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Cultural Taboos and Misinformation about Menstrual Health Management in Rural Bangladesh

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Abstract

Every month, millions of women worldwide face challenges managing their menstrual hygiene, suffering negative impacts on their health, education, and productivity. Cultural taboos and social norms may contribute to harmful health behaviors and may also interfere with attempts to improve knowledge. Our study explores how deep-rooted cultural norms relate to, and potentially hinder, effective menstrual hygiene practices. We engaged with women in rural communities in Bangladesh to understand and quantify their well-being during menstruation and their perceptions on the prevailing social norms around menstrual health. With an educational intervention, we aim to disseminate crucial knowledge on menstrual hygiene practices. Our findings show that while the information intervention succeeded in reshaping certain misconceptions and menstrual practices, it was not enough to alter deep-seated norms regarding the washing and maintenance of menstrual cloth.

JEL-Codes: I120, I150, D910, O120.

Keywords: social norms, menstrual health management, menstrual hygiene, information, adverse health behavior.

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1 Introduction

Across many contexts, managing menstruation with dignity and hygiene remains a significant challenge. Worldwide, inadequate menstrual health management has emerged as a pressing public health concern. This challenge is particularly pronounced in low-income countries, where the deficiency of menstrual hygiene practices and materials is acute. In these contexts, women often rely on inadequate materials such as old cloth, cotton wool, leaves or ash for menstrual health management, highlighting a critical gap in basic health resources (McMahon et al., 2011; Van Eijk et al., 2016; Kuhlmann et al., 2017; International Institute for Population Sciences, 2020; Singh et al., 2022). Furthermore, adherence to hygienic practices for cleaning traditional materials is low (Bangladesh Bureau of Statistics, 2020). Reusable cloth needs to be washed with clean water and soap, and dried in the sunlight for disinfection.¹ Yet, often these products are not properly cleaned or dried (Bangladesh Bureau of Statistics, 2020), and are stored damp in hidden places, compromising their hygienic integrity.

The inability to manage menstrual hygiene has far-reaching consequences: adverse effects on women’s physical health due to urogenital tract infections (Sumpter and Torondel, 2013; Das et al., 2015); reduced mental well-being due to feelings of shame, stress and anxiety about menstruation (Crichton et al., 2013); lower educational participation, since adolescent girls miss more days at school when menstruating and increasingly drop out (Benshaul-Tolonen et al., 2021; Agarwal et al., 2022); and higher work absenteeism (Krenz and Strulik, 2021).²

Inadequate menstrual hygiene is rooted in cultural beliefs and taboos. Menstruation, often misconstrued as a curse or ailment (Khanna et al., 2005), is shrouded in stigma, and linked with disease and misfortune (Mohamed et al., 2018). Such misconceptions not only impose behavioral restrictions on menstruating women (Kumar and Srivastava, 2011), but also dictate that menstrual practices remain concealed (Mason et al., 2013; Thapa et al., 2019). These cultural narratives perpetuate knowledge gaps about menstrual health and interfere with hygienic menstrual practices, including the proper maintenance of reusable products (Dasgupta and Sarkar, 2008) and the adoption of disposable sanitary pads (Castro and Mang, 2022). Czura et al. (2024) show that providing information can enhance hygienic menstrual health management using traditional products, suggesting that hygienic practices are as effective as modern menstrual products in improving women’s health. Nevertheless, the dynamics between menstrual taboos, information dissemination, and their implications on women’s well-being are not yet fully understood.

In this paper, we study cultural beliefs and social norms surrounding menstruation and

¹The disinfecting properties of the sun’s UV light are often the only available method of killing bacteria in the cloth in many low-income settings (Torondel et al., 2018).

²For example, a study by the Water Supply Sanitation Collaborative Council (WSSCC) in Bangladesh suggests that an infection caused by using cloth during menstruation leads to 73 percent of women missing work for an average of 6 days a month (WSSCC, 2013).

we examine how they interact with the provision of information. Our study has two primary objectives. First, we document various aspects of menstrual health management: knowledge and practices, societal implications on women’s physical and mental well-being, the reported impact of menstruation on behavior, and the societal taboos and social norms surrounding menstruation. Second, we implement an information intervention on menstrual health and hygiene and observe how the aforementioned outcomes change, both in the short and in the long run. Our data come from surveys with artisan workers in Bangladesh. To elicit social norms, we employ a state-of-the-art, monetarily incentivized experimental procedure (Krupka and Weber, 2013), building on the conceptual framework of Bicchieri (2005).

We find substantial knowledge gaps on the proper use of hygienic material for menstrual health management: Around 25 percent of the women using menstrual cloth are unaware of the correct methods for cleaning and drying it. Moreover, only 9 percent follow the recommended cleaning and drying process for reusable menstrual cloth. The exposure to these unhygienic menstrual practices is particularly high: 70 percent of women report using cloth regularly to manage their menstruation. We find that the majority of women report a decline in physical and mental well-being, particularly experiencing stress and shame, during menstruation. This highlights the heavy stigma associated with menstruation in the studied context, also evidenced by the reported fear of others noticing their menstruation due to stains or odor. It also points towards the fact that the absorbent materials used are either inadequate or not used properly. Further, we find some support for mobility restrictions: 50 percent of women restrict their market visits and 76 percent avoid visiting ill people during menstruation. We do not find restrictions for attending social gatherings or cooking for the family. In our social norm elicitation, we find that reported adverse behavior is well reflected in normative expectations, in particular on hygienic menstrual practices.

The information intervention had a notable impact on correcting harmful social norms. Post-intervention, respondents reported a shift in the social norm: The correct drying of reusable cloth was deemed 30 percent more socially appropriate. Impressively, this positive change persisted even two years after the intervention. Beyond this, the intervention also had a broader influence on normative expectations not directly addressed in the information session. We observe positive shifts in perceptions regarding mobility restrictions and communication. However, there remains a persistent view, both immediately after the intervention and two years later, that washing cloth in communal laundry facilities or any public setting is highly socially inappropriate. This enduring perception highlights the complexity of changing deeply ingrained social norms and practices.

Our research contributes to three strands of literature. First, we contribute to the literature on menstrual health management. Prior studies predominantly focused on the financial barriers to hygienic menstrual health management, showing how improved access to menstrual material can positively impact schoolgirls’ educational outcomes (Montgomery et al.,

2012; Benshaul-Tolonen et al., 2021; Agarwal et al., 2022). For working women, Krenz and Strulik (2021) document reduced work absenteeism for women using disposable sanitary pads in Burkina Faso. Czura et al. (2024) relax both financial and informational constraints related to hygienic menstrual health management in a randomized-controlled trial among garment workers in Bangladesh. While alleviating these constraints does not affect labor outcomes, it yields important improvements in women’s health: Reducing financial barriers leads to better health outcomes through the adoption of modern menstrual material, whereas reducing information gaps improves the hygienic use of traditional materials. Our study complements existing studies by documenting knowledge gaps in hygienic menstrual health management. Alongside Castro and Mang (2022) and Czura et al. (2020), our research further expands the scope by studying cultural beliefs, social norms and menstruation-related taboos.³

Second, we contribute to a growing literature on the importance of stigma and taboos for health behavior.

Cultural beliefs and social norms have been identified as important factors in individual’s health behavior (see Mollen et al. (2010) for an overview). For example, Templeton et al. (2016) show that individuals adapt their food preferences for healthy and unhealthy foods depending on their peers’ preferences.⁴ Moreover, stigma and fear of negative social repercussions have been reported to influence diverse preventive health behaviors, including the use of contraception (Håkansson et al., 2018) and face masks during a global pandemic (Kwon, 2022), and the decision for medical tests and treatments, such as testing for sexually transmitted diseases (Yang et al., 2023), preventative health check-ups (Ghosal et al., 2022), and seeking help for substance addiction or mental health issues (Shidhaye and Kermode, 2013). Most related to our study, Castro and Mang (2022) show that a discussion-based intervention can effectively destigmatize menstruation, increase demand for hygienic menstrual products, and alleviate restrictive social norms surrounding their purchase. Our contribution lies in directly measuring and quantifying social norms in the context of menstruation in a low-income setting, and empirically documenting their evolution in response to targeted information dissemination.

Lastly, we extend the literature on the role of information provision in influencing health behavior. The impact of information campaigns on health outcomes has been mixed, as evidenced in hand washing promotion efforts. Some studies report a reduction in diseases like diarrhea (Haggerty et al., 1994), while others only find an improvement in knowledge without corresponding health improvements (Galiani et al., 2016). The nature of the information provided appears crucial. For instance, while abstinence-focused sexual behavior recommen-

³Czura et al. (2020) is an earlier working paper version of Czura et al. (2024), in which they also report the effects of the information intervention on social norms with similar findings to ours.

⁴This influence mirrors the observed effects of peer behavior on various health-related behaviors, including unhealthy weight-control in adolescent girls (Eisenberg et al., 2005), physical activity and dietary habits in adult women (Ball et al., 2010), and hand-washing habits among university students (Dickie et al., 2018).

dations have been ineffective in preventing teen pregnancy, information on HIV risk has lead to substantial reductions (Dupas, 2011). In India, hand washing behavior was notably enhanced when messages incorporated emotional drivers such as nurture or disgust (Biran et al., 2014). In Pakistan, Bennett et al. (2018) find that information provision alone is ineffective when it contrasts with traditional beliefs and culture: Standard hygiene instructions did not change respondents’ health behavior unless they were accompanied by a module that also addressed traditional health beliefs. Our study sheds new light on the complex interplay between cultural context and the receptivity to new health-related information.

In the next section we present detailed information about the background of the study. The study design and the sample are described in section 3. Section 4 documents menstrual health management and its societal implications, and section 5 analyzes the impact of the information campaign; section 6 concludes.

2 Background on Menstruation Practices

Menstrual Health Management Practices

Menstruation is a natural process and women have developed different methods to manage their menstrual hygiene, depending on available resources, socio-economic conditions, local traditions, cultural beliefs, and education. An increased focus on menstrual health management has revealed shortfalls in knowledge on cleaning, drying and storing absorptive materials, insufficient availability of menstrual material, and lack of sanitary facilities.

In the last twenty years, descriptive studies across low- and middle-income countries have showcased the extent of inadequate menstrual management practices. Several studies report that women rely on inadequate absorbent materials such as old cloths, tissue paper, cotton pieces, leaves or ash to manage their menstrual bleeding (McMahon et al., 2011; Van Eijk et al., 2016; Kuhlmann et al., 2017; International Institute for Population Sciences, 2020; Singh et al., 2022). Reusable menstrual cloth products are only hygienic if they are treated appropriately, i.e., they are washed with clean water and soap and dried in sunlight due to the disinfecting properties of the sun’s UV light. But often reusable products are neither washed nor dried properly (Bangladesh Bureau of Statistics, 2020) and are directly stored wet after washing, in concealed places such as cupboards or under the mattress. Commercially available disposable sanitary pads offer a good alternative and women report using them because they are seen as more comfortable and less likely to leak. But the rates of pad usage are rather low.⁵ High prices, lack of knowledge and stigmatisation of menstruation

⁵The International Institute for Population Sciences (2017) estimates that of the 336 million menstruating women in India, about 121 million women (roughly 36 percent) are using sanitary pads, locally or commercially produced. The International Centre for Diarrhoeal Disease Research, Bangladesh (ICDDR,

are suspected culprits for this low take-up (Averbach et al., 2009; Crofts and Fisher, 2012; Jewitt and Ryley, 2014; Castro and Mang, 2022; Czura et al., 2024).

When it comes to sanitary facilities, numerous descriptive studies and technical reports identify that schoolgirls and adult women in low- and middle-income countries often lack the facilities to change their menstrual absorbents in privacy and with appropriate hygiene. Oftentimes, toilets at schools lack cleanliness, light, soap or water (Boosey et al., 2014), they are regularly shared with boys, they have no doors and when they do, they lack locks (Crofts and Fisher, 2012; Alexander et al., 2014; Guya et al., 2014). A quarter of girls report not attending school during menstruation due to inadequate sanitary facilities (Van Eijk et al., 2016; Adukia, 2017). In the home environment, women with less access to sanitation facilities have to manage their menstruation outdoors or use the sleeping area of the house (Hennegan et al., 2018).

Mistaken Beliefs, Taboos, and Stigma Surrounding Menstruation

In low- and middle-income countries, pervasive knowledge gaps and numerous myths, cultural restrictions, and psycho-social constructs exist around menstruation. Contrary to the assumption of public health experts that familial guidance bridges the gap, misinformation and myths about menstruation significantly impede young women’s understanding of their own bodies: Many girls are unprepared for menarche, often concealing their first menstrual period out of fear of being punished for perceived sexual activity (Mason et al., 2013; Sommer and Sahin, 2013; Bangladesh Bureau of Statistics, 2020). This lack of preparedness stems largely from the discomfort and misinformation prevalent among adults, resulting in girls entering puberty with limited and inaccurate information (Chandra-Mouli and Patel, 2017).

This educational vacuum extends to formal schooling environments. Health education programs for teenagers in low-income countries do not often address menstrual hygiene practices and disorders. Moreover, teachers and schools have an almost negligible role in providing information about menstruation (Khanna et al., 2005; ICDDR, 2014; Michael et al., 2020), leaving schoolboys completely uninformed and girls with only limited information about the physiological processes involved. This knowledge gap persists during adulthood. Although adult women have more experience, they do not necessarily have access to (more) information.

Cultural beliefs and taboos seem to be at the core of poor menstrual hygiene management through the perpetuation of misinformation or unhygienic customs (McMahon et al., 2011; Crichton et al., 2013). Common myths arise from the nature of menstruation, which is not seen as a natural process but perceived as a divine curse, a disease, or the result of a sin (Khanna et al., 2005; Dasgupta and Sarkar, 2008). The belief that menstrual blood is dirty, toxic, or impure is also widespread, including in India (Kumar and Srivastava, 2011), Nepal

2014) estimates that in Bangladesh disposable pads are used by one quarter of adult women.

(Thapa et al., 2019), Fiji, Solomon Islands, and Papua New Guinea (Mohamed et al., 2018). It is believed that seeing menstrual blood can bring infertility, blindness (Garikipati and Boudot, 2017) and bad luck to men (Mohamed et al., 2018). Studies in various contexts have reported taboos around the disposal of menstrual blood and practices including restrictions on bathing and participation in social activities. It is commonly believed that taking a bath during menstruation increases the flow of menstrual blood or can cause problems during pregnancies in the future. There are restrictions on praying or entering places of worship, entering kitchens and attending to guests during menstruation, going to the market, and talking about menstruation itself. Women report not performing household work, and not attending school or social events, such as a marriage or a festive gathering. Further, cultural norms dictate that menstruation and all associated practices should remain completely hidden (Mason et al., 2013).

Significant Adverse Consequences of Inadequate Menstrual Hygiene

Inadequate menstrual health management can have significant adverse consequences for women and for their families. Taboos and stigmatisation of menstruation restrict female behavior (Ali and Rizvi, 2010; McMahan et al., 2011; Kumar and Kundan, 2011; Crichton et al., 2013; Muhit and Chowdhury, 2013; Mason et al., 2013; Mohamed et al., 2018), leading to unhygienic menstrual practices. This includes insufficient personal hygiene during menstruation and unhygienic treatment of menstrual cloth. Further, they may restrict buying hygienic menstrual products, such as sanitary pads, out of fear of being seen by other (Castro and Mang, 2022). Such practices can have severe physical health repercussions, like urogenital infections and related symptoms (Torondel et al., 2018), potentially resulting in pelvic inflammatory diseases, infertility, adverse pregnancy outcomes, and increased susceptibility to HIV (Nagarkar and Mhaskar, 2015). Mental health is also impacted, with increased levels of stress, shame, and anxiety about menstruation (Sahoo et al., 2015; Hulland et al., 2015).

The implications extend to educational participation for adolescent girls (Agarwal et al., 2022) and increased work absenteeism (Krenz and Strulik, 2021). The effects of access to menstrual material on educational attainment among schoolgirls depend on the type of menstrual product: Menstrual cups do not improve school attendance in Kenya (Benshaul-Tolonen et al., 2021) and Nepal (Oster and Thornton, 2011); sanitary pads improve attendance among schoolgirls in Ghana (Montgomery et al., 2012), Kenya (Benshaul-Tolonen et al., 2021), and India (Agarwal et al., 2022) and reduce school drop outs by 25 percents in the latter study. For working women, the effects of unhygienic menstrual practices on labor outcomes are less documented. In the Netherlands, Schoep et al. (2019) document a general increase of absenteeism and reduced productivity during menstruation. Similar findings are reported by Ichino and Moretti (2009) using data from an Italian bank, although Herrmann and Rockoff

(2012, 2013) do not find similar effects for U.S. teachers. For low-income countries, Krenz and Strulik (2021) show that women using modern menstrual products, such as sanitary pads, have lower work absenteeism in Burkina Faso. However, this is not observed in fast-paced work environments as in the randomized evaluation of Czura et al. (2024) in garment factories in Bangladesh. Understanding constraints to hygienic menstrual health management is crucial for improving women’s physical and mental health, their mobility and participation in daily activities, and their educational and possibly labor outcomes.

Menstrual Health Management in Bangladesh

In Bangladesh, the country of our study, misinformation and unhygienic practices are widespread and the biological process of menstruation continues to be closeted in a culture of shame. The *Bangladesh National Hygiene Survey* (Bangladesh Bureau of Statistics, 2020) reports that 45 percent of adolescent girls and 36 percent of women face health problems directly linked to menstrual practices. The survey, conducted in 2018, aims to offer a comprehensive overview of the current state of personal hygiene in Bangladesh, and it depicts a concerning scenario. A significant portion of the population relies on traditional methods: The majority of adolescent girls (50 percent) and women (64 percent) report using old cloth for menstrual hygiene management. More troubling is the fact that menstrual cloth is often dried clandestinely, with 55 to 67 percent of adolescent girls and women hiding them when drying. Additionally, 40 percent of adolescent girls and 44 percent of women store their washed cloths in concealed locations. Other studies have shown that only 3 percent of schoolgirls wash their menstrual cloth with soap, dry them in sunlight, and then store them with other cloth for repeated use (Alam et al., 2017). Education on menstruation is not provided in formal education and the topic is discussed only scarcely at home. Only 36 percent of the adolescent girls in the sample of the *Bangladesh National Hygiene Survey* had heard about menstruation before the onset of menarche, and only 3.5 percent learn about menstruation in school.

There has been a significant mobilization by humanitarian organizations and the private sector around the lack of access to commercial products and girls’ decreased school attendance during their menstruation. For example, in the Bangladeshi garment industry there is an active discussion among various stakeholders about improving menstrual health for its large, mostly female workforce. Several NGOs such as SNV, RHSTEP, Reemi and CARE have initiatives to improve access to menstrual health management products in garment factories.⁶ Efforts at the national level include programs such as the *Bangladesh National Hygiene*

⁶The NGO SNV recently started a project which provides access to subsidized sanitary pads in 25 factories. A baseline survey for their project shows that 60 percent of female workers are still using old cloth or paper during their menstruation, while 40 percent currently use disposable or reusable sanitary pads (SNV, 2016). The NGO Reemi has distributed between 2020 and 2021 more than 6.000 reusable menstrual underwear among garment factories (<https://reemi.org/blogs/news/1-700-phone-interviews-later>).

Promotion Strategy targeting menstrual health advancement, and the *National Health and Population Policies* seeking to improve women’s health. However, little research has been carried out in Bangladesh to help guide these efforts.

3 Study Design

Our study is structured into two separated but interrelated parts. In the first part, we comprehensively document various aspects of menstrual health management among our sample of working women in Bangladesh. This includes an in-depth examination of their knowledge and practices, an analysis of the prevailing social norms and behavioral restrictions, as well as an exploration of the stigma and taboos associated with menstruation. The second part of the paper focuses on the evaluation of an information campaign. Here, we assess the campaign’s effectiveness in altering the aforementioned outcomes, both in the immediate aftermath and over an extended period. This dual-phase approach enables us to not only understand the current state of menstrual health management but also to gauge the potential for positive change through targeted information interventions.

Data and Sample

Our data come from surveys with 113 working women from the region of Maniganjk, a rural district situated 50 kilometers west of the capital city of Dhaka in Bangladesh. All respondents work as artisans in embroidery centers of the social enterprise Aarong, which hand-produces ethnic wear and is part of the non-profit development agency BRAC. The artisans usually live near the artisan centers and belong to the same local community. We collaborated with Aarong to improve knowledge about menstrual health management for its all-female workforce and visited four different artisan centers to carry out information campaigns on menstrual health management in April 2019.

We elicited information on demographics, physical and mental well-being, menstrual health management knowledge and practices, behavior and restrictions during menstruation, and social norms surrounding menstruation before the information campaign in our *baseline* survey. Directly after the information campaign, we repeated questions on knowledge and social norms in our *midline* survey. An *endline* survey was conducted around two years after the information campaign via telephone to elicit knowledge, practices, and social norms surrounding menstruation. We reached 104 of the original 113 participants.⁷ All surveys were conducted by a team of female enumerators.

At baseline, the women in our sample are on average 32 years old, 86 percent are Muslim, 95 percent are married, and they have on average 10 years of experience working as artisans

⁷One participant has passed away, and eight left their work place and could not be reached via phone.

at this workplace (Table 2, Column 1).

Information Provision on Menstrual Health Management

The information campaign was delivered as a one-hour information session by staff of an NGO with extensive experience in conducting such educational programs in various workplaces across Bangladesh. All study participants attended a session, held at the artisan work center.

The session addressed several information constraints. First, it included an anatomical explanation of menstruation. Second, it offered practical advice for managing period pain and strategies for effective communication about menstrual health, particularly with adolescent girls. Last, hygienic menstrual health management was highlighted and the session equally promoted the use of modern disposable absorbents, such as disposable pads, and provided guidance on the hygienic use of reusable absorbents like cloth, emphasizing the need for washing cloth with soap and water and drying it in sunlight.

Social Norms Surrounding Menstruation

Prevailing cultural and social beliefs can be understood as social norms, defined as *"a rule of behavior such that individuals prefer to conform to it on condition that they believe that [...] most people in their reference network believe they ought to conform to it (normative expectation)"* (Bicchieri, 2005). Ongoing research in social sciences strives to set a detailed framework that delineates what is understood as social norms, cultural traditions, and personal preferences (Bicchieri, 2005, 2017; Tremewan and Vostroknutov, 2020).

In this paper, we follow the definition by Bicchieri (2005) and elicit normative expectations of Bangladeshi women on various issues surrounding menstruation: menstrual health management, mobility restrictions, and communication about menstruation. The normative expectations were elicited using an incentivized method based on Krupka and Weber (2013). Norms are obtained by using a matching coordination game: Participants are incentivized to match the valuation of others instead of revealing their own. Social norms, or normative expectations, are the emerging focal point in this coordination game about the social appropriateness of a given behavior.

We elicit the expectations with vignettes describing different behaviors of a woman in Bangladesh who has her period. To illustrate the vignettes, we showed pictures of a Bangladeshi woman, called Romana. For example, in one picture Romana was shopping for groceries and the vignette described her as having her monthly period and going to the market to buy food. The participants rated the social appropriateness of the described behavior on the four-point Likert-scale: 1 'very socially inappropriate', 2 'socially appropriate', 3 'socially inappropriate', and 4 'very socially appropriate'. The respondents received answer cards that illustrated the different answer options using different smileys to symbolize the

various levels of social appropriateness. To place their rating, the respondent selected one of the answer cards and enumerators recorded the answers. After a practice round based on a vignette on the social appropriateness of a Bangladeshi woman going to the mosque without wearing a head scarf - a behavior unrelated to menstruation, each respondent rated various vignettes on their social appropriateness. All answers are monetarily incentivized: Workers receive a bonus payment if their answer for a given behavior matches the modal answer among other respondents in the same artisan working center. To determine the bonus payments, one vignette was randomly chosen by the enumerator for the bonus calculation.

In our analysis, we categorize social norms into four distinct sets: the first set pertains to food-related limitations, encompassing preparing meals for the family and going to the market to purchase food. The second set relates to daily activities, including norms around praying, working, visiting newborns, or attending school. The third set focuses on aspects of menstrual hygiene management, including the use of cloth and pads, the practice of drying cloth outdoors, the acceptability of washing cloth in visible areas, and using communal village facilities for washing cloth. Finally, the fourth set addresses communication and secrecy regarding menstruation, in particular the social norms about discussing menstrual health with close family members, such as mothers or husbands.

4 Menstrual Health Management and its Societal Implications

In this section we give a detailed description of menstrual health management knowledge and practices, and the implications for female well-being, stigma and social norms at baseline.

Menstrual Health Management: Knowledge and Practices

At baseline, knowledge about menstruation and hygienic menstrual practices is limited among the participants. While nearly all women recognize menstruation as a natural process rather than a curse, a significant proportion (27 percent) erroneously believe it to be an illness. A striking 97 percent of respondents hold the misconception that menstruation is a process of eliminating toxic blood from the body. Regarding menstrual hygiene, nearly all women (97 percent) are aware of the necessity to wash reusable cloth with soap, but approximately a quarter of them lacks knowledge about proper drying techniques. Specifically, they are unaware that menstrual cloth should not be stored without adequate drying and that it should be hung outside in the sun for effective drying.

Participants predominantly use reusable cloth (70 percent) for managing their menstru-

Table 1: Summary Statistics

	(1) Baseline	(2) Endline	(3) Difference
Knowledge and practices			
<i>Menstruation is a... (% of correct answers)</i>			
Curse	98.23 (13.24)	97.12 (16.82)	-1.11 (2.07)
Illness	72.57 (44.82)	94.32 (23.28)	21.75*** (4.89)
Natural process	97.32 (16.22)	99.04 (9.81)	1.72 (1.81)
Toxic	2.65 (16.15)	2.88 (16.82)	0.23 (2.24)
<i>Menstrual cloth...(% of correct answers)</i>			
must be washed with soap	96.46 (18.56)	100.00 (0.00)	3.54** (1.75)
should not be stored without drying	75.22 (43.37)	100.00 (0.00)	24.77*** (4.08)
must be hanged in the sun to dry	75.89 (42.97)	94.23 (23.43)	18.34*** (4.67)
<i>Practices (in %)</i>			
Cloth Use	69.64 (46.19)	34.62 (47.80)	-35.03*** (6.40)
Pad Use	45.54 (50.02)	64.42 (48.11)	18.89*** (6.68)
Wash - no see	0.88 (0.32)	0.84 (0.37)	-0.05 (-0.05)
Wash - public		0.06 (0.23)	
Wash- private		0.88 (0.32)	
Dry outside	0.08 (0.28)	0.68 (0.46)	0.60*** (2.70)
Mental Well-Being			
Increased level of stress	46.85 (50.01)	17.30 (38.01)	-30.47*** (6.01)
Increased feeling shame	51.82 (50.08)	20.19 (40.33)	-32.48*** (6.17)
Concern noticeable stains	62.16 (48.61)	30.76 (46.40)	-32.06*** (6.44)
Concern noticeable odor	56.36 (49.71)	7.69 (26.77)	-49.45*** (5.38)
Increased difficulty of reaching work tasks	67.57 (46.92)	49.03 (50.23)	-19.10*** (6.60)
Mobility Restrictions			
Avoid going to the market (in %)	0.50 (0.50)	0.41 (0.49)	-0.08 (0.06)
Go to social gatherings (in %)	0.82 (0.38)	0.67 (0.47)	-0.15*** (0.05)
Walk long distances (in %)	0.46 (0.50)	0.48 (0.50)	0.03 (0.06)
Cook for the family (in %)	0.96 (0.19)	0.98 (0.14)	0.02 (0.02)
Avoid ill people (in %)	0.76 (0.43)	0.36 (0.48)	-0.41*** (0.06)
Work absence	0.23 (0.42)	0.15 (0.36)	-0.08* (0.05)
Observations	113	104	

Notes. Means and standard deviations (in parentheses) at baseline in Column 1 and endline in Column 2. Column 3 reports the difference as the coefficient of a simple regression of the baseline vs. endline on the variable with robust standard errors. * p < 0.10, ** p < 0.05, *** p < 0.01.

ation. Additionally, 46 percent report using sanitary pads frequently.⁸ These percentages refer to methods used frequently, not exclusively, as some women use more than one method during menstruation. The reported practices associated with reusable cloth reveal a lack of adherence to hygienic standards; specifically, the cloth is often neither washed nor dried appropriately. Despite the vast majority of women (88 percent) stating that they wash their reusable menstrual cloth without being seen by anyone, informal discussions with respondents revealed that they most often wash their reusable cloth on the floor of toilets. This choice reflects a prioritization of privacy over hygiene, as this location typically lacks clean water and soap but offers privacy. Moreover, only 9 percent of the respondents report drying their washed reusable cloth outside in sunlight even though 77 percent acknowledge the importance of sun drying their reusable cloth (Table 1, column 1). This discrepancy between knowledge and practice suggests that factors other than awareness significantly influence menstrual hygiene behaviors.

Well-being and Behavioral Implications

Limited knowledge and hygienic menstrual practices go along with limited physical and mental well-being. Around 75 percent are tired and suffer from acute pain during their menstruation, 20 percent use pain killers. In addition, women report that they experience very abundant bleeding (48 percent), stains on their clothes from leaking menstrual blood (60 percent) and strong menstrual odor (49 percent). These findings suggest that respondents are not using adequate absorbents.

Not using adequate absorbent material can be a source of stress or shame, in particular in environments where menstruating women are stigmatized. In fact, we find substantial self-reported negative effects on mental well-being during menstruation. Half of our sample reports increased feelings of stress (47 percent) and shame (52 percent) and they are concerned about others noticing that they are menstruating, both due to stains on their clothes (62 percent) and menstrual odor (56 percent). Two thirds report finding it more difficult to fulfil their work tasks during this time. These findings suggest that the respondents experience psychological stress and reduced mental well-being when menstruating.

Women are also restricted in their daily activities. Around half of the respondents avoid going to the market, 76 percent avoid visiting ill people, and 18 percent do not go to social gatherings while menstruating. In contrast to other studies, in our sample there is no restriction imposed when it comes to entering the kitchen or even touching food: 96 percent of the

⁸There is a significant correlation between menstrual management choices and demographic factors. The use of menstrual cloth is positively correlated with age (Pearson's correlation coefficient: 0.26, p-value: 0.00) and inversely correlated with educational attainment (Pearson's correlation coefficient: -0.27, p-value: 0.00). Conversely, pad usage is negatively correlated with age (Pearson's correlation coefficient: -0.36, p-value: 0.00) and positively with years of education (Pearson's correlation coefficient: 0.26, p-value: 0.00).

respondents report cooking for the family during their menstruation. Twenty-three percent have missed a day at work because of menstruation.

In Table 2, we investigate the interrelations between demographics and well-being, on the one hand, and menstrual health practices and behavioral restrictions, on the other hand. Columns 2, 3, and 4 show that women using pads, i.e. modern, hygienic menstrual material, are younger, higher educated and less-likely to be married (though still predominantly so). They are also less likely to report menstrual blood leaking through their absorbent material. We do not find any difference with respect to physical and mental well-being when menstruating, suggesting that the choice of menstrual material is not directly influencing this. In line with Czura et al. (2024), we conjecture that hygienic menstrual health management, either through modern hygienic material, such as pads, or the hygienic treatment of traditional material, i.e., washing and drying reusable cloth properly, is crucial for female well-being, and not the choice of material itself.

We find that the most common behavioral restriction, not going to the market when menstruating, is concentrated among women who face lower mental well-being during their menstruation: Women who experience increased stress and shame during their menstruation, and who are more concerned about others noticing their menstruation by stains or odor are substantially more likely (15 to 27 percentage points) to restrict their behavior and avoid going to the market place when they are menstruating (Table 2, Column 7).

Taboos and Stigma in Communication About Menstruation

We now shed more light on the potential secrecy and taboos surrounding menstruation by looking at communication patterns around menstruation. Women are asked what reason they would give if they need to miss a day of work due to their menstruation when communicating with i) their supervisor (supervisors are also female in our sample), ii) their coworkers, or iii) their family at home. Respondents stated their level of agreement to giving the real underlying reason, namely, menstruation, or to indicate with a euphemism or a term that would hide that menstruation is the reason (such as the term *shorir karap* that in Bangladesh is commonly used to refer to one's period and it is also used to state a general feeling of uneasiness which allows a woman to hide the true reason for missing a day at work).

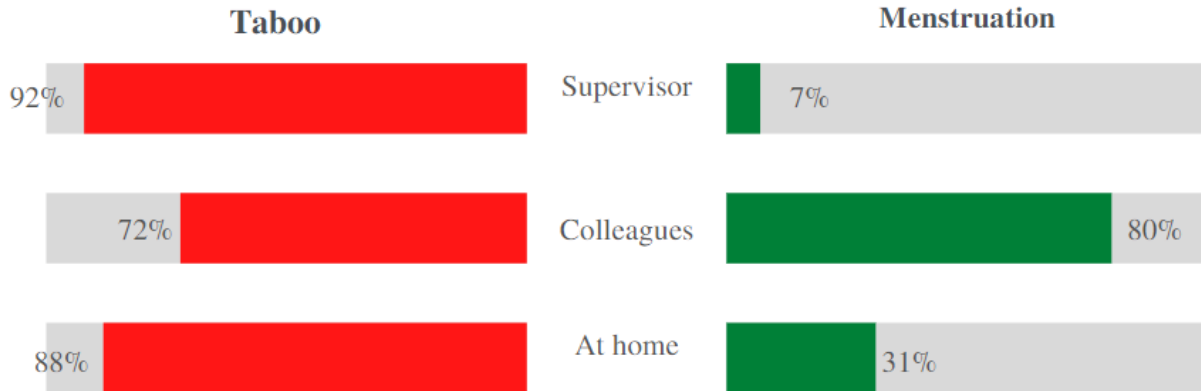
Figure 1 displays the distribution of answers. There are some indications for a taboo inducing women to hide the real reason for not attending work, both at home and at work. The left side of Figure 1 shows that the respondents would choose nearly unanimously not to inform their female supervisor about menstruation being the true reason for missing work and would rather indicate that they are feeling unwell. When it comes to their coworkers, we observe that respondents combine reporting the real reason and using also the vague term. Lastly, looking at the domestic environment, we can also observe a stronger taboo in place,

Table 2: Behavioral Implications - Pad use & Going to the market

	(1)	(2)	(3)		(4)	(5)		(6)	(7)
	Baseline	No	Pad Use		Diff	No	Going to Market		Diff
Age	32.23 (8.16)	34.68 (7.54)	28.94 (7.20)	-0.06*** (0.01)	32.33 (8.06)	32.12 (8.37)	-0.21 (1.10)		
Non-muslim (in %)	14.41 (35.20)	18.64 (39.11)	9.80 (29.88)	-0.09* (0.05)	18.52 (39.21)	10.53 (30.96)	-7.99* (4.74)		
Married (in %)	95.50 (20.79)	98.31 (12.96)	92.16 (27.02)	-0.06** (0.03)	94.44 (23.12)	96.49 (18.56)	2.05 (2.81)		
Education (years)	6.36 (3.97)	5.49 (3.70)	7.49 (3.96)	0.02*** (0.01)	5.70 (3.98)	6.98 (3.90)	1.28** (0.53)		
Work experience (years)	10.53 (7.57)	11.51 (7.92)	9.06 (6.59)	-0.02** (0.01)	10.40 (7.62)	10.66 (7.63)	0.26 (1.02)		
Commute to work (min)	11.57 (11.22)	11.71 (11.31)	11.53 (11.23)	-0.00 (0.02)	13.26 (12.78)	9.96 (9.40)	-3.29** (1.51)		
Ever absent due to menstruation (in %)	23.36 (42.41)	21.43 (41.22)	26.00 (44.08)	0.05 (0.06)	25.00 (43.72)	21.82 (41.68)	-3.18 (5.82)		
Physical Well-Being (in %)									
Increased tiredness	77.48 (41.87)	76.27 (42.72)	78.43 (41.33)	0.02 (0.06)	77.78 (41.96)	77.19 (42.33)	-0.58 (5.63)		
Suffer from acute pain	72.97 (44.51)	71.19 (45.48)	76.47 (42.63)	0.05 (0.06)	68.52 (46.88)	77.19 (42.33)	8.67 (5.98)		
Use painkillers	19.52 (33.40)	16.38 (29.80)	23.53 (37.11)	0.07 (0.05)	16.67 (32.86)	22.22 (34.12)	5.56 (4.47)		
Very abundant bleeding	46.97 (37.23)	44.63 (38.79)	50.00 (35.61)	0.05 (0.05)	49.69 (36.76)	44.44 (37.97)	-5.24 (5.02)		
Full of energy	55.26 (36.01)	55.93 (32.29)	54.25 (40.33)	-0.02 (0.05)	50.62 (37.05)	59.65 (34.92)	9.03* (4.82)		
Leaks on clothes	59.46 (49.21)	64.41 (48.08)	52.94 (50.16)	-0.11* (0.07)	62.96 (48.74)	56.14 (50.06)	-6.82 (6.60)		
Strong menstrual odor	49.25 (35.27)	51.41 (33.94)	46.41 (36.98)	-0.05 (0.05)	50.00 (35.32)	48.54 (35.67)	-1.46 (4.74)		
Mental Well-Being (in %)									
Increased level of stress	46.85 (50.01)	42.37 (49.63)	50.98 (50.24)	0.09 (0.07)	59.26 (49.60)	35.09 (48.15)	-24.17*** (6.54)		
Increased feeling shame	51.82 (50.08)	50.85 (50.21)	52.00 (50.21)	0.01 (0.07)	66.04 (47.81)	38.60 (49.11)	-27.44*** (6.51)		
Concern noticeable stains	62.16 (48.61)	62.71 (48.56)	60.78 (49.06)	-0.02 (0.07)	75.93 (43.15)	49.12 (50.44)	-26.80*** (6.26)		
Concern noticeable odor	56.36 (49.71)	56.90 (49.74)	54.90 (50.00)	-0.02 (0.07)	64.15 (48.41)	49.12 (50.44)	-15.03** (6.63)		
Increased feeling irritated	57.88 (40.21)	52.87 (40.78)	62.75 (39.05)	0.10* (0.05)	64.15 (36.31)	52.05 (43.19)	-12.10** (5.34)		
Increased difficulty of reaching work tasks	67.57 (46.92)	62.71 (48.56)	72.55 (44.85)	0.10 (0.06)	74.07 (44.23)	61.40 (49.11)	-12.67** (6.24)		
Observations	113	59	51		54	57			

Notes. Means and standard deviations (in parentheses) of baseline characteristics by "pad use" and "going to the market during menstruation". Physical and mental well-being measures equal 1 for "(completely) agree" and 0 for "(completely) disagree". Columns 4 and 7 report the difference between the two sub-samples based on a simple regression with robust standard errors (in parentheses). * p < 0.10, ** p < 0.05, *** p < 0.01.

Figure 1: Communication Regarding Absence at Work



Notes: Self-reported level of agreement in percent to the communication strategies for needing to miss a day of work due to menstruation towards a) the supervisor, b) the coworker, and c) at home. The left side of the panel reports the percentage of women who use an euphemism or report that they are feeling unwell when they need to miss work due to menstruation. The right hand side reports the percentage of women who would disclose the real reason, i.e., their menstruation. The questions are not exclusive and women could agree to different communication strategies.

since the respondents prefer to indicate that they are feeling unwell to stating that they are menstruating. We conclude that the taboo is not apparent in horizontal communication among individuals of the same hierarchical status, represented in our sample by the coworkers, but is more apparent in vertical communication among different hierarchical statuses: in the communication between workers and supervisors or between wife and husband, daughter and mother or step-mother. Secrecy and taboos around menstruation seem to be particularly present in communication across different hierarchical levels and may pose constraints to information transmission across these levels.

Social Norms

In addition to taboos and stigma, there are many social norms surrounding menstrual health management. Based on our incentivized norm elicitation, Table 3 sets out the mean and the distribution of the normative expectations stating the percentage share of respondents choosing each answer option. At baseline (Panel A), the respondents think that it is considered very socially inappropriate to pray during menstruation (93 percent) and to dry menstrual cloth outside (67 percent). The norm against correctly drying of menstrual cloth is especially concerning, as this unhygienic practice increases the risk of infection (Torondel et al.,

2018). For the remaining normative expectations, the focal point is on the highest social appropriateness rating: Respondents report that it is considered very socially appropriate to engage in daily activities such as cooking (74 percent), visiting the market (51 percent), and working (83 percent) during menstruation. Regarding menstrual hygiene products, a substantial portion of the respondents perceive using cloth (57 percent), and pads (77 percent) as socially acceptable, along with purchasing pads (56 percent). Notably, open communication about menstruation with close family members is also perceived as highly appropriate, with 88 percent and 90 percent of respondents considering it very socially acceptable to discuss menstruation with their mothers and husbands, respectively.

5 Effects of Information Provision on Menstrual Health Management

We conducted information campaigns on menstrual health management in four artisan workplaces to improve knowledge about menstrual health management, and ultimately improve female well-being and reduce behavioral restrictions. To assess the effects of the information campaign, we elicit MHM practices and knowledge, behavioral restrictions and social norms directly after (midline) and two and a half years after (endline) the information campaign, and document the changes over time.

Empirical strategy

For the analyses, we compare menstrual health management knowledge and practices, behavior and social norms before and after the information intervention. We identify differences in means using simple t-tests. For our elicitation of social norms we additionally test for differences in the distribution using a Kolmogorov-Smirnov test. Additionally, we test for shifts in the mean of the normative expectations using two regression estimation methods: First we estimate the effect of the intervention using a stacked ordinary least squares regression. This method is chosen as it allows an economically meaningful interpretation of the results. We include binary elicitation round indicators to measure the changes in the outcome variable over time and we include individual fixed effects to control for unobserved heterogeneity. Second, we present results from an ordered logistic regression in order to verify that the results are robust to using an estimation method that considers the ordinal nature of our discrete dependent variable (see Appendix A). The specifications have the following (standard) form:

$$y_{it} = \alpha + \beta_1 \text{midline}_{it} + \beta_2 \text{endline}_{it} + \delta_i + \epsilon_{it} \quad (1)$$

where y_{it} is the outcome variable for respondent i at time t , $t \in (0 = \text{baseline}, 1 =$

Table 3: Social Norms

Panel	A: Before Information - Baseline				B: After Information - Midline				C: After Information - Endline											
	Mean	SD	-	+	++	Mean	SD	-	+	++	Mean	SD	-	+	++	K-S test				
<i>Menstrual cloth</i>																				
Use	0.77	0.32	9	8	26	57	0.81	0.29	6	8	26	61	1.00	0.56	0.31	11	32	36	21	0.00***
Drying	0.23	0.37	67	10	10	14	0.83	0.33	10	6	9	75	0.00***	0.67	0.34	14	17	26	43	0.00***
Wash - non-private							0.50	0.47	44	4	12	40		0.29	0.34	46	34	6	14	
Wash - village facilities							0.29	0.32	42	38	9	11		0.29	0.32	42	38	9	11	
<i>Disposable pads</i>																				
Use	0.88	0.26	5	2	16	77	0.98	0.07	0	0	5	95	0.05***	0.99	0.07	0	0	5	95	0.05***
Purchase - herself	0.76	0.34	13	4	28	56	0.97	0.09	0	0	8	92	0.00***	0.88	0.23	5	11	23	62	0.08
Purchase - husband							0.94	0.17	2	0	13	85		0.87	0.21	1	5	24	70	
Purchase - female clerk							0.98	0.08	0	1	3	96								
<i>Nutrition</i>																				
Purchase - market	0.74	0.33	11	7	31	51	0.96	0.14	1	0	10	89	0.00***	0.66	0.32	9	21	37	33	0.24
Cook - family	0.86	0.28	6	5	15	74	0.97	0.13	1	0	7	92	0.05**	0.97	0.11	1	1	7	92	0.07
Cook - relative							0.97	0.09	0	0	8	92								
Cook - newborn							0.97	0.10	0	0	9	91								
Cook - other food							0.97	0.10	0	1	7	92								
<i>Mobility</i>																				
Attend - work	0.89	0.26	5	6	6	83	0.96	0.19	4	0	0	96	0.36	0.95	0.15	1	2	9	88	0.71
Attend - school							1.00	0.03	0	0	1	99		0.78	0.34	6	12	22	60	
<i>Communication</i>																				
Mother	0.95	0.17	2	1	9	88	0.99	0.10	1	0	1	98	0.67	0.99	0.07	0	0	5	95	0.95
Husband	0.95	0.19	3	1	6	90	0.99	0.06	0	0	3	97	0.95	0.95	0.16	2	3	13	82	1.00
<i>Religion</i>																				
Praying	0.05	0.21	93	2	2	4	0.01	0.05	98	2	0	0	1.00	0.04	0.11	88	12	0	0	1.00
Participate in Ramadan							0.01	0.05	98	2	0	0								

Notes: This table presents normalized means (range: 0–1) and standard deviations of the normative expectation ratings, as well as the share of respondents for each answer possibility of the 4-point Likert scale: (–) very socially inappropriate, (–) rather socially inappropriate, (+) rather socially appropriate, (++) very socially appropriate. Responses are reported for three phases: before the information intervention (baseline), directly after the information intervention (midline), and two years after the information intervention (endline). The p-value for the Kolmogorov–Smirnov test, assessing distribution equality across different elicitation times (Panel B and C) against the baseline (Panel A), is shown in the final columns of the respective panel. Significance levels: * p < 0.10, ** p < 0.05, *** p < 0.01.

Table 4: Knowledge on Menstruation

	(1) Index	(2) Cause	(3) Curse	(4) Illness	(5) Natural	(6) Toxic
Midline	0.10*** (0.02)	0.05 (0.06)	-0.03 (0.03)	0.19*** (0.05)	0.02 (0.02)	0.31*** (0.05)
Endline	0.04** (0.02)	0.03 (0.06)	-0.01 (0.02)	0.22*** (0.05)	0.02 (0.02)	0.00 (0.02)
Mean of dep. var.	0.59	0.24	0.98	0.73	0.97	0.03
Observations	104	104	104	104	104	104
R-squared	0.11	0.00	0.01	0.07	0.00	0.17

Notes: OLS estimation on knowledge on menstruation over survey rounds. Dependent variables are binary variables equal to one if the question has been answered correctly, and zero otherwise. Questions test knowledge on whether menstruation is (2) a body function that happens for no reason, (3) a curse, (4) an illness, (5) a normal and natural process for all women worldwide or, (6) a process for the elimination of toxic or bad blood from the body. The index reported in Column 1 is the average of the knowledge questions reported in Columns 2 to 6. Mean share of correctly answered questions is reported for all knowledge questions at baseline before the information intervention. The coefficients measure changes right after the session (midline) and after two years (endline) compared to baseline. Participant fixed effects included in all regressions. Robust standard errors are reported in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

$midline, 2 = endline$, $midline$ and $endline$ are binary variables equal to one if the social norm was elicited this survey round after the information session, and zero if not; δ_i are individual fixed effects; ϵ_{it} refers to robust standard errors.

5.1 Menstrual Health Management Knowledge

Menstrual health management is directly addressed in the information session: The increased risks of infections that arise from not properly treating menstrual cloth are explained together with instructions for proper washing and drying. Information on how to use and dispose sanitary pads is also provided. Table 4 elicits changes in knowledge after the information intervention. We see improvements in knowledge after the information session. We do see a significant effect on the aggregated index (Table 4, column 1), both at midline and at endline. This is driven by improvements in knowledge on the misconception that menstruation is an illness (19 percentage points, corresponding to 26 percent evaluated at baseline mean) and that menstrual blood is toxic (31 percentage points, corresponding to 1.033 percent evaluated at baseline mean). On the latter, the knowledge gap remains large: 66 percent of the respondents still believe that menstruation is composed of toxic blood after the information session. The knowledge improvements persist only for one of the misconception that menstruation is an illness at endline two years after the intervention. For the belief that menstrual blood is toxic, all knowledge gains evaporated after two years and nearly all the participants believe that menstrual blood is toxic.

5.2 Social Norms

To assess the effect of the information intervention on social norms, we first look at the distribution of normative expectations. Table 3, Panel, A sets out the normative expectations before (left side) the information intervention, these are our baseline metrics. Panel B (middle) shows the normative expectations right after the information session at midline. Lastly, Panel C (right side) provides the results elicited two years after the intervention at endline. Not every social norm could be elicited at all points in time to avoid fatigue of the participants and due to time constraints. We analyze shifts in focal points and in the overall distribution compared to baseline using a Kolmogorov-Smirnov test. Second, we also analyze shifts in the social appropriateness ratings in regression analyses. For this, we consider a reduced set of normative expectations as outcome variables: (i) related to menstrual health practices: cloth use, pad use, purchase pads, dry cloth outside, and (ii) related to behavior: daily activities, nutrition, and communication.

Menstrual Health Practices

We see that there are no differences in the focal points before and after the information intervention with the exception of drying cloth in sunlight. Here we do see that the focal point shifted from 'very socially inappropriate' to 'very socially appropriate' behavior. When looking at the long term effect, two years after the intervention, the focal point remains at 'very socially appropriate', indicating the persistence of this change.

Using menstrual cloth itself has become persistently less socially appropriate over time: Both the distribution of normative expectations at endline has become significantly more dispersed (see Table 3) and the socially appropriateness rating has declined (see Table 5, Column 2). We see the opposite development for using and purchasing disposable sanitary pads: The distribution of the ratings becomes significantly more concentrated (Table 3) and the mean rating has increased (Table 5, Columns 4 and 5).

Daily Activities, Nutrition, and Communication

We observe a shift in focal points for purchasing at the market during ones period from 'very socially appropriate' before the information intervention to 'socially appropriate' two years after the intervention. While we do not observe other, persistent changes in focal points or the distribution of the social appropriateness rating (Table 3), we mainly see improvements in the average ratings in our regression analyses (Table 6).

We observe an overall positive effect of the information intervention on normative expectations (11 percent evaluated at the sample mean) for mobility restrictions and communication (Table 6, Column 1), but effects at endline are more modest. The information sessions did

Table 5: Normative Expectations - Menstrual Health Management

	(1) Index	(2) Menstrual Cloth Use	(3) Drying	(4) Disposable pads Use	(5) Purchase
Midline	0.24*** (0.02)	0.05 (0.04)	0.60*** (0.05)	0.11*** (0.03)	0.20*** (0.03)
Endline	0.10*** (0.02)	-0.22*** (0.04)	0.41*** (0.05)	0.11*** (0.03)	0.11*** (0.04)
Mean of dep. var	0.66	0.77	0.23	0.87	0.75
Observations	104	104	104	104	104

Notes: OLS estimation on menstrual health management practices over survey rounds. Dependent variables are measures of normative expectations based on the 4-point Likert scale (very socially inappropriate, socially inappropriate, socially appropriate, and very socially appropriate) normalized to a range between 0 and 1. The index reported in Column 1 is the average of the elicited normative expectations. Mean ratings are reported at baseline before the information intervention. The coefficients measure changes right after the session (midline) and after two years (endline) compared to baseline. Participant fixed effects included in all regressions. Robust standard errors are reported in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

not address behavior restrictions associated with menstruation, and all of them involve more or less directly a third party, such as the family or the market vendor who have not received the information. It is therefore not surprising, that we only observe changes in the mean rating but not in the distribution or overall social norm, the focal point of the distribution.

For communication patterns (Table 6, Columns 7 and 8), we see significant but modest changes, mainly because the level of observed frequency and social acceptability was already high at the baseline. The information session leads to an increased level of social acceptability of 4 to 5 percent, evaluated at the baseline sample mean. The mean expectations for talking to one’s mother and husband were shifted, after the information session it is seen as more socially appropriate to discuss menstruation, but only effects for communicating with the mother prevail at endline.

Discussion: Normative Expectations Vs. Knowledge

Our study’s design precludes a causal analysis of the effects of information provision on menstrual health management knowledge, practices, and social norms. However, when examining knowledge acquired immediately before and after the information sessions, it seems reasonable to ascribe observed changes directly to the information campaign. The case of social norms, which are derived from incentivized assessments of others’ beliefs, presents a more complex scenario. Here, it is challenging to ascertain whether shifts in beliefs about the social appropriateness of certain behaviors are due to altered perceptions and second order beliefs or simply reflect an adjustment based on new information acquired by the respondents and their peers. If the positive effect of the information intervention were just an information

Table 6: Normative Expectations - Mobility Limitations and Communication

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Index	Praying	Attend Work	Nutrition Meal	Market	Communication Mother	Husband
Midline	0.07*** (0.01)	-0.05** (0.02)	0.06** (0.03)	0.11*** (0.03)	0.20*** (0.03)	0.04** (0.02)	0.04** (0.02)
Endline	0.02 (0.01)	-0.01 (0.02)	0.07** (0.03)	0.12*** (0.03)	-0.11*** (0.04)	0.05** (0.02)	0.00 (0.02)
Mean dep. var	0.74	0.05	0.89	0.86	0.74	0.94	0.95
N	104	104	104	104	104	104	104

Notes: OLS estimation on mobility limitations and communication during menstruation over survey rounds. Dependent variables are measures of normative expectations based on the 4-point Likert scale (very socially inappropriate, socially inappropriate, socially appropriate, and very socially appropriate) normalized to a range between 0 and 1. The index reported in Column 1 is the average of the elicited normative expectations. Mean ratings are reported at baseline before the information intervention. The coefficients measure changes right after the session (midline) and after two years (endline) compared to baseline. Participant fixed effects included in all regressions. Robust standard errors are reported in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

update, we would expect to see two changes: (i) an improvement in their knowledge after the information session, and (ii) a change in normative expectations only regarding matters directly addressed in the information session, while those regarding other matters not directly addressed in the information session remain unaltered.

As discussed above, there are only modest persistent increases in knowledge after the information session, as they deteriorate over time. Despite an improvement directly after the information campaign, knowledge gaps for the misconception that menstrual blood is toxic remain substantial directly after the information campaign and increase even further at endline.

We see sizable changes in normative expectations for menstrual practices and mobility restrictions and communications. While the information campaigns directly addressed menstrual practices, mobility restrictions and communications are not covered in the information session. Castro and Mang (2022) and Czura et al. (2020) find similar changes in normative expectations: Czura et al. (2020) offer the same information intervention in their randomized controlled trial and they find similar, persisting changes in normative expectations on drying reusable cloth outside in the sun as we do. Castro and Mang (2022) study how offering discussion sessions on menstruation among garment workers helps to break the silence on taboos around menstruation, and leads to similar changes in social norms surrounding menstruation. We conjecture, that the changes in normative expectations go beyond a pure facilitation of the matching of second order beliefs by the information provision.

5.3 MHM Practices, Mobility Restrictions, and Communication

Changes in self-reported behavior after the information campaign corroborate the interpretation that changes in the normative expectations go beyond a pure information effect. Women report improved menstrual practices. The share of women who use sanitary pads increased from 46 percent at baseline to 64 percent at endline, while the use of reusable cloth decreased from 70 to 35 percent (Table 1). Table 7 displays that women started to treat their menstrual cloth more hygienically by washing it with warm water and soap and drying in outside in the sunlight after the information session. They also overwhelmingly reported to feel less ashamed about their period (88 percent) and to talk more about menstruation with others (92 percent). All of these self-reported changes are directly visible in descriptive statistics at baseline and endline (Table 1, Column 3).

Table 7: Self-reported Behavior Change After the Information Session

	Percentage
<hr/> In the last 1.5 years:	
Started to wash menstrual cloth with soap and warm water	89.42 (30.90)
Started to wash menstrual cloth in the pond or village facilities for washing	3.84 (19.32)
Started to dry cloth menstrual cloth outside or under sunlight	67.30 (47.13)
Started to feel less ashamed about having your period	88.46 (32.21)
Talked about menstruation more with others	92.30 (26.77)
<hr/> How helpful was the info session in the following...	
Understanding how the menstrual cycle works	86.07 (34.87)
Recognizing menstruation as a natural phenomenon	81.60 (39.42)
Improving your menstrual hygiene	85.72 (35.88)
Making it easier to exchange information about menstruation	85.00 (34.05)
<hr/> Observations	
	104

Notes. Means and standard deviations (in parentheses). This table summarizes responses to questions evaluating the perceived usefulness of the information session. All responses are quantified in percentages, representing the proportion of respondents who reported the information campaign to be "very helpful" for the statement, instead of "somewhat helpful". No respondent replied that the information campaign was "not helpful".

At endline, over two years after the information session, 96 percent of the women remem-

bered taking part in this information session and they found it very helpful to understand how the menstrual cycle works (87 percent), to recognize menstruation as a natural phenomenon (83 percent), to exchange information about menstruation (88 percent) and to improve menstrual hygiene (83 percent).⁹ The changes in menstrual practices are accompanied by large improvements in mental well-being over time. During menstruation, women report to feel less stressed, less ashamed, less concerned about noticeable stains and odor, and less difficulty of reaching work targets (Table 1, Column 3).

5.4 Restrictions to Effectiveness of Information Provision

Our baseline survey focuses on washing menstrual cloth in private, and we observe a persistently high share of women following this practice (88 percent at baseline and 64 percent at endline). At endline, we elicited details on different possibilities to wash menstrual cloth as qualitative interviews cast doubt on hygienic standards in private facilities. We observe a wide dispersion for normative expectations regarding washing menstrual cloth in a public facility (or publicly): 40 percent consider this behavior to be very socially appropriate, and 44 percent perceive it to be very socially inappropriate. The strong dispersion suggests that the information session, in which this behavior was directly addressed and the importance of washing menstrual cloth with clean water and soap was stressed, may not be sufficient to overcome restrictive norms on menstrual hygiene practices. At endline, the social norms are more restrictive. Only 20 percent of the respondents think that it is socially appropriate or very appropriate to use non-private or village facilities to wash their menstrual cloth. Using the village laundry facilities, or a nearby water body to wash the menstrual cloth is perceived as very socially inappropriate by 42 percent of the participants and as socially inappropriate by 38 percent. The normative expectations are also reflected in reported own behavior: Only 6 percent report washing their menstrual cloth at public water sources (Table 1, Column 2).

In particular in light of the living standards, where households only have access to communal water sources such as washing facilities in the village, large ponds, or rivers to launder their clothes, normative restrictions on washing menstrual cloth in public facilities may lead to unhygienic menstrual health management. Women seem to wash their menstrual cloth in places that provide privacy but that are unhygienic and do not facilitate effective washing, such as on the floor of toilets, as reported qualitative interviews by respondents in our sample and in Das et al. (2015) for a sample in India.¹⁰ Although information leads to shifts in expectations related to menstrual hygiene (such as drying menstrual cloth) as our results

⁹The reported shares refer to binary variables equal 1 if the information campaign is reported to be "very helpful" and 0 if it is reported to be "somewhat helpful". No respondent replied that the information campaign was "not helpful".

¹⁰Das et al. (2015) report that the 69 per cent of the women in their study in Odisha, India, wash their menstrual cloth in the toilet and not at the public washing facility, the pond or at a tub well or yard.

show, deeply-rooted taboos, like the taboo of seeing menstrual blood, do not seem to be affected by information provision. When the menstrual cloth is hanged outside to dry, it has already been cleaned so the taboo or secrecy that affects menstruation has a lower intensity than when washing menstrual cloth. We interpret this finding as further support for the important role of taboos and cultural norms: Some practices are not affected by available information and improving knowledge alone might not change unhygienic behavior, if they are connected to deeply-rooted taboos. This is particularly relevant for WASH policy efforts when trying to improve hygiene in such settings. Public improved facilities might not suffice in order to improve menstrual hygiene.

6 Conclusion

In this paper, we comprehensively document various facets of menstrual health management among a sample of working women in Bangladesh, encompassing their knowledge, practices, and the social norms, behavioral restrictions, and stigma associated with menstruation. Additionally, we evaluate how information sessions alter these outcomes, both in the short- and in the long-run.

Our findings reveal substantial psychological distress related to menstruation within this population. The majority of our respondents report feelings of shame and fear of others noticing that they are menstruating. Notably, these emotions are closely linked to self-imposed behavioral restrictions, such as avoiding market visits during menstruation, further exacerbating their reduced mental well-being. The information interventions positively influence restrictive norms and behaviors. The most notable change, possibly indicating a shift in social norms, is observed in the practice of drying menstrual cloth in sunlight, a key element for maintaining hygiene. While other behaviors exhibited persistent changes in perceived social appropriateness, a shift in the underlying norms is not evident.

Our conclusion is twofold: Firstly, targeted information campaigns can bridge knowledge gaps and influence women’s behavior and social norms. However, effectuating a comprehensive change in entrenched social norms remains a complex challenge. Future research should aim to experimentally delineate the extent and mechanisms through which information can modify harmful social norms. Secondly, even after the information provision, taboos and stigmatization around menstruation continue to impose constraints on proper menstrual hygiene practices, such as the public washing of menstrual cloth. This persistence suggests that taboos and stigma can significantly hinder the uptake of provided information, which is also observed by Czura et al. (2024), who find partial improvements in menstrual practices for drying, but not washing of menstrual cloth. More generally, this observation aligns with findings from Pakistan, where standard hygiene instructions are found to be ineffective unless they are coupled with education about germ theory, replacing traditional medical beliefs

with modern understanding (Bennett et al., 2018). Our study extends this insight, proposing that not just traditional health beliefs, but any form of taboo or stigma, may diminish the effectiveness of informational interventions. This underscores the need for multifaceted approaches that address both informational deficits and cultural barriers to foster meaningful behavioral change.

References

- ADUKIA, A. (2017): “Sanitation and education,” *American Economic Journal: Applied Economics*, 9, 23–59.
- AGARWAL, S., L. E. CHIA, AND P. GHOSH (2022): “Do Sanitary Pads Alleviate Period Poverty and Improve Girls’ Educational Outcomes?” *SSRN Working Paper*.
- ALAM, M. U., S. P. LUBY, A. K. HALDER, K. ISLAM, A. OPEL, A. K. SHOAB, P. K. GHOSH, M. RAHMAN, T. MAHON, AND L. UNICOMB (2017): “Menstrual hygiene management among Bangladeshi adolescent schoolgirls and risk factors affecting school absence: Results from a cross-sectional survey,” *BMJ Open*, 7.
- ALEXANDER, K. T., C. ODUOR, E. NYOTHACH, K. F. LASERSON, N. AMEK, A. ELEVELD, L. MASON, R. RHEINGANS, C. BEYNON, A. MOHAMMED, M. OMBOK, D. OBOR, F. ODHIAMBO, R. QUICK, AND P. A. PHILLIPS-HOWARD (2014): “Water, Sanitation and Hygiene Conditions in Kenyan Rural Schools: Are Schools Meeting the Needs of Menstruating Girls?” *Water*, 6, 1453–1466.
- ALI, T. S. AND S. N. RIZVI (2010): “Menstrual knowledge and practices of female adolescents in urban Karachi, Pakistan,” *Journal of Adolescence*, 33, 531–541.
- AVERBACH, S., N. SAHIN-HODOGLUGIL, P. MUSARA, T. CHIPATO, AND A. VAN DER STRATEN (2009): “Duet for menstrual protection: A feasibility study in Zimbabwe,” *Contraception*, 79, 463–468.
- BALL, K., R. W. JEFFERY, G. ABBOTT, S. A. MCNAUGHTON, AND D. CRAWFORD (2010): “Is healthy behavior contagious: Associations of social norms with physical activity and healthy eating,” *International Journal of Behavioral Nutrition and Physical Activity*, 7, 86.
- Bangladesh Bureau of Statistics (2020): “National Hygiene Survey,” 122.
- BENNETT, D., A. NAQVI, AND W. SCHMIDT (2018): “Learning, hygiene and traditional medicine,” *Economic Journal*, 128, F545–F574.
- BENSHAUL-TOLONEN, A., G. ZULAIKA, E. NYOTHACH, C. ODOUR, L. MASON, D. OBOR, K. T. ALEXANDER, K. F. LASERSON, AND A. PENELOPE (2021): “Sanitary products, absenteeism and psychosocial well-being: Evidence from a three-arm cluster randomized controlled feasibility study in Western Kenya,” CDEP-CGEG WP No . 96.
- BICCHIERI, C. (2005): “The Grammar of Society: The Nature and dynamics of social norms,” *Cambridge University Press*.

- (2017): “Norms in the wild: How to diagnose, measure, and change social norms,” *Oxford University Press USA*.
- BIRAN, A., W. P. SCHMIDT, K. S. VARADHARAJAN, D. RAJARAMAN, R. KUMAR, K. GREENLAND, B. GOPALAN, R. AUNGER, AND V. CURTIS (2014): “Effect of a behaviour-change intervention on handwashing with soap in India (SuperAmma): A cluster-randomised trial,” *Lancet Global Health*, 2, e145–e154.
- BOOSEY, R., G. PRESTWICH, AND T. DEAVE (2014): “Menstrual hygiene management amongst schoolgirls in the Rukungiri district of Uganda and the impact on their education: a cross-sectional study,” *Pan African Medical Journal*, 19.
- CASTRO, S. AND C. MANG (2022): “Breaking the silence - Group discussions, social pressure, and the adoption of health technologies,” *SSRN Working Paper*.
- CHANDRA-MOULI, V. AND S. V. PATEL (2017): “Mapping the knowledge and understanding of menarche, menstrual hygiene and menstrual health among adolescent girls in low-and middle-income countries,” *Reproductive Health*, 14, 1–16.
- CRICHTON, J., J. OKAL, C. W. KABIRU, AND E. M. ZULU (2013): “Emotional and psychosocial aspects of menstrual poverty in resource-poor settings: A qualitative study of the experiences of adolescent girls in an informal settlement in Nairobi,” *Health Care for Women International*, 34, 891–916.
- CROFTS, T. AND J. FISHER (2012): “Menstrual hygiene in Ugandan schools: An investigation of low-cost sanitary pads,” *Journal of Water Sanitation and Hygiene for Development*, 2, 50–58.
- CZURA, K., A. MENZEL, AND M. MIOTTO (2020): “Menstrual health, worker productivity and well-being among female Bangladeshi garment workers,” *CERGE-EI Working Paper Series*.
- (2024): “Improved menstrual health and the workplace: An RCT with female Bangladeshi garment workers,” *Journal of Development Economics*, 166, 103174.
- DAS, P., K. K. BAKER, A. DUTTA, T. SWAIN, S. SAHOO, B. S. DAS, B. PANDA, A. NAYAK, M. BARA, B. BILUNG, P. R. MISHRA, P. PANIGRAHI, S. CAIRNCROSS, AND B. TORONDEL (2015): “Menstrual hygiene practices, wash access and the risk of urogenital infection in women from Odisha, India,” *PLoS ONE*, 10, e0130777.
- DASGUPTA, A. AND M. SARKAR (2008): “Menstrual hygiene: How hygienic is the adolescent girl?” *Indian Journal of Community Medicine*, 33, 77.

- DICKIE, R., S. RASMUSSEN, R. CAIN, L. WILLIAMS, AND W. MACKAY (2018): “The effects of perceived social norms on handwashing behaviour in students,” *Psychology, Health & Medicine*, 23, 154–159, PMID: 28592138.
- DUPAS, P. (2011): “Do teenagers respond to HIV risk information? Evidence from a field experiment in Kenya,” *American Economic Journal: Applied Economics*, 3, 1–34.
- EISENBERG, M. E., D. NEUMARK-SZTAINER, M. STORY, AND C. PERRY (2005): “The role of social norms and friends’ influences on unhealthy weight-control behaviors among adolescent girls,” *Social Science & Medicine*, 60, 1165–1173.
- GALIANI, S., P. GERTLER, N. AJZENMAN, AND A. ORSOLA-VIDAL (2016): “Promoting handwashing behavior: The effects of large-scale community and school-level interventions,” *Health Economics*, 25, 1545–1559.
- GARIKIPATI, S. AND C. BOUDOT (2017): “To pad or not to pad: Towards better sanitary care for women in Indian slums,” *Journal of International Development*, 29, 32–51.
- GHOSAL, S., S. JANA, A. MANI, S. MITRA, AND S. ROY (2022): “Sex workers, stigma, and self-image: Evidence from Kolkata brothels,” *Review of Economics and Statistics*, 104, 431–448.
- GUYA, E., A. W. MAYO, AND R. KIMWAGA (2014): “Menstrual hygiene management in secondary schools in Tanzania,” *Ijst*, 3, 27–40.
- HAGGERTY, P. A., K. MULADI, B. R. KIRKWOOD, A. ASWORTH, AND M. MANUNEBO (1994): “Community-based hygiene education to reduce diarrhoeal disease in rural Zaire: Impact of the intervention on diarrhoeal morbidity,” *International Journal of Epidemiology*, 23, 1050–1059.
- HÅKANSSON, M., M. OGUTTU, K. GEMZELL-DANIELSSON, AND M. MAKENZIOUS (2018): “Human rights versus societal norms: A mixed methods study among healthcare providers on social stigma related to adolescent abortion and contraceptive use in Kisumu, Kenya,” *BMJ Global Health*, 3.
- HENNEGAN, J., L. ZIMMERMAN, A. SHANNON, N. EXUM, F. OLAOLORUN, E. OMOLUABI, AND K. SCHWAB (2018): “The relationship between household sanitation and women’s experience of menstrual hygiene: Findings from a cross-sectional survey in Kaduna state, Nigeria,” *International Journal of Environmental Research and Public Health*, 15, 905.
- HERRMANN, M. A. AND J. E. ROCKOFF (2012): “Does menstruation explain gender gaps in work absenteeism?” *Journal of Human Resources*, 47, 493–508.

- (2013): “Do menstrual problems explain gender gaps in absenteeism and earnings? Evidence from the National Health Interview Survey,” *Labor Economics*, 24, 12–22.
- HULLAND, K. R., R. P. CHASE, B. A. CARUSO, R. SWAIN, B. BISWAL, K. C. SAHOO, P. PANIGRAHI, AND R. DREIBELBIS (2015): “Sanitation, stress, and life stage: A systematic data collection study among women in Odisha, India,” *PLoS ONE*, 10, e0141883.
- ICDDR (2014): “Bangladesh national hygiene baseline survey,” Technical report, International Centre for Diarrheal Diseases Research.
- ICHINO, A. AND E. MORETTI (2009): “Biological gender differences, absenteeism, and the earnings gap,” *American Economic Journal: Applied Economics*, 1, 183–218.
- INTERNATIONAL INSTITUTE FOR POPULATION SCIENCES (2017): “National Family Health Survey (NFHS-4), 2015-16: India,” *International Institute for Population Sciences (IIPS) and ICF*, 1–192.
- (2020): “National Family Health Survey - 5, 2019-21,” Ministry of Health and Family Welfare, National.
- JEWITT, S. AND H. RYLEY (2014): “It’s a girl thing: Menstruation, school attendance, spatial mobility and wider gender inequalities in Kenya,” *Geoforum*, 56, 137–147.
- KHANNA, A., R. S. GOYAL, AND R. BHAWSAR (2005): “Menstrual practices and reproductive problems: A Study of adolescent girls in Rajasthan,” *Journal of Health Management*, 7, 91–107.
- KRENZ, A. AND H. STRULIK (2021): “The impact of menstruation hygiene management on work absenteeism of women in Burkina Faso,” *Economics and Human Biology*, 43, 101067.
- KRUPKA, E. L. AND R. A. WEBER (2013): “Identifying social norms using coordination games: Why does dictator game sharing vary?” *Journal of the European Economic Association*, 11, 495–524.
- KUHLMANN, A. S., K. HENRY, AND L. L. WALL (2017): “Menstrual hygiene management in resource-poor countries,” *Obstetrical & Gynecological Survey*, 72, 356.
- KUMAR, A. AND K. SRIVASTAVA (2011): “Cultural and social practices regarding menstruation among adolescent girls,” *Social Work in Public Health*, 26, 594–604.
- KUMAR, G. M. AND M. KUNDAN (2011): “Psycho-social behaviour of urban Indian adolescent girls during menstruation,” *Australasian Medical Journal*, 4, 49–52.

- KWON, S. (2022): “Mask wearing and perceived discrimination associated With COVID-19 in the United States from March 2020 to May 2021: Three-level longitudinal analyses,” *Health Education & Behavior*.
- MASON, L., E. NYOTHACH, K. ALEXANDER, F. O. ODHIAMBO, A. ELEVELD, J. VULULE, R. RHEINGANS, K. F. LASERSON, A. MOHAMMED, AND P. A. PHILLIPS-HOWARD (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, e79132.
- MCMAHON, S. A., P. J. WINCH, B. A. CARUSO, E. A. OGUTU, I. A. OCHARI, AND R. D. RHEINGANS (2011): “‘The girl with her period is the one to hang her head’ Reflections on menstrual management among schoolgirls in rural Kenya,” *BMC International Health and Human Rights*, 11, 1–10.
- MICHAEL, J., Q. IQBAL, S. HAIDER, A. KHALID, N. HAQUE, R. ISHAQ, F. SALEEM, M. A. HASSALI, AND M. BASHAAR (2020): “Knowledge and practice of adolescent females about menstruation and menstruation hygiene visiting a public healthcare institute of Quetta, Pakistan,” *BMC Women’s Health*, 20, 1–8.
- MOHAMED, Y., K. DURRANT, C. HUGGETT, J. DAVIS, A. MACINTYRE, S. MENU, J. N. WILSON, M. RAMOSAEA, M. SAMI, D. J. BARRINGTON, D. MCSKIMMING, AND L. NATOLI (2018): “A qualitative exploration of menstruation-related restrictive practices in Fiji, Solomon Islands and Papua New Guinea,” *PLoS ONE*, 13, e0208224.
- MOLLEN, S., R. N. RIMAL, AND M. K. LAPINSKI (2010): “What is normative in health communication research on norms? A review and recommendations for future scholarship,” *Health Communication*, 25, 544–547.
- MONTGOMERY, P., C. R. RYUS, C. S. DOLAN, S. DOPSON, AND L. M. SCOTT (2012): “Sanitary pad interventions for girls’ education in Ghana: A pilot study,” *PLoS ONE*, 7, e48274.
- MUHIT, I. B. AND S. CHOWDHURY (2013): “Menstrual hygiene condition of adolescent schoolgirls at Chittagong Division in Bangladesh,” *International Journal of Scientific Technology Research*, 2, 58–62.
- NAGARKAR, A. AND P. MHASKAR (2015): “A systematic review on the prevalence and utilization of health care services for reproductive tract infections/sexually transmitted infections: Evidence from India,” *Indian Journal of Sexually Transmitted Diseases and AIDS*, 36, 18–25.

- OSTER, E. AND R. THORNTON (2011): “Menstruation, sanitary products, and school attendance: Evidence from a randomized evaluation,” *American Economic Journal: Applied Economics*, 3, 91–100.
- SAHOO, K. C., K. R. HULLAND, B. A. CARUSO, R. SWAIN, M. C. FREEMAN, P. PANIGRAHI, AND R. DREIBELBIS (2015): “Sanitation-related psychosocial stress: A grounded theory study of women across the life-course in Odisha, India,” *Social Science & Medicine*, 139, 80–89.
- SCHOEP, M. E., E. M. ADANG, J. W. MAAS, B. DE BIE, J. W. AARTS, AND T. E. NIEBOER (2019): “Productivity loss due to menstruation-related symptoms: A nationwide cross-sectional survey among 32 748 women,” *BMJ Open*, 9, e026186.
- SHIDHAYE, R. AND M. KERMODE (2013): “Stigma and discrimination as a barrier to mental health service utilization in India,” *International Health*, 5, 6–8.
- SINGH, A., M. CHAKRABARTY, S. SINGH, R. CHANDRA, S. CHOWDHURY, AND A. SINGH (2022): “Menstrual hygiene practices among adolescent women in rural India: A cross-sectional study,” *BMC Public Health*, 22, 2126.
- SNV (2016): “Working with Women: Baseline Study of Target RMG Factories and their Workers,” Technical report.
- SOMMER, M. AND M. SAHIN (2013): “Advancing the global agenda for menstrual hygiene management for schoolgirls,” *American Journal of Public Health*, 103, 1556–1559.
- SUMPTER, C. AND B. TORONDEL (2013): “A systematic review of the health and social effects of menstrual hygiene management,” *PLoS ONE*, 8, e62004.
- TEMPLETON, E. M., M. V. STANTON, AND J. ZAKI (2016): “Social norms shift preferences for healthy and unhealthy foods,” *PLoS ONE*, 11, 1–16.
- THAPA, S., S. BHATTARAI, AND A. R. ARO (2019): “‘Menstrual blood is bad and should be cleaned’: A qualitative case study on traditional menstrual practices and contextual factors in the rural communities of far-western Nepal,” *SAGE Open Medicine*, 7.
- TORONDEL, B., S. SINHA, J. R. MOHANTY, T. SWAIN, P. SAHOO, B. PANDA, A. NAYAK, M. BARA, B. BILUNG, O. CUMMING, P. PANIGRAHI, AND P. DAS (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, 1–12.

- TREMEWAN, J. AND A. VOSTROKNUTOV (2020): “An informational framework for studying social norms,” *Working Paper*.
- VAN EIJK, A. M., M. SIVAKAMI, M. B. THAKKAR, A. BAUMAN, K. F. LASERSON, S. COATES, AND P. A. PHILLIPS-HOWARD (2016): “Menstrual hygiene management among adolescent girls in India: A Systematic review and meta-analysis,” *BMJ Open*, 6, e010290.
- WSSCC (2013): “Celebrating Womanhood. How Better Menstrual Hygiene Management is the Path to better Health, Dignity and Business,” Technical report, Water Supply Sanitation Collaborative Council.
- YANG, D., J. ALLEN, A. MAHUMANE, J. RIDDELL, AND H. YU (2023): “Knowledge, stigma, and HIV testing: An analysis of a widespread HIV/AIDS program,” *Journal of Development Economics*, 160, 102958.

A Robustness Check: Ordered logistic regression

Table A1: Normative Expectations - Menstrual Health Management

	(1)	(2)	(3)	(4)	(5)
	Index	Menstrual Cloth Use	Drying	Disposable pads Use	Purchase
Midline	2.72*** (0.29)	0.22 (0.27)	2.93*** (0.32)	1.87*** (0.50)	2.21*** (0.38)
Endline	1.16*** (0.25)	-1.37*** (0.27)	2.13*** (0.29)	1.65*** (0.47)	0.74*** (0.28)
Mean of dep. var	0.66	0.77	0.23	0.87	0.75
Observations	104	104	104	104	104

Notes: Ordered Logistic estimation on menstrual health management practices over survey rounds. Dependent variables are measures of normative expectations based on the 4-point Likert scale (very socially inappropriate, socially inappropriate, socially appropriate, and very socially appropriate) normalized to a range between 0 and 1. The index reported in Column 1 is the average of the elicited normative expectations. Mean ratings are reported at baseline before the information intervention. The coefficients measure changes right after the session (midline) and after two years (endline) compared to baseline. Participant fixed effects included in all regressions. Robust standard errors are reported in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table A2: Normative Expectations - Mobility Limitations and Communication

	(1)	(2)	(3)	(4)	(5)	(7)	(8)
	Index	Praying	Attend Work	Nutrition Cook	Purchase	Communication Mother	Husband
Midline	1.91*** (0.28)	-1.41* (0.79)	1.60*** (0.59)	1.36*** (0.40)	2.11*** (0.35)	1.99** (0.78)	1.33** (0.66)
Endline	0.05 (0.25)	0.71 (0.47)	0.54 (0.39)	1.46*** (0.42)	-0.62** (0.26)	1.29** (0.58)	-0.16 (0.44)
Mean dep. Var	0.75	0.05	0.89	0.86	0.74	0.94	0.95

Notes: Ordered Logistic regressions on mobility limitations and communication during menstruation over survey rounds. Dependent variables are measures of normative expectations based on the 4-point Likert scale (very socially inappropriate, socially inappropriate, socially appropriate, and very socially appropriate) normalized to a range between 0 and 1. The index reported in Column 1 is the average of the elicited normative expectations. Mean ratings are reported at baseline before the information intervention. The coefficients measure changes right after the session (midline) and after two years (endline) compared to baseline. Participant fixed effects included in all regressions. Robust standard errors are reported in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.