1007/978-981-15-0614-7_52

Berthault, L., Charbit, J., & McGrath, L.K. (2023, May). *Scaling up access to menstrual health in the Global South: Improving product quality and access to reusable options.* Hystra. Retrieved December 14, 2023 from https://www.hystra.com/our-insights/a2mh.

Bhattacharyya, M., Sen, P., Hazra, S., Sinha, R. N., & Sahoo, S. (2015). A study of menstrual hygiene among adolescent school girls in a slum area of Kolkata. *National Journal of Community Medicine*, 6(03), Article 03.

Bhattacherjee, S., Ray, K., Biswas, R., & Chakraborty, M. (2013). Menstruation: Experiences of adolescent slum dwelling girls of Siliguri City, West Bengal, India. *Journal of Basic and Clinical Reproductive Sciences*, *2*(2), Article 2.

Bobel, C., Bobel, Winkler, I.T., Fahs, B., Hasson, K.A., Kissling, E.A. & Roberts, T.-A. (Eds.) (2020), *The Palgrave Handbook of Critical Menstruation Studies*. Springer Singapore. https://doi.org/10.1007/978-981-15-0614-7_35

Boral, K., Burman, J., & Sembiah, S. (2020). A cross-sectional study on menstrual hygiene among rural adolescent girls of West Bengal. *International Journal of Contemporary Medical Research*, 7(10), J10-J14. https://doi.org/10.21276/ijcmr.2020.7.10.29

Caruso, B. A., Portela, G., McManus, S., & Clasen, T. (2020). Assessing Women's Menstruation Concerns and Experiences in Rural India: Development and Validation of a Menstrual Insecurity Measure. *International Journal of Environmental Research and Public Health*, *17*(10), Article 10. https://doi.org/10.3390/ijerph17103468

Caruso, B. A., Clasen, T. F., Hadley, C., Yount, K. M., Haardörfer, R., Rout, M., Dasmohapatra, M., & Cooper, H. L. (2017). Understanding and defining sanitation insecurity: Women's gendered experiences of urination, defecation and menstruation in rural Odisha, India. *BMJ Global Health*, *2*(4), e000414. https://doi.org/10.1136/bmjgh-2017-000414

Chakravarthy, V., Rajagopal, S., & Joshi, B. (2019). Does Menstrual Hygiene Management in Urban Slums Need a Different Lens? Challenges Faced by Women and Girls in Jaipur and Delhi. *Indian Journal of Gender Studies*, *26*(1–2), 138–159. https://doi.org/10.1177/0971521518811174

Chandra-Mouli, V., & Patel, S. V. (2020). Mapping the Knowledge and Understanding of Menarche, Menstrual Hygiene and Menstrual Health Among Adolescent Girls in Low- and Middle-Income Countries. In C. Bobel, I. T. Winkler, B. Fahs, K. A. Hasson, E. A. Kissling, & T.-A. Roberts (Eds.), *The Palgrave Handbook of Critical Menstruation Studies* (pp. 609–636). Springer Singapore. https://doi.org/10.1007/978-981-15-0614-7_46

Chothe, V., Khubchandani, J., Seabert, D., Asalkar, M., Rakshe, S., Firke, A., Midha, I., & Simmons, R. (2014). Students' Perceptions and Doubts About Menstruation in Developing Countries: A Case Study From India. *Health Promotion Practice*, *15*(3), 319–326. https://doi.org/10.1177/1524839914525175

Coast, E., Lattof, S. R., & Strong, J. (2019). Puberty and menstruation knowledge among young adolescents in low- and middle-income countries: A scoping review. *International Journal of Public Health*, *64*(2), 293–304. https://doi.org/10.1007/s00038-019-01209-0

Cohen, I. (2020). Menstruation and religion: Developing a critical menstrual studies approach. In C. Bobel, I. T. Winkler, B. Fahs, K. A. Hasson, E. A. Kissling, & T.-A. Roberts (Eds.), *The Palgrave Handbook of Critical Menstruation Studies* (pp. 115-129). Springer Singapore. https://doi.org/10.1007/978-981-15-0614-7_35

Crankshaw, T. L., Strauss, M., & Gumede, B. (2020). Menstrual health management and schooling experience amongst female learners in Gauteng, South Africa: A mixed method study. *Reproductive Health*, *17*(1), 48. https://doi.org/10.1186/s12978-020-0896-1

Critchley, H. O. D., Babayev, E., Bulun, S. E., Clark, S., Garcia-Grau, I., Gregersen, P. K., Kilcoyne, A., Kim, J.-Y. J., Lavender, M., Marsh, E. E., Matteson, K. A., Maybin, J. A., Metz, C. N., Moreno, I., Silk, K., Sommer, M., Simon, C., Tariyal, R., Taylor, H. S., … Griffith, L. G. (2020). Menstruation: Science and society. *American Journal of Obstetrics & Gynecology*, *223*(5), 624–664. https://doi.org/10.1016/j.ajog.2020.06.004

Das, P., Baker, K. K., Dutta, A., Swain, T., Sahoo, S., Das, B. S., Panda, B., Nayak, A., Bara, M., Bilung, B., Mishra, P. R., Panigrahi, P., Cairncross, S., & Torondel, B. (2015). Menstrual Hygiene Practices, WASH Access and the Risk of Urogenital Infection in Women from Odisha, India. *PLOS ONE*, *10*(6), e0130777. https://doi.org/10.1371/journal.pone.0130777

Das, A., Dasgupta, A., Biswas, R., Ray, D., Ghosal, A., & Sarkar, T. (2014). Knowledge and practices regarding menstrual management among women in a remote village of Eastern India. *International Journal of Biological and Medical Research*, 5(3): 4190-4196.

Days for Girls (n.d). https://www.daysforgirls.org/where-we-operate/

Deshpande, T. N., Patil, S. S., Gharai, S. B., Patil, S. R., & Durgawale, P. M. (2018). Menstrual hygiene among adolescent girls: A study from urban slum area. *Journal of Family Medicine & Primary Care*, 7(6), 1439–1445. https://doi.org/10.4103/jfmpc.jfmpc_80_18

EcoFemme (n.d.). https://ecofemme.org/ecosisterhood/learn-with-us/

The Economic Times (2023, July 24). National policy on menstrual hygiene: SC warns states and UTs if they fail to submit response. https://economictimes.indiatimes.com/news/india/national-policy-on-menstrual-hygiene-sc-warns-states-and-uts-if-they-fail-to-submit-response/articleshow/102077029.cms?from=mdr

Elledge, M., Muralidharan, A., Parker, A., Ravndal, K., Siddiqui, M., Toolaram, A., Woodward, K. (2018). Menstrual Hygiene Management and Waste Disposal in Low and Middle Income Countries—A Review of the Literature. *International Journal of Environmental Research and Public Health*, 15(11), 2562. https://doi.org/10.3390/ijerph15112562

Fahs, B., & Perianes, M. B. (2020). Transnational Engagement: Designing an Ideal Menstrual Health (MH) Curriculum—Stories from the Field. In C. Bobel, I. T. Winkler, B. Fahs, K. A. Hasson, E. A. Kissling, & T.-A. Roberts (Eds.), *The Palgrave Handbook of Critical Menstruation Studies* (pp. 449–465). Springer Singapore. https://doi.org/10.1007/978-981-15-0614-7_35

Foulds, K., Moskowitz, A., Bucuvalas, A., Chidavaenzi, M., Ndanga, A., Sibanda, S., Kagodo, N., Mvere, C., Mlotshwa, N., Hynes, P., Schmitt, M. L., & Carney, A. (2021). Using Participatory Design to Develop a Menstrual Hygiene Management Intervention: Designing WASH UP! Girl Talk in Zimbabwe. *WH2O: The Journal of Gender and Water*, *8*(1). https://repository.upenn.edu/wh2ojournal/vol8/iss1/12

Ganguly, L., & Satpati, L. (2022). Sanitation Condition and its Association with Menstrual Hygiene of Non-Tribal and Tribal Communities in Selected Districts of West Bengal. *Ecology, Environment and Conservation*, 328–339. https://doi.org/10.53550/EEC.2022.v28i02s.054

Garg, S., Bhatnagar, N., Singh, M. M., Basu, S., Borle, A., Marimuthu, Y., Azmi, F., Dabi, Y., & Bala, I. (2022). Menstrual hygiene management and its determinants among adolescent girls in low-income urban areas of Delhi, India: A community-based study. Osong Public Health and Research Perspectives, 13(4), 273–281. https://doi.org/10.24171/j.phrp.2022.0127

Garg, S., Singh, M. M., Basu, S., Bhatnagar, N., Dabi, Y., Azmi, F., Bala, I., Marimuthu, Y., & Borle, A. (2021). Perceptions of Frontline Workers, Female Health Workers, and School Teachers in Menstrual Hygiene Promotion among Adolescent Girls of Delhi, India: A Qualitative Study. *Indian Journal of Community Medicine*, *46*(2), 201–205. https://doi.org/10.4103/ijcm.IJCM_137_20

Garg, S. & Anand, T. (2015). Menstruation related myths in India: Strategies for combating it. *Journal of Family Medicine and Primary Care*, *4*(2), 184–186. https://doi.org/10.4103/2249-4863.154627

Garg, S., Sharma, N., & Sahay, R. (2001). Socio-cultural aspects of menstruation in an urban slum in Delhi, India. *Reproductive Health Matters*, *9*(17), 16–25. https://doi.org/10.1016/S0968-8080(01)90004-7

Garikipati, S., & Boudot, C. (2017). To pad or not to pad: Towards better sanitary care for women in Indian slums. Journal of International Development, 29(1), 32–51. https://doi.org/10.1002/jid.3266

Gottlieb, A. (2020). Menstrual taboos: Moving beyond the curse. In C. Bobel, I. T. Winkler, B. Fahs, K. A.Hasson, E. A. Kissling, & T.-A. Roberts (Eds.), *The Palgrave Handbook of Critical Menstruation Studies* (pp. 143-62). Springer Singapore. https://doi.org/10.1007/978-981-15-0614-7_47

Grow and Know (n.d.). https://www.growandknow.org/country-books

Gruer, C., Hopper, K., Smith, R. C., Kelly, E., Maroko, A., & Sommer, M. (2021). Seeking menstrual products: A qualitative exploration of the unmet menstrual needs of individuals experiencing homelessness in New York City. *Reproductive Health*, *18*(1), 77. https://doi.org/10.1186/s12978-021-01133-8

Gundi, M., & Subramanyam, M. A. (2019). Menstrual health communication among Indian adolescents: A mixed-methods study. *PLoS ONE*, *14*(10), e0223923. https://doi.org/10.1371/journal.pone.0223923

Ha, A. T., & Alam, Z. (2022). Menstrual hygiene management practice among adolescent girls: An urban–rural comparative study in Rajshahi division, Bangladesh. *BMC Women's Health*, *22*(1), 86. https://doi.org/10.1186/s12905-022-01665-6

Haver, J. (2018). New Directions for Assessing Menstrual Hygiene Management (MHM) in Schools: A Bottom-Up Approach to Measuring Program Success. *Studies in Social Justice*, *12*(2).

Hawkey, A.J., Ussher, J.M., & Perz, J. (2020). "I treat my daughters not like my mother treated me": Migrant and refugee women's constructions and experiences of menarche and menstruation. In C. Bobel, I. T. Winkler, B. Fahs, K. A.Hasson, E. A. Kissling, & T.-A. Roberts (Eds.), *The Palgrave Handbook of Critical Menstruation Studies* (pp. 99-113). Springer Singapore. https://doi.org/10.1007/978-981-15-0614-7_47

Hennegan, J., Winkler, I. T., Bobel, C., Keiser, D., Hampton, J., Larsson, G., Chandra-Mouli, V., Plesons, M., & Mahon, T. (2021). Menstrual health: A definition for policy, practice, and research. *Sexual and Reproductive Health Matters*, 29(1), 31–38. https://doi.org/10.1080/26410397.2021.1911618

Hennegan, J. (2020). Interventions to improve menstrual health in low- and middle-income countries: Do we know what works? In C. Bobel, I. T. Winkler, B. Fahs, K. A.Hasson, E. A. Kissling, & T.-A. Roberts (Eds.), *The Palgrave Handbook of Critical Menstruation Studies* (pp. 637–652). Springer Singapore. https://doi.org/10.1007/978-981-15-0614-7_47

Hennegan, J., Kibira, S. P. S., Exum, N. G., Schwab, K. J., Makumbi, F. E., & Bukenya, J. (2020a). 'I do what a woman should do': A grounded theory study of women's menstrual experiences at work in Mukono District, Uganda. *BMJ Global Health*, *5*(11), e003433. https://doi.org/10.1136/bmjgh-2020-003433

Hennegan, J., Brooks, D. J., Schwab, K. J., & Melendez-Torres, G. J. (2020b). Measurement in the study of menstrual health and hygiene: A systematic review and audit. *PLOS ONE*, *15*(6), e0232935. https://doi.org/10.1371/journal.pone.0232935

Hennegan, J., Shannon, A. K., Rubli, J., Schwab, K. J., & Melendez-Torres, G. J. (2019). Women's and girls' experiences of menstruation in low- and middle-income countries: A systematic review and qualitative metasynthesis. *PLoS Medicine*, 16(5), e1002803. https://doi.org/10.1371/journal.pmed.1002803

Hennegan, J., Dolan, C., Steinfield, L., & Montgomery, P. (2017). A qualitative understanding of the effects of reusable sanitary pads and puberty education: Implications for future research and practice. *Reproductive Health*, *14*(1), 78. https://doi.org/10.1186/s12978-017-0339-9

Hennegan, J. M. (2017). Menstrual Hygiene Management and Human Rights: The Case for an Evidence-Based Approach. *Women's Reproductive Health*, *4*(3), 212–231. https://doi.org/10.1080/23293691.2017.1388720

Hennegan, J., & Montgomery, P. (2016). Do Menstrual Hygiene Management Interventions Improve Education and Psychosocial Outcomes for Women and Girls in Low and Middle Income Countries? A Systematic Review. *PLoS ONE, 11(2),* e0146985. https://doi.org/10.1371/journal.pone.0146985

Hennegan, J., Dolan, C., Wu, M., Scott, L., & Montgomery, P. (2016). Schoolgirls' experience and appraisal of menstrual absorbents in rural Uganda: A cross-sectional evaluation of reusable sanitary pads. *Reproductive Health*, 13(1), 143. https://doi.org/10.1186/s12978-016-0260-7

Hystra (2023, Oct.). *A business case for selling reusable menstrual health products in the Global South.* Retrieved Dec. 17, 2023 from https://static1.squarespace.com/static/5fc8cfc5ae882d23f7359f96/t/654e4e6a67bf000fb65d2ff8/1699630705111/Hystra_Reusable+MH+products+business+case_2023.pdf.

International Federation of Red Cross and Red Crescent Societies (IFRC) (2019, July). *Addressing menstrual hygiene management (MHM) needs: Guide and tools for Red Cross and Red Crescent societies.* Retrieved March 24, 2023, from https://watsanmissionassistant.org/menstrual-hygiene-management/

Kannan, P., & Claydon, L. S. (2014). Some physiotherapy treatments may relieve menstrual pain in women with primary dysmenorrhea: A systematic review. *Journal of Physiotherapy*, *60*(1), 13–21. https://doi.org/10.1016/j.jphys.2013.12.003

Kansal, S., Singh, S., & Kumar, A. (2016). Menstrual Hygiene Practices in Context of Schooling: A Community Study Among Rural Adolescent Girls in Varanasi. *Indian Journal of Community Medicine: Official Publication of Indian Association of Preventive & Social Medicine*, *41*(1), 39–44. https://doi.org/10.4103/0970-0218.170964

Lane, B., Perez-Brumer, A., Parker, R., Sprong, A., & Sommer, M. (2022). Improving menstrual equity in the USA: Perspectives from trans and non-binary people assigned female at birth and health care providers. *Culture, Health & Sexuality*, *24*(10), 1408–1422. https://doi.org/10.1080/13691058.2021.1957151

Light, D., Matinhure-Muzondo, N., Ferguson, C., Muzondo, T. H., & Lungu, N. H. (2021). Improving students' knowledge of puberty and menstruation in rural Zimbabwe: An evaluation of Sesame Workshop's Girl Talk program. *Journal of Water, Sanitation and Hygiene for Development*, *11*(1), 173–178. https://doi.org/10.2166/washdev.2020.286

Loughnan, L., Mahon, T., Goddard, S., Bain, R., & Sommer, M. (2020). Monitoring menstrual health in the sustainable development goals. In C. Bobel, I. T. Winkler, B. Fahs, K. A. Hasson, E. A. Kissling, & T.-A. Roberts (Eds.), *The Palgrave Handbook of Critical Menstruation Studies* (pp. 577–592). Springer Singapore. https://doi.org/10.1007/978-981-15-0614-7_44

Majeed, J., Sharma, P., Ajmera, P., & Dalal, K. (2022). Menstrual hygiene practices and associated factors among Indian adolescent girls: A meta-analysis. *Reproductive Health*, *19*(1), 148. https://doi.org/10.1186/s12978-022-01453-3

Mahon, T., Tripathy, A., & Singh, N. (2015). Putting the men into menstruation: The role of men and boys in community menstrual hygiene management. *Waterlines*, *34*(1), 7–14. https://doi.org/10.3362/1756-3488.2015.002

Mahon, T., & Fernandes, M. (2010). Menstrual hygiene in South Asia: A neglected issue for WASH (water, sanitation and hygiene) programmes. *Gender & Development*, *18*(1), 99–113. https://doi.org/10.1080/13552071003600083

Manna, D. N., Lahiri, D. A., Bhattacharjee, D. A., & Bera, S. (2019). Knowledge, awareness and practices on menstrual hygiene management among under-graduate nursing students: Experience from a cross-sectional study in West Bengal, India. *IOSR Journal of Dental and Medical Sciences*, 18(1), 1-6.

Manorama, S., & Desai, R. (2020). Menstrual Justice: A Missing Element in India's Health Policies. In C. Bobel, I. T. Winkler, B. Fahs, K. A. Hasson, E. A. Kissling, & T.-A. Roberts (Eds.), *The Palgrave Handbook of Critical Menstruation Studies* (pp. 511–527). Springer Singapore. https://doi.org/10.1007/978-981-15-0614-7_39

Mason, L., Sivakami, M., Thakur, H., Kakade, N., Beauman, A., Alexander, K. T., van Eijke, A. M., Laserson, K. F., Thakkar, M. B., & Phillips-Howard, P. A. (2017). "We do not know": A qualitative study exploring boys perceptions of menstruation in India. *Reproductive Health*, *14*(1), 174. https://doi.org/10.1186/s12978-017-0435-x

Mason, L., Nyothach, E., Alexander, K., Odhiambo, F. O., Eleveld, A., Vulule, J., Rheingans, R., Laserson, K. F., Mohammed, A., & Phillips-Howard, P. A. (2013). 'We keep it secret so no one should know'—A qualitative study to explore young schoolgirls attitudes and experiences with menstruation in rural western Kenya. *PloS One*, *8*(11), e79132. https://doi.org/10.1371/journal.pone.0079132

Matteson, K. A., & Zaluski, K. M. (2019). Menstrual Health as a Part of Preventive Health Care. *Obstetrics and Gynecology Clinics of North America*, *46*(3), 441–453. https://doi.org/10.1016/j.ogc.2019.04.004

Matteson, K. A. (2017). Menstrual questionnaires for clinical and research use. *Best Practice & Research Clinical Obstetrics & Gynaecology*, *40*, 44–54. https://doi.org/10.1016/j.bpobgyn.2016.09.009

Matteson, K., Scott, D., Raker, C., & Clark, M. (2015). The menstrual bleeding questionnaire: Development and validation of a comprehensive patient-reported outcome instrument for heavy menstrual bleeding. *BJOG: An International Journal of Obstetrics & Gynaecology*, *122*(5), 681–689. https://doi.org/10.1111/1471-0528.13273

McCarthy, A., & Lahiri-Dutt, K. (2020). Bleeding in public? Rethinking narratives of menstrual management from Delhi's slums. In C. Bobel, I. T. Winkler, B. Fahs, K. A. Hasson, E. A. Kissling, & T.-A. Roberts (Eds.), *The Palgrave Handbook of Critical Menstruation Studies* (pp. 15–30). Springer Singapore. https://doi.org/10.1007/978-981-15-0614-7_3

Menstrupedia (n.d.). https://menstrupedia.com

Miiro, G., Rutakumwa, R., Nakiyingi-Miiro, J., Nakuya, K., Musoke, S., Namakula, J., Francis, S., Torondel, B., Gibson, L. J., Ross, D. A., & Weiss, H. A. (2018). Menstrual health and school absenteeism among adolescent girls in Uganda (MENISCUS): A feasibility study. *BMC Women's Health*, *18*(1), 4. https://doi.org/10.1186/s12905-017-0502-z

Mishra, S. K., Dasgupta, D., & Ray, S. (2017). A study on the relationship of sociocultural characteristics, menstrual hygiene practices and gynaecological problems among adolescent girls in Eastern India. *International Journal of Adolescent Medicine and Health*, *29*(5). https://doi.org/10.1515/ijamh-2015-0111

Modak, B. K., Gorai, P., Dhan, R., Mukherjee, A., & Dey, A. (2015). Tradition in treating taboo: Folkloric medicinal wisdom of the aboriginals of Purulia district, West Bengal, India against sexual, gynaecological and related disorders. *Journal of Ethnopharmacology*, *169*, 370–386. https://doi.org/10.1016/j.jep.2015.04.020

Montgomery, P., Hennegan, J., Dolan, C., Wu, M., Steinfield, L., & Scott, L. (2016). Menstruation and the Cycle of Poverty: A Cluster Quasi-Randomised Control Trial of Sanitary Pad and Puberty Education Provision in Uganda. *PLoS ONE*, *11*(12), 1–26. https://doi.org/10.1371/journal.pone.0166122

Mukherjee, A., Lama, M., Khakurel, U., Jha, A. N., Ajose, F., Acharya, S., Tymes-Wilbekin, K., Sommer, M., Jolly, P. E., Lhaki, P., & Shrestha, S. (2020). Perception and practices of menstruation restrictions among urban adolescent girls and women in Nepal: A cross-sectional survey. *Reproductive Health*, *17*, 81. https://doi.org/10.1186/s12978-020-00935-6

Muralidharan, A. & Singhania, A. (August 2022). *Integrating menstrual health and sexual and reproductive health and rights: Insights from and implication for India.* United Nations Population Fund and WaterAid India. Retrieved November 6, 2023 from https://www.wateraid.org/in/sites/g/files/jkxoof336/files/2023-06/Final%20Report%20-%20Integration%20of%20Menstrual%20Hygiene_2.pdf

Nalugya, R., Tanton, C., Hytti, L., Kansiime, C., Nakuya, K., Namirembe, P., Nakalema, S., Neema, S., Alezuyo, C., Namuli Musoke, S., Torondel, B., Francis, S. C., Ross, D. A., Bonell, C., Seeley, J., & Weiss, H. A. (2020). Assessing the effectiveness of a comprehensive menstrual health intervention program in Ugandan schools (MENISCUS): Process evaluation of a pilot intervention study. *Pilot and Feasibility Studies*, *6*(1), 51. https://doi.org/10.1186/s40814-020-00585-2

Nelson, L. (2023, November 21). *Days for Girls International and MIET Africa's Reusable Pads Study*. Days for Girls International. https://www.daysforgirls.org/blog/days-for-girls-international-and-miet-africas-reusable-pads-studydays-for-girls-international-and-miet-africas-reusable-pads-study/

New Life Charitable Trust (n.d.). http://newlifecharitabletrust.org/about-us/

Ntuyeko, H.B. (2021, June 17). *Empowering Tanzanian schools to improve Menstrual Health and Hygiene.* Duke-UNICEF Innovation Accelerator. https://dukeunicef.org/empowering-tanzanian-schools-to-improve-menstrual-health-and-hygiene/

Oruko, K., Nyothach, E., Zielinski-Gutierrez, E., Mason, L., Alexander, K., Vulule, J., Laserson, K. F., & Phillips-Howard, P. A. (2015). "He is the one who is providing you with everything so whatever he says is what you do": A Qualitative Study on Factors Affecting Secondary Schoolgirls' Dropout in Rural Western Kenya. *PLOS ONE*, *10*(12), e0144321. https://doi.org/10.1371/journal.pone.0144321

Pal, J., Ahmad, S., & Siva, A. (2017). Impact of health education regarding menstrual hygiene on genitourinary tract morbidities: An intervention study among adolescent girl students in an urban slum. *International Journal of Research in Medical Sciences*, 5, 4937. https://doi.org/10.18203/2320-6012.ijrms20174948

Patkar, A. (2020). Policy and Practice Pathways to Addressing Menstrual Stigma and Discrimination. In C. Bobel, I. T. Winkler, B. Fahs, K. A. Hasson, E. A. Kissling, & T.-A. Roberts (Eds.), *The Palgrave Handbook of Critical Menstruation Studies* (pp. 485–509). Springer Singapore. https://doi.org/10.1007/978-981-15-0614-7_38

Paul, K. K., Chaudhuri, S., & Maiti, A. (2020). Menstrual hygiene practices among women aged 15-49 years attending a medical college hospital in Kolkata: A cross-sectional study. *Journal of Family Medicine and Primary Care*, 9(9), 4699–4704. https://doi.org/10.4103/jfmpc.jfmpc_718_20

Nepal Fertility Care Center (2015, March). Assessment Study on Chhaupadi in Nepal: Towards a Harm Reduction Strategy.

Panda, N., Desaraju, S., Panigrahy, R. P., Ghosh, U., Saxena, S., Singh, P., & Panda, B. (2024). Menstrual health and hygiene amongst adolescent girls and women of reproductive age: A study of practices and predictors, Odisha, India. *BMC Women's Health*, *24*(1), 144. https://doi.org/10.1186/s12905-024-02894-7

Partos (2024). Feminist MEL. Available at https://www.partos.nl/wp-content/uploads/2024/02/Rethinking-MEL-a-guide-for-a-Feminist-approach.pdf.

Phillips-Howard, P. A., Caruso, B., Torondel, B., Zulaika, G., Sahin, M., & Sommer, M. (2016). Menstrual hygiene management among adolescent schoolgirls in low- and middle-income countries: Research priorities. *Global Health Action*, *9*(1), 33032. https://doi.org/10.3402/gha.v9.33032

Punzi, M. C., & Werner, M. (2020). Challenging the Menstruation Taboo One Sale at a Time: The Role of Social Entrepreneurs in the Period Revolution. In C. Bobel, I. T. Winkler, B. Fahs, K. A. Hasson, E. A. Kissling, & T.-A. Roberts (Eds.), *The Palgrave Handbook of Critical Menstruation Studies* (pp. 833–851). Springer Singapore. https://doi.org/10.1007/978-981-15-0614-7_60

Ram, U., Pradhan, M. R., Patel, S., & Ram, F. (2020). Factors Associated with Disposable Menstrual Absorbent Use Among Young Women in India. *International Perspectives on Sexual & Reproductive Health*, *46*(1), 223–234. https://doi.org/10.1363/46e0320

Ramesh, R. (2024, Feb. 29). *Can step to end period poverty be greener?* Bangalore Mirror. Retrieved March 7, 2024, from https://bangaloremirror.indiatimes.com/bangalore/others/can-step-to-end-period-poverty-be-greener/articleshow/108082480.cms.

Ray, S., & Dasgupta, A. (2012). Determinants Of Menstrual Hygiene Among Adolescent Girls: A Multivariate Analysis. *National Journal of Community Medicine*, *3*(02), Article 02.

Rohatgi, A., & Dash, S. (2023). Period poverty and mental health of menstruators during COVID-19 pandemic: Lessons and implications for the future. *Frontiers in Global Women's Health*, *4*, 1128169. https://doi.org/10.3389/fgwh.2023.1128169

Rydstrom, K. (2020). Degendering menstruation: Making trans menstruators matter. In C. Bobel, I. T. Winkler, B. Fahs, K. A. Hasson, E. A. Kissling, & T.-A. Roberts (Eds.), *The Palgrave Handbook of Critical Menstruation Studies* (pp. 945-959). Springer Singapore. https://doi.org/10.1007/978-981-15-0614-7_52

Samanta, M., & Sarkar, S. (2022). Menstrual hygiene: Knowledge and practices among the Muslim rural adolescent girls of Paschim Medinipur, West Bengal, India. *Journal of the Indian Anthropological Society*, 57(2), 177–191.

Samanta, A., Thakur, J., & Goswami, M. (2019). Menstrual characteristics and its association with socio-demographic factors and nutritional status: A study among the urban slum adolescent girls of West Bengal, India. *Anthropological Review*, 82(2), 105–124. https://doi.org/10.2478/anre-2019-0008

Santra, S. (2017). Assessment of knowledge regarding menstruation and practices related to maintenance of menstrual hygiene among the women of reproductive age group in a slum of Kolkata, West Bengal, India. *International Journal of Community Medicine and Public Health*, 4(3), 708-712. https://doi.org/10.18203/2394-6040.ijcmph20170744

Sarkar, I., Dobe, M., Dasgupta, A., Basu, R., & Shahbabu, B. (2017). Determinants of menstrual hygiene among school going adolescent girls in a rural area of West Bengal. *Journal of Family Medicine and Primary Care*, 6(3), 583–588. https://doi.org/10.4103/2249-4863.222054

Save the Children. (2022). *Menstrual Hygiene Management: Operational Guidelines*. Retrieved March 14, 2023, from https://resourcecentre.savethechildren.net/pdf/menstrual_hygiene_management_operational_guidelines.pdf/

Schmitt, M. L., Wood, O. R., Clatworthy, D., Rashid, S. F., & Sommer, M. (2021). Innovative strategies for providing menstruation-supportive water, sanitation and hygiene (WASH) facilities: Learning from refugee camps in Cox's bazar, Bangladesh. *Conflict and Health*, 15(1), 10. https://doi.org/10.1186/s13031-021-00346-9

Schoep, M. E., Adang, E. M. M., Maas, J. W. M., Bie, B. D., Aarts, J. W. M., & Nieboer, T. E. (2019). Productivity loss due to menstruation-related symptoms: A nationwide cross-sectional survey among 32 748 women. *BMJ Open*, *9*(6), e026186. https://doi.org/10.1136/bmjopen-2018-026186

Scott, L., Montgomery, P., Steinfield, L., Dolan, C., Dopson, S. (Oct. 2013). *Sanitary Pad Acceptability and Sustainability Study.* University of Oxford. Retrieved March 14, 2023 from https://menstrualhygieneday.org/wp-content/uploads/2016/12/UniversityOxford_SanPads_Kenya_2013.pdf.

Seth, A. (2023, Aug 12). Recommendations for India's much awaited menstrual care policy to ensure sexual and reproductive health rights and sustainably ending period poverty. *The Times of India.* Retrieved September 6, 2023, from https://timesofindia.indiatimes.com/blogs/nonpartisan-perspectives/recommendations-for-indias-much-awaited-menstrual-care-policy-to-ensure-sexual-and-reproductive-health-rights-and-sustainably-ending-period-poverty

Shah, S. P., Nair, R., Shah, P. P., Modi, D. K., Desai, S. A., & Desai, L. (2013). Improving quality of life with new menstrual hygiene practices among adolescent tribal girls in rural Gujarat, India. *Reproductive Health Matters*, *21*(41), 205–213. https://doi.org/10.1016/S0968-8080(13)41691-9

Shah, V., Nabwera, H. M., Sosseh, F., Jallow, Y., Comma, E., Keita, O., & Torondel, B. (2019). A rite of passage: A mixed methodology study about knowledge, perceptions and practices of menstrual hygiene management in rural Gambia. *BMC Public Health*, *19*(1), 277. https://doi.org/10.1186/s12889-019-6599-2

Singh, A., Chakrabarty, M., Singh, S., Chandra, R., Chowdhury, S., & Singh, A. (2022a). Menstrual hygiene practices among adolescent women in rural India: A cross-sectional study. *BMC Public Health*, *22*(1), 2126. https://doi.org/10.1186/s12889-022-14622-7

Singh, A., Chakrabarty, M., Singh, S., Mohan, D., Chandra, R., & Chowdhury, S. (2022b). Wealth-based inequality in the exclusive use of hygienic materials during menstruation among young women in urban India. *PLoS ONE*, 17(11), 1–19. https://doi.org/10.1371/journal.pone.0277095

Singh, M., Rajoura, O. P., & Honnakamble, R. A. (2019). Patterns and problems of menstruation among the adolescent school girls of Delhi: A cross-sectional study. *International Journal Of Community Medicine And Public Health*, *6*(6), 2595. https://doi.org/10.18203/2394-6040.ijcmph20192329

Sinha, R.N., Paul, B. (2018). Menstrual hygiene management in India: The concerns. Indian J Public Health 62:71-4. Available at https://www.ijph.in/temp/IndianJPublicHealth62271-5822019_161020.pdf.

Sivakami, M., Maria van Eijk, A., Thakur, H., Kakade, N., Patil, C., Shinde, S., Surani, N., Bauman, A., Zulaika, G., Kabir, Y., Dobhal, A., Singh, P., Tahiliani, B., Mason, L., Alexander, K. T., Thakkar, M. B., Laserson, K. F., & Phillips-Howard, P. A. (2019). Effect of menstruation on girls and their schooling, and facilitators of menstrual hygiene management in schools: Surveys in government schools in three states in India, 2015. *Journal of Global Health*, *9*(1), 010408. https://doi.org/10.7189/jogh.09.010408

Sommer, M., Torondel, B., Hennegan, J., Phillips-Howard, P.A., Mahon, T., Motivans, A., Zulaika, G., Gruer, C., Haver, J., Caruso, B.A. & Monitoring Menstrual Health and Hygiene Group (2021a). How addressing menstrual health and hygiene may enable progress across the Sustainable Development Goals. *Global Health Action*, 14:1, 1920315, DOI: 10.1080/16549716.2021.1920315.

Sommer, M., Caruso, B. A., Torondel, B., Warren, E. C., Yamakoshi, B., Haver, J., Long, J., Mahon, T., Nalinponguit, E., Okwaro, N., & Phillips-Howard, P. A. (2021b). Menstrual hygiene management in schools: Midway progress update on the "MHM in Ten" 2014–2024 global agenda. *Health Research Policy and Systems*, *19*(1), 1. https://doi.org/10.1186/s12961-020-00669-8

Sommer, M., Schmitt, M., Ogello, T., Mathenge, P., Mark, M., Clatworthy, D., Khandakji, S., & Ratnayake, R. (2018). Pilot testing and evaluation of a toolkit for menstrual hygiene management in emergencies in three refugee camps in Northwest Tanzania. *Journal of International Humanitarian Action*, *3*(1), 6. https://doi.org/10.1186/s41018-018-0034-7

Sommer, M., Caruso, B. A., Sahin, M., Calderon, T., Cavill, S., Mahon, T., & Phillips-Howard, P. A. (2016a). A Time for Global Action: Addressing Girls' Menstrual Hygiene Management Needs in Schools. *PLoS Medicine*, *13*(2), e1001962. https://doi.org/10.1371/journal.pmed.1001962

Sommer, M., Chandraratna, S., Cavill, S., Mahon, T., & Phillips-Howard, P. (2016b). Managing menstruation in the workplace: An overlooked issue in low- and middle-income countries. *International Journal for Equity in Health*, *15*, 86. https://doi.org/10.1186/s12939-016-0379-8

Sommer, M., Hirsch, J. S., Nathanson, C., & Parker, R. G. (2015). Comfortably, Safely, and Without Shame: Defining Menstrual Hygiene Management as a Public Health Issue. *American Journal of Public Health*, *105*(7), 1302–1311. https://doi.org/10.2105/AJPH.2014.302525

Straight Talk Foundation (n.d.). https://straighttalkfoundation.org

Sukumar, D. (2020). Personal narrative: Caste is my period. In C. Bobel, I. T. Winkler, B. Fahs, K. A. Hasson, E. A. Kissling, & T.-A. Roberts (Eds.), *The Palgrave Handbook of Critical Menstruation Studies* (pp. 137–142). Springer Singapore. https://doi.org/10.1007/978-981-15-0614-7_13

Sumpter, C., & Torondel, B. (2013). A Systematic Review of the Health and Social Effects of Menstrual Hygiene Management. *PLoS ONE*, *8*(4), e62004. https://doi.org/10.1371/journal.pone.0062004

Taklikar, C., Dobe, M., & Mandal, R. (2016). Short Communication Menstrual Hygiene Knowledge and Practice among Adolescent School Girls of Urban Slum of Chetla, Kolkata. *Indian Journal of Hygiene and Public Health*, 2(1), 57-67.

Tellier, M., Farley, A., Jahangir, A., Nakalema, S., Nalunga, D., & Tellier, S. (2020). Practice Note: Menstrual Health Management in Humanitarian Settings. In C. Bobel, I. T. Winkler, B. Fahs, K. A. Hasson, E. A. Kissling, & T.-A. Roberts (Eds.), *The Palgrave Handbook of Critical Menstruation Studies* (pp. 593-608). Springer Singapore. https://doi.org/10.1007/978-981-15-0614-7_52

Thakur, H., Aronsson, A., Bansode, S., Stalsby Lundborg, C., Dalvie, S., & Faxelid, E. (2014). Knowledge, Practices, and Restrictions Related to Menstruation among Young Women from Low Socioeconomic Community in Mumbai, India. *Frontiers in Public Health*, *2*. https://www.frontiersin.org/articles/10.3389/fpubh.2014.00072

Torondel, B., Sinha, S., Mohanty, J. R., Swain, T., Sahoo, P., Panda, B., Nayak, A., Bara, M., Bilung, B., Cumming, O., Panigrahi, P., & Das, P. (2018). Association between unhygienic menstrual management practices and prevalence of lower reproductive tract infections: A hospital-based cross-sectional study in Odisha, India. *BMC Infectious Diseases*, *18*(1), 473. https://doi.org/10.1186/s12879-018-3384-2

UN (n.d.). Quality Education: Why it matters. https://www.un.org/sustainabledevelopment/wp-content/uploads/2017/02/04_Why-It-Matters-2020.pdf. Accessed November 16, 2023.

UNICEF (2021). *Menstrual hygiene in South Asia: Synthesis report*. Retrieved March 14, 2023, from https://washmatters.wateraid.org/sites/g/files/jkxoof256/files/higiene-menstrual-en-el-sur-de-asia-informe-de-sntesis.pdf.

UNICEF (2020, June). *Guidance for monitoring menstrual health and hygiene (version I)*. Retrieved March 14, 2023, from https://www.unicef.org/documents/guidance-monitoring-menstrual-health-and-hygiene

UNICEF (2019a, March). *Guidance on menstrual health and hygiene.* Retrieved July 17, 2023 from https://www.unicef.org/media/91341/file/UNICEF-Guidance-menstrual-health-hygiene-2019.pdf

UNICEF (2019b, May). *Guide to menstrual hygiene materials*. Retrieved March 14, 2023, from https://www.unicef.org/documents/guide-menstrual-hygiene-materials

UNICEF (2013, Nov). WASH in schools empowers girls' education: Tools for assessing menstrual hygiene management in schools. Retrieved July 17, 2023 from https://wins4girls.azurewebsites.net/resources/2013%20UNICEF%20Emory%20Tools%20for%20Assessing%20MHM%20in%20Schools.pdf.

Uninhibited. (2024, February 14). Re-envision the evidence for Menstrual Health? *Medium*. https://uninhibited2016.medium.com/re-envision-the-evidence-for-menstrual-health-2c0e16e43237

USAID (2019, Dec). Menstrual hygiene management and women's economic empowerment: A review of existing evidence. Retrieved March 15, 2023 from https://www.globalwaters.org/sites/default/files/WASHPaLS%20MHM%20Desk%20Review%20-%20February%202020.pdf

van Eijk, A. M., Jayasinghe, N., Zulaika, G., Mason, L., Sivakami, M., Unger, H. W., & Phillips-Howard, P. A. (2021). Exploring menstrual products: A systematic review and meta-analysis of reusable menstrual pads for public health internationally. *PLoS ONE*, *16*(9), 1–26. https://doi.org/10.1371/journal.pone.0257610

van Eijk, A. M., Laserson, K. F., Nyothach, E., Oruko, K., Omoto, J., Mason, L., Alexander, K., Oduor, C., Mohammed, A., Eleveld, A., Ngere, I., Obor, D., Vulule, J., & Phillips-Howard, P. A. (2018). Use of menstrual cups among school girls: Longitudinal observations nested in a randomised controlled feasibility study in rural western Kenya. *Reproductive Health*, *15*(1), 139. https://doi.org/10.1186/s12978-018-0582-8

van Eijk, A. M., Sivakami, M., Thakkar, M. B., Bauman, A., Laserson, K. F., Coates, S., & Phillips-Howard, P. A. (2016). Menstrual hygiene management among adolescent girls in India: A systematic review and meta-analysis. BMJ Open, 6(3), e010290. https://doi.org/10.1136/bmjopen-2015-010290

Vashisht, A., Pathak, R., Agarwalla, R., Patavegar, B. N., & Panda, M. (2018). School absenteeism during menstruation amongst adolescent girls in Delhi, India. *Journal of Family & Community Medicine*, *25*(3), 163–168. https://doi.org/10.4103/jfcm.JFCM_161_17

WASH United (n.d.). https://wash-united.org

WHO/UNICEF Joint Monitoring Programme for Water Supply, Sanitation and Hygiene (2021). *Progress on household drinking water, sanitation and hygiene, 2000-2020: Five years into the SDGs*. Retrieved March 14, 2023 from https://data.unicef.org/resources/progress-on-household-drinking-water-sanitation-and-hygiene-2000-2020/

WHO/UNICEF Joint Monitoring Programme for Water Supply, Sanitation and Hygiene (2018). *Core questions on water, sanitation and hygiene for household surveys.* Retrieved March 14, 2023, from https://washdata.org/monitoring/methods/core-questions

Wilbur, J., Torondel, B., Hameed, S., Mahon, T., & Kuper, H. (2019). Systematic review of menstrual hygiene management requirements, its barriers and strategies for disabled people. *PLOS ONE*, *14*(2), e0210974. https://doi.org/10.1371/journal.pone.0210974

Wilson, E., Reeve, J., & Pitt, A. (2014). Education. Period. Developing an acceptable and replicable menstrual hygiene intervention. *Development in Practice*, 24(1), 63–80. https://doi.org/10.1080/09614524.2014.867305

Winkler, I. T. (2021). Menstruation and Human Rights: Can We Move Beyond Instrumentalization, Tokenism, and Reductionism? *Columbia Journal of Gender and Law*, *41*(1), Article 1. https://doi.org/10.52214/cjgl.v41i1.8842

Winkler, I. T., & Bobel, C. (2021). "Bizarre" and "Backward": Saviorism and Modernity in Representations of Menstrual Beliefs and Practices in the Popular Media. *Feminist Formations*, *33*(2), 313–339. https://doi.org/10.1353/ff.2021.0016

Winkler, I. T. (2019). Human Rights Shine a Light on Unmet Menstrual Health Needs and Menstruation at the Margins. *Obstetrics & Gynecology*, *133*(2), 235–237. https://doi.org/10.1097/AOG.0000000000003098

Wood, J. M. (2020). (In)Visible Bleeding: The Menstrual Concealment Imperative. In C. Bobel, I. T. Winkler, B. Fahs, K. A. Hasson, E. A. Kissling, & T.-A. Roberts (Eds.), *The Palgrave Handbook of Critical Menstruation Studies* (pp. 319–336). Springer. https://doi.org/10.1007/978-981-15-0614-7_25

Appendix A

Name/Phone	Age	Location	Religion
Occupation Paid employment / housewife / student / other (specify)		Marital status: Single never married / married / widowed	
1. During your last menstrual period, what hygiene materials did you use? (Describe materials and manner of use) Code: (1) new cloth / (2) reused cloth / (3) reusable sanitary pads / (3) single-use sanitary pads / (4) toilet paper / (5) underwear alone / (6) no materials / (7) other (specify). **Circle all used, and underline primary method**			
2. During your last menstrual period were you able to wash and change in privacy while at home? (Describe circumstances) Code: (1) Yes / (2) No			
3. If you reused hygiene materials during your last menstrual period, how did you wash them? (Describe washing method and place) Code: (1) Water only / (2) soap / (3) disinfectant / (4) scrubbing brush / (5) other (specify)			
4a. If you reused hygiene materials during your last menstrual period, where did you dry them? (Describe drying manner and location) Code: (1) Inside / (2) Outside / (3) Outside but covered with other cloth / (4) other (specify) 4b. Were they completely dry when you needed them? Code: (1) Yes / (2) No			
5. During your last menstrual period, did you miss any activities due to your period? Why? (Describe missed activities and reason.) Code activity: (1) going to temple/worship / (2) cooking / (3) visiting family / (4) exercise / (5) shopping for groceries / (6) school or paid work / (7) work in fields / (8) caring for children / (9) other (specify) / (10) none of this applies Code reason: (1) forbidden / (2) did not feel well / (3) embarrassed or afraid of accident / (4) other (specify)			
6a. From one menstrual period to the next, are there certain days when a woman is more likely to become pregnant? Code: (1) Yes / (2) No 6b. If yes, when: (1) just before her period begins / (2) during her period / (3) right after her period has ended / (4) halfway between two periods			
7. In the last year, have you experienced any of the following symptoms: Code: (1) Abdominal pain without diarrhea / (2) abnormal vaginal discharge (unusual texture and color, more abundant than normal) / (3) burning or itching in the genitalia / (4) Genital sores / (5) None of these			
8. Do you agree with the following statement: Menstruation should be kept secret. Code: (1) strongly agree / (2) agree / (3) disagree / (4) strongly disagree			
9. Do you agree with the following statement: I feel confident during my menstrual period. Code: (1) strongly agree / (2) agree / (3) disagree / (4) strongly disagree			
10. What information about your body would you like to know?			
Other notes:			

Appendix B

1. Are periods healthy or unhealthy?
   Healthy / unhealthy
2. Is it normal to get periods?
   Yes / No
3. Which of these is correct?
   a. Periods is a curse /
   b. Periods is a natural body process /
   c. Periods is a disease
4. Is vaginal discharge normal?
   Yes / No
5. Anemia is cause due to
   a. Growing up
   b. Periods
   c. Deficiency of iron in the body
6. Which food items are good sources of iron?
   a. Potato (with skin)
   b. Spinach
   c. Cold drinks
   d. Peas
   e. Biscuits
7. Is it possible to predict the dates of your next periods?
   Yes / No

8a. From one menstrual period to the next, are there certain days when a woman is more likely to become pregnant?
   Yes / No

8b. If yes, when?:
   a. Just before her period begins
   b. During her period
   c. Right after her period has ended
   d. Halfway between two periods

9. During periods you must change your pads/cloth at least every six hours.
   True / False
10. What will you do if you get your periods in school?
   a. I will go home /
   b. I will ask a teacher or a friend for a pad /
   c. I will not tell anyone and will wait for school to be over
11. You should not take bath during periods.
   True / False
12. What helps in relieving period pain?
   a. Yoga poses like butterfly pose, child pose, cobra pose
   b. Placing hot water bag on lower abdomen
   c. Watching TV
   d. Consulting a doctor