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## Exploring Knowledge and Practices Regarding Menstrual Hygiene Management Among Bihari Women In The Geneva Camp In Bangladesh

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### ABSTRACT

**Background:** Research into menstrual hygiene management (MHM) has been mainly based on menstruation-related knowledge and practices of women and girls in the mainstream Bangladeshi society; socially disadvantaged groups, such as the Bihari refugee women, have largely been ignored.

**Purpose:** This study aims to assess knowledge and practices about MHM among Bihari women in the Mohammadpur Geneva Camp in Dhaka, Bangladesh.

**Methods:** In 2017, a cross-sectional survey was conducted among Bihari women and girls by the trained interviewers using a structured questionnaire. The purposive sampling was applied to select 160 Bihari women aged between 15 and 49. Data were entered, cleaned, and analysed using SPSS software. Both univariate and bivariate analyses were undertaken to examine knowledge and MHM-related practices with a significance level of  $p < 0.01$ .

**Results:** Overall, most women (59.4%) had low knowledge about menstruation. More than one-quarter (27.0%) used disposable sanitary napkins. The Bihari women who did not use sanitary pads (73%) reported that they used old disposable clothes (59.83%), reusable cloths (25.64%), cotton (9.40%), or toilet tissue paper (4.27%). Around two-thirds of the women (68.0%) performed special baths and 36.9% followed socio-cultural taboos during menstruation. The bivariate analyses revealed that higher menstruation knowledge was associated with higher use of disposable sanitary napkins (low knowledge: 18.9%, high knowledge: 38.5%;  $p < 0.01$ ).

**Conclusions:** The findings suggest that it is imperative for Bihari women to have adequate and appropriate menstruation knowledge so that they can maintain good menstrual hygiene practices. The findings highlight challenges experienced by the refugee women in maintaining MHM and can be used to improve women's reproductive health and well-being and reduce the risk of reproductive tract infections (RTI) among socially disadvantaged women.

**Keywords:**

Bangladesh; Menstrual hygiene management; practices; refugee women; sanitary napkins;

**BACKGROUND**

Menstrual hygiene management (MHM) can be defined as a way of managing menstruation by gathering or absorbing period blood applying various absorbent materials (such as disposable sanitary pads and cups) safely with self-respect (Afiaz & Biswas, 2021). According to the United Nations Children's Fund (UNICEF), MHM is an integral part of hygiene for most women and girls (UNICEF, 2020) from menarche to menopause (Budhathoki et al., 2018). During menstruation, they need to maintain hygiene by adequately cleaning the external genitalia, using a clean cloth, a sanitary pad (or other products, e.g., tampon, cup) hygienically, and changing the pad or cloth every 3 to 4 hours (Hjelm et al., 2018; Kaur, 2018; Kumar et al., 2017). The use of unhygienic materials may adversely affect women's and girls' health and result in reproductive tract infections (RTIs) (Ulley et al., 2019). Therefore, menstruation and MHM remain crucial public health issues for most women and girls across the world.

Studies in low- and middle-income countries (LMIC), countries whose gross national income per capita is between \$1,046 and \$12,695, indicate that adolescent girls and their female relatives and friends often lack knowledge about MHM (Alam et al., n.d.; Prajapati & Patel, 2015). Although mass media, mothers, relatives, and friends play critical roles in informing girls about MHM (Rubinsky et al., 2020) women and girls' knowledge about menstruation is often poor, and many do not even know about menarche until they experience it (DeMaria et al., 2020). Existing evidence also suggests that MHM is influenced by inadequate knowledge about menstrual hygiene and incorrect knowledge of cleanliness (Gultie et al., 2014). Even, women with adequate knowledge may not translate good menstrual hygiene into practice due to various socio-cultural taboos and stigma (Afiaz & Biswas, 2021; Boakye-Yiadom et al., 2018).

Various factors shape women's and girls' MHM. Studies from LMIC – such as Ethiopia (Smiles et al., 2017), Kenya (Phillips-Howard Nyothach et al., 2016), Zambia (Lahme et al., 2018), India (Astuti et al., 2021; Budhathoki et al., 2018; Kaur, 2018), Nepal (Budhathoki et al., 2017) and Bangladesh (Ainul et al., 2017) – demonstrates that many menstruating women and girls do not adequately follow MHM healthy practices, including the use of disposable sanitary pads, tampons or menstrual cups. Instead, many women and girls in resource-limited settings tend to use reusable pads, dirty rags, washable clothes, old fabrics, tissue paper, cotton pieces, or some mixture of absorbent materials to manage menstrual bleeding because they have limited access to commercial products (Kuhlmann et al., 2017). Notably, the hygienic use and storage of reusable pads and washable cloths remain a concern for many rural women and girls in LMIC (Kaur, 2018). MHM in LMIC is constrained by socio-economic factors such as the high price and unavailability of sanitary pads (and other products), insufficient water and latrine facilities, and a lack of private rooms for changing sanitary pads (Ameade & Garti, 2016; Astuti et al., 2021; Kuhlmann et al., 2017; Varghese et al., 2015). Such factors may lead to limited use and/or non-use of absorbent materials (such as disposable sanitary nappies, tampons and cups. This may put girls and women at risk of contracting RTIs, pelvic inflammatory disease, and urinary tract diseases. Moreover, some socio-cultural taboos (e.g., women are impure while menstruating) and limited use and/or non-use of absorbent materials (such as disposable sanitary nappies, tampons and cups) may discourage women and girls in LMIC to participant in household work, playing, social event and cultural and religious practices (Prajapati & Patel, 2015). This has a negative impact on women's reproductive

health and their well-being, which, in turn, may hinder the achievement of the United Nation's (UN) Sustainable Development Goals (SDGs): Goal 3 (good health and well-being) and Goal 5 (gender equality) (Gultie et al., 2014; Tiwary, 2018)

The participants of the study are the Bihari women of the Geneva Camp in Dhaka, Bangladesh. The Biharis, an Urdu-speaking minority group, including the Bihari women of the Geneva Camp originally and mostly from the Indian province of Bihar, are the descendants of Muslim refugees who migrated from India to East Pakistan (now Bangladesh) after the partition of 1947 to escape communal unrests and retain their religious identity (Bashar, 2006; Khan, 2015). Approximately 400,000 Bihari Muslims are living in 116 camps in Bangladesh. The Bihari people have been living in camps due to their ancestry and roots in Bihar and possibly due to their families' support of Pakistani authorities during the liberation war of Bangladesh in 1971 (Haider, 2018; Rafe, 2018). Around 25,000 Biharis live in the Geneva Camp at Dhaka, which was established by the International Committee of the Red Cross to provide security for Bihari communities after the independence of Bangladesh. Houses inside the Geneva Camp are characterized by a narrow passage occupied by domestic cattle. Camp dwellers are crammed into tiny rooms with limited privacy for family members. Toilets are overflowed, and paths are flooded during the rainy days, leading to poor sanitation for refugee women (Rafe, 2018).

There were two compelling reasons for conducting the present study among the Bihari women of the Geneva Camp in Dhaka. First, although Bihari women living in Geneva camps are citizens of Bangladesh, they are a socially disadvantaged ethnic minorities and do not identify themselves as Bangladeshi. In the Geneva camps, they live in a diasporic situation characterised by insecurity, hunger, poverty, misery, and unhealthy sanitary systems. This situation, together with inadequate literacy and limited medical facilities, produce poor (sexual and reproductive) health outcomes, including high-risk pregnancies, chronic illnesses, and sexually transmitted diseases, among other health-related problems. Compared to mainstream Bangladeshi women, Bihari women have limited or no access to MHM-related interventions, including menstrual and reproductive health education, the regular supply of water, sanitary napkins, and disposal facilities (Ainul et al., 2017; Farzana, 2009). This may be because Bihari women are considered an "artificial minority" or displaced persons (Bashar, 2006). The relatively limited access to MHM-related interventions suggests that Bihari women's reproductive health issue may also be a great concern. As such, there is an urgent need to study the MHM of Bihari women. Second, research into MHM has been mainly based on menstruation-related knowledge and practices of women and girls in the mainstream Bangladeshi society (Alam et al., n.d.; Hennegan & Sol, 2019; Muhit & Chowdhury, 2013) socially disadvantaged groups, such as the Bihari, have largely been ignored.

To our knowledge, no study has been conducted on menstruation-related knowledge and practices of Bihari women in Bangladesh. Therefore, the present study was undertaken to assess knowledge and practices related to MHM among Bihari women in Mohammadpur Geneva Camp (MGC) in Dhaka, Bangladesh. Our goal was to highlight their MHM-related challenges, which might be useful for policymakers, health professionals, and researchers. The data may also constitute a basis for targeted MHM-related interventions for the refugee women in Bangladesh.

## **METHODS**

### **Study setting**

Between March and April 2017, a descriptive cross-sectional survey was conducted among Bihari women and girls in MGC in Bangladesh. MGC is located in the heart of the capital city of Bangladesh, Dhaka. We selected MGC because it is the largest Geneva Camp for the Bihari community in Bangladesh. Menstruating girls and women living in the MGC, aged between 15 and 49 years, were eligible for the study.

### **Sample size and sampling procedure**

In the absence of a suitable sampling frame, we applied a complete enumeration (census-type purposive sampling technique): All the women in the selected age group (15-49 years) were targeted

for the survey. Such purposive (i.e., non-probability) sampling is often chosen to conduct surveys among marginalized and hard-to-reach populations, such as street children (Ennew, 1994; Faugier & Sargeant, 1997) and truck drivers (Huda et al., 2016). Of the 175 approached eligible subjects, 160 participants participated in the study (response rate 91%). During the recruitment for the survey, field investigators visited every household, and they asked a screening question to adult residents: ‘Are there any women or girls aged between 15 and 49 years living in your specific household?’ If they answered ‘yes’ and the targeted women or girls were present at that time, the field investigators provided a brief description of the study. Any further questions were answered at that time or later if the women wanted to take more time to consider whether or not to participate. Women and girls interested in taking part in the survey who were available immediately were offered the option to complete the survey at that time in their rooms to maintain privacy. Those who were interested in taking part but were not immediately available were offered an alternative, mutually convenient time to complete the survey. Field investigators returned to their households to conduct the survey at a mutually convenient time. Finally, a sample size of 160 women was selected and successfully surveyed.

### **Survey instrument**

A structured questionnaire was used to obtain the women’s socio-demographic characteristics (e.g., age, education, monthly family income, primary source of income, family size, and family type), experiences during menstruation, and knowledge about and practices of MHM. Through an extensive review of relevant published studies (Ali & Rizvi, 2010; Ameade & Garti, 2016; Gultie et al., 2014; Thakur et al., 2014; Upashe et al., 2015), the questionnaire was developed, and appropriate questions related to knowledge and practices related to MHM were selected from the questionnaire based on the objective of our study.

Once the questionnaire was drafted, it was pre-tested as a pilot study among Bihari women at the study site to identify any problems with the questionnaire, enhance the questionnaire’s quality, and maximize the response rate and ensure reliability (Bolarinwa, 2015; Haider, 2018; Rafe, 2018). In the pilot study, five face-to-face survey interviews with Bihari women were conducted. Considering the high illiteracy rate of Bihari women (94%), in the pre-testing, the printed version of the questionnaire was administered orally by the interviewer. The face-to-face interviews for pre-testing were conducted by a co-author (i.e., MR) who is experienced in conducting interviews with vulnerable women and familiar with Bihari culture. Feedback from this pre-testing process was incorporated into the final questionnaire, which comprised close-ended questions. Respondents who were involved in the pre-testing of the printed questionnaire were excluded from the actual survey. Before finalizing the questionnaire, two authors (i.e., MNH and SA) reviewed the questionnaire and paid careful attention to the wording and order of each question to enhance its validity further. The main printed questionnaire was developed in Bangla (the native language of participants) and then translated back in English for documentation.

Prior to the survey, a female co-author (e.g., MR) provided training to all field investigators about the content and nature of the questions. Training on the process of data collection and how to overcome challenges during data collection was jointly provided by two authors (i.e., MR and MNH). All field investigators were also given a brief idea about women’s usual behavior, including those who were experiencing psychological and health problems during menstruation. The female field investigators were proficient in Bangla and familiar with Bihari culture as well. Thus, the three experienced and well-trained female field investigators, including one co-author (i.e., MR), collected survey data from Bihari women in the Geneva Camp. As in the pre-testing, the paper questionnaire was administered orally by the interviewers in the actual survey. On average, it took 15-18 minutes to complete each questionnaire.

### **Measures**

In consultation with senior research experts, questions related to socio-demographic characteristics, knowledge about menstruation and experiences during menstruation, and menstruation-related knowledge and practices were designed. Pooled scores related to menstruation knowledge were

generated from six questions: a) menstrual is a regular event for women at reproductive or childbearing ages (yes, no); b) menstruation is a sign that a woman is capable of bearing a child (i.e., becoming a mother) (yes, no); c) women have a high chance of becoming pregnant around the time of ovulation (yes, no); d) during menstruation, changing underwear once a day is enough (yes, no); e) during menstruation, uncleanliness can increase the risk of an infection or bacteria-related diseases (yes, no); and f) personal menstrual hygiene can reduce the risk of contracting reproductive tract infections (yes, no) (see Table III). A value of '1' was assigned for each 'correct' response, whereas '0' was given for each 'incorrect' response. Thus, a total score of menstruation knowledge was calculated (6 points). The mean score of menstruation knowledge (mean=4.37, SD=0.77) was used to determine the cut-offs for high and low menstruation knowledge. High knowledge of menstruation (5–6) was given to those who scored above the mean. Those scored at or below the mean score were classified as having low menstruation knowledge (1–4). This high and low score approach is consistent with similar studies that measured knowledge, attitudes, and practices of menstrual hygiene management among girls and women (Baumann et al., 2019; Kitesa et al., 2016; Upashe et al., 2015). Practices related to MHM among study participants were assessed by asking questions on the use of disposable sanitary napkins, advice from doctors, daily baths, and socio-cultural taboos.

### Data Analysis

Data were checked manually for completeness, then coded and entered into Statistical Package for the Social Sciences (SPSS) version 20 for analysis. Prior to the statistical analyses, data cleaning and cross-checking were done to ensure quality. Descriptive and bivariate analyses were then performed. The socio-demographic characteristics, knowledge about menstruation and experiences during menstruation, and menstruation-related knowledge and practices were presented in percentage form of categorized responses. The Chi-square statistic was used to examine the association between menstruation knowledge and menstruation practices ( $p < 0.01$ ).

### Ethical issues

The Independent University in Bangladesh reviewed the study protocol. Participation in this study was voluntary. By providing verbal consent, participants indicated that they were willing to participate in the survey. If participants were under 18 years of age, permission and verbal consent of their parents was obtained in order for the participants to complete the survey. No personally identifiable information was recorded. Respondents were informed that they had the full right to withdraw their participation in the survey or skip any question at any time without any penalty or prejudice. A unique identifier code was given to each participant so that they could mention this code if they chose to withdraw their data from the study.

Any information obtained from the girls and women during the survey remained confidential and was not disclosed to anyone except the authors. The completed paper questionnaires were kept in a locked filing cabinet to which nobody, but the authors had access. SPSS data and output files were stored and backed up in a password-protected folder on our personal password-protected computers. All paper questionnaires were destroyed after the analysis of the data. Overall, privacy, anonymity, and confidentiality were maintained throughout data collection, data analysis, and presentation of the results.

## RESULTS

### Socio-demographic characteristics of the study participants

The socio-demographic characteristics of the study participants ( $n=160$ ) are presented in Table 1. Findings demonstrate that 58.1% were aged between 20 and 39 years ( $M=25.1$ ,  $SD=8.8$ ). Twenty six percent had no formal education. Majority (61%) had less than secondary education. About 80% of the participants' mothers had no formal education, and 62.5% reported that their monthly family income was between 5,001 Taka (US \$ 58.95) and 10,000 Taka (US \$ 118). The main source of

participants' family income was day labor (e.g., rickshaw pullers, restaurant waiters, salon assistants, and scavengers) (70%). The average family size was 4.9, and 68.1% were living in a nuclear family.

**Table 1. Socio-demographic characteristics of Bihari women in the Geneva Camp.**

Socio-demographic characteristics	Frequency (n=160)	Percentage
<i>Age</i>		
≤19 years	52	32.5
20 to 39 years	93	58.1
40 years and above	15	9.4
<i>Education: years of schooling</i>		
No education	42	26.3
1 to 4 years	26	16.3
5 to 8 years	72	45.0
9 years or more	20	12.5
<i>Mothers education</i>		
No education	129	80.6
Primary completed	30	18.8
Secondary or higher	1	0.6
<i>Monthly family income</i>		
1,000-5,000 Taka (11.79-58.94 US \$)	26	16.3
5,001-10,000 Taka (58.94- 117.88 US \$)	100	62.5
10,001-15,000 Taka (117.89-176.82 US \$)	29	18.1
>15,000 Taka (>176.82 US \$)	5	3.1
<i>Primary sources of income</i>		
Day labor (e.g., rickshaw pullers, restaurant waiters)	112	70.0
Small business (e.g., selling bakery, street food, and toys)	33	20.6
Government jobs	15	9.4
<i>Family size</i>		
1-4 members	75	46.9
5 or more	85	53.1
<i>Family type</i>		
Nuclear family	109	68.1
Joint/extended family	51	31.9

BD 1,000 Taka = 11.79 US \$ (3 September 2020)

## Experiences of Menstruation

Nearly 66% of participants did not hear about menstruation prior to their menarche. Of those who had heard about menstruation (n=54), 48.1% had heard about it from their mothers/sisters/other close relatives. Other important source of menstruation information were mass media, including newspapers, radio, and television (35.2%) and female friends (16.7%). Seventy six percent of the participants mentioned that they were not psychologically prepared for menarche, and 69% experienced their first menstruation at the age of 10-12 years. Women's emotional reactions during menstruation included fear (26.3%), embarrassment (23.1%), discomfort (16.3%), and surprise (2.5%). Almost 32% reported multiple reactions. Approximately 80% reported that their menstruation lasted up to 6 days (see Table 2).

**Table 2. Bihari women and girls' experiences of menstruation.**

Menstruation-related experiences	Frequency	Percentage
<i>Heard of menstruation before undergoing it (n=160)</i>		
No	106	66.2

Yes	54	33.8
<i>Main source of information about menstrual hygiene (n=54)</i>		
Mother/sister/relatives	26	48.1
Mass media (including newspapers, radio, and television)	19	35.2
Female friends	9	16.7
<i>Respondents were prepared mentally for the first menstrual period (n=160)</i>		
No	122	76.3
Yes	38	23.8
<i>Age of first menstrual period (n=160)</i>		
10-12 years	111	69.4
13-16 years	49	30.6
<i>Emotional reactions during menstruation (n=160)</i>		
Fear	42	26.3
Embarrassment	37	23.1
Discomfort	26	16.3
Surprise	4	2.5
Multiple reactions	51	31.9
<i>Duration of menstrual flow (n=160)</i>		
0-6 Days	132	82.5
More than 6 days	28	17.5

### Knowledge about MHM

Table 3 presents the findings on Bihari women's knowledge about MHM. Results show that 99.4% reported that menstruation is a regular event for women of childbearing/reproductive age. Around eighty percent knew that menstruation was a sign of capability to become a mother or bear a child. Approximately 54% agreed with the statement that women have a high chance of becoming pregnant around the time of ovulation. However, 83.1% reported that changing underwear once a day was enough. Ninety three percent of the participants knew that uncleanliness during menstruation could increase the risk of infection or bacteria-related diseases. Likewise, 93% of Bihari women reported that personal menstrual hygiene could reduce the risk of contracting RTIs. Overall, 59.4% of participants possessed low knowledge, and 40.6% high knowledge, about menstruation.

**Table 3. Bihari women's knowledge about menstruation.**

Knowledge questions	Frequency (n=160)	Percentage
<i>Menstruation is a regular event for women at reproductive or childbearing ages.</i>		
No	1	0.6
Yes*	159	99.4
<i>Menstruation is a sign of having the capability to bear a child (i.e., become a mother).</i>		
No	31	19.4
Yes*	129	80.4
<i>Women have a high chance of becoming pregnant around the time of ovulation.</i>		
No	74	46.3



Yes*	86	53.8
<i>During menstruation, changing underwear once a day is enough</i>		
No*	27	16.9
Yes	133	83.1
<i>During menstruation, uncleanliness can increase the risk of an infection or bacteria-related diseases.</i>		
No	11	6.9
Yes*	149	93.1
<i>Personal menstrual hygiene can reduce the risk of contracting reproductive tract infections.</i>		
No	11	6.9
Yes*	149	93.1
<i>Pooled knowledge (1 – 6 scores; Mean=4.37; SD=0.77)</i>		
Low knowledge (1 – 4 scores)	95	59.4
High knowledge (5 – 6 scores)	65	40.6

\*Correct answers

### Practices related to MHM

Most women (73.1%) reported that they did not use disposable sanitary napkins during their menstruation (see Table 4). The reasons reported by the women for not using disposable sanitary napkins were high price (47.9%), felt it was not necessary (11.1%), a lack of awareness (6.8%), feeling ashamed of buying sanitary napkins (2.6%), and unavailability (1.7%). Around thirty percent of the participants reported that they did not use disposable sanitary napkins for multiple reasons. The Bihari women who did not use sanitary pads (n=117) reported that they used old disposable clothes (59.83%), reusable cloths (25.64%), cotton (9.40%), or toilet tissue paper (4.27%). Only 1% of the women did not use anything (data not shown in table). Almost 66% reported that they used only underwear. In addition, 75% said that they did not seek a doctor's advice in case of any health problems during menstruation. About 68% performed daily baths during menstruation, and 36.9% of the women followed socio-cultural taboos during menstruation. Over 35% stated that they followed multiple taboos during menstruation. Some of the taboos followed by the participants included not wearing new clothes (27.1%), using a separate bedcover (20.3%), and not serving guests (1.7%) (data not shown in table).

**Table 4. Bihari women's practices related to menstrual hygiene management.**

Menstrual hygiene-related practices	Frequency (n=160)	Percentage
<i>Use disposable sanitary napkins</i>		
No	117	73.1
Yes	43	26.9
<i>Use underwear during menstruation</i>		
No	55	34.4
Yes	105	65.6
<i>Seek advice from doctors about menstruation-related problems</i>		
No	120	75.0
Yes	40	25.0
<i>Perform daily baths during menstruation</i>		
No	52	32.5
Yes	108	67.5
<i>Follow socio-cultural taboos during menstruation</i>		

No	101	63.1
Yes	59	36.9

### Association between Menstruation-related Knowledge and Menstrual Hygiene-related Practices

The associations between menstruation-related knowledge and menstrual hygiene-related practices were examined (see Table 5). The results reveal that menstrual hygiene-related practices varied by the low and high levels of correct knowledge about menstruation. For example, women who have a higher level of menstruation-related knowledge used disposable sanitary napkins more often than those who had a low level of menstruation-related knowledge (low knowledge: 18.9%, high knowledge: 38.5%;  $p < 0.01$ ). No statistically significant associations between menstruation knowledge and the three other menstrual hygiene-related practices (e.g., advice from doctors, performing daily baths, following socio-cultural taboos) were found. This may be due to small sample size. Therefore, a multivariate analysis was not undertaken.

**Table 5. Association between menstruation-related knowledge and menstrual hygiene-related practices (n=160).**

Knowledge by practices	Menstrual hygiene-related practices				Total	Chi-square ( $\chi^2$ ) test: p-value
	No n	%	Yes n	%		
<i>Knowledge vs. use of sanitary napkins</i>						
Low knowledge	77	81.1	18	18.9	95	$\chi^2=7.48$ $p=0.006^*$
High knowledge	40	61.5	25	38.5	65	
<i>Knowledge vs. advice from doctors about menstruation-related problems</i>						
Low knowledge	66	69.5	29	30.5	95	$\chi^2=3.81$ $p=0.051$
High knowledge	54	83.1	11	16.9	65	
<i>Knowledge vs. performing daily baths</i>						
Low knowledge	31	32.6	64	67.4	95	$\chi^2=0.002$ $p=0.966$
High knowledge	21	32.3	44	67.7	65	
<i>Knowledge vs. following socio-cultural taboos</i>						
Low knowledge	58	61.1	37	38.9	95	$\chi^2=0.43$ $p=0.511$
High knowledge	43	66.2	22	33.8	65	

\* $p < 0.01$

## DISCUSSION

The current study aimed to assess knowledge and practices related to MHM among Bihari women in MGC in Dhaka, Bangladesh. The findings demonstrate that most of the women (59.4%) had a low level of menstruation-related knowledge. The majority of the women and girls (73.0%) did not use disposable sanitary napkins during menstruation. Instead of disposable sanitary napkins, Bihari women mostly used various absorbents including old disposable clothes (60.0%), reusable cloths (25.64%), cotton (9.40%), and tissue paper (4.27%). Nearly two-fifths of the Bihari women maintained some socio-cultural taboos during their menstrual period. Around two-thirds of the participants (67.5%) performed special baths during menstruation. Bivariate findings indicated that higher menstruation knowledge was associated with higher use of disposable sanitary napkins ( $p < 0.01$ ). From a policy perspective, the findings about knowledge and practices related to MHM among Bihari women are essential to appropriately identify the entry points for MHM-related interventions.

Most women's low level of menstruation-related knowledge in the current study is consistent with the findings of studies in LMIC, including India (Thakur et al., 2014) and Bangladesh (Salim & Begum, 2016) (Salim & Begum, 2016), where adolescent girls had limited

knowledge about MHM. A potential reason for this is that participants in these studies did not receive adequate information about this important life-changing event from their mothers/relatives, school, and/or mass media. However, the findings of the current study contrast with some studies of adolescent school girls in India (Nemade et al., 2009), female university students in Ghana (Ameade & Garti, 2016), high school girls in Ethiopia (Upashe et al., 2015) and Australia (Munro et al., 2022), which suggests that those women had good knowledge of MHM. A probable explanation for this difference may be that those three studies in India, Ghana, and Ethiopia were conducted with student participants who might have received education about MHM in their institutions. However, the current study was conducted among the refugee women in a Geneva Camp, who lacked formal education and had limited access to mass media, including television and newspapers.

Similar to the present study, available literature from some LMIC, including Kenya (Phillips-Howard et al., 2016), India, Pakistan, and Bangladesh (Muhit & Chowdhury, 2013; Victora et al., 2016), shows that the majority of the women and girls did not use disposable sanitary napkins during menstruation. A tentative explanation for this similarity is that, despite the religious variation, Bangladeshi women and girls have socio-economic and cultural characteristics similar to those of women and girls in other LMIC.

Our study also demonstrates that, instead of disposable sanitary napkins, Bihari women mostly used various absorbents including old clothes, reusable cloths, cotton, and tissue paper, primarily due to limited economic capacity to buy disposable sanitary napkins. Their monthly household income is lower than the average per capita income of Bangladesh in 2019. Notably, Bihari women are primarily dependent on male household members who earn money, run their households, and make decisions on financial matters. Furthermore, Bihari women have a lack of access to commercial products and inadequate awareness and education about MHM. Moreover, maybe sociocultural taboos surrounding menstruation restrict Bihari women to discuss the subject with their husbands. Bihari women may also feel embarrassed to tell their husbands that they need to buy sanitary napkins. Therefore, the Bihari women in the current study had limited options or no option at all, to purchase disposable sanitary napkins to maintain good menstrual hygiene.

In contrast to the findings of the current study, some studies of women of reproductive age (Astuti et al., 2021; Budhathoki et al., 2018; Kumar et al., 2017; Patel, 2016; Varghese et al., 2015) medical students, and adolescent girls in India show that the majority women and girls used disposable sanitary napkins during menstruation instead of unhygienic rags and old clothes, tissue paper, or cotton/wool pieces. The possible reasons for this difference are that the women in those studies had good knowledge about MHM and financial capacity to buy sanitary napkins. Furthermore, available evidence indicates that women in developing countries, including Nepal (Budhathoki et al., 2017) and Uganda (Budhathoki et al., 2017; Crofts & Fisher, 2012), used reusable sanitary napkins, which are culturally appropriate, affordable, and environmentally-friendly. This suggests that it is possible to manage menstrual hygiene with culturally appropriate and locally available low-cost absorbents.

Our results also suggest that the majority of the Bihari women did daily baths, which is congruent with findings of a systematic review and meta-analysis on studies of adolescent girls in India (Eijk et al., 2016; Upashe et al., 2015) and with those of other studies in Ethiopia. Pakistan (Ali & Rizvi, 2010), and Turkey (Özdemir et al., 2012). The findings of those studies indicate that most women and girls regularly took baths during menstruation. However, a study in Pakistan shows that avoidance of taking a bath during menstruation is a cultural practice in some places.

Our finding that around two-fifths of the Bihari women maintained some socio-cultural taboos during their menstrual period is moderately consistent with some studies in India (Baumann et al., 2019; Morrison et al., 2018; Thakur et al., 2014), Nepal, sub-Saharan Africa (Kuhlmann et al., 2017), and Kenya (Chebii, 2018). Studies in those countries indicate that socio-cultural taboos restricted women and girls from taking part in common activities, including sleeping in their homes, eating dairy products, cooking food, attending marriage ceremonies, attending school, and engaging

in income-generating activities. Our finding that most Bihari women used underwear during menstruation is similar to that of a study in Uganda (Parker et al., 2014). Our data also suggest that women with a higher level of knowledge about MHM used disposable sanitary napkins more than those with a low level of knowledge. This finding is supported by studies in India, Ghana, Ethiopia, and Indonesia (Mufdlilah & Rachmawati, 2018) which show that women with good knowledge about MHM tended to maintain good menstrual hygiene (e.g., use of disposable sanitary napkins).

### **Strengths and Limitations**

Among the strengths of the present research are that the participants represent an important socially disadvantaged minority group in Bangladesh, that information generated from our study may be useful for further research, and that our findings have policy implications in similar settings. To our knowledge, this cross-sectional study is the first of its kind to examine knowledge and practices related to MHM among Bihari women in Bangladesh. Our study contributes to the existing scientific literature examining the menstruation-related knowledge and practices of women and girls in LMIC (Mappa et al., 2020).

However, there are several limitations associated with the study. The sample size is relatively small. As such, we did not find any associations of menstruation knowledge with practices and sociodemographic characteristics such as education and income. Therefore, multiple logistic regression analysis was not undertaken. In addition, our sample is restricted to Bihari women refugees only. Thus, the findings are limited to this specific group of women and are not generalizable to the population of Bangladesh. Furthermore, our study is limited to quantitative analysis, as we did not explore the qualitative aspects of women's experience of menstrual hygiene management and its barriers. These limitations warrant further studies to be conducted with a mixed-method approach, including a qualitative study exploration of women's and girls' experience of MHM and the barriers/enablers of MHM. This will provide a better understanding of MHM among socially disadvantaged Bihari women living in the MGC.

### **Policy Implications**

The findings of the study can be used for a better understanding of the menstruation behaviour of socially disadvantaged women and other refugee women of similar characteristics, living in similar conditions. Furthermore, the results of the study might be useful for policy development concerning socially disadvantaged women's reproductive health, including initiating interventions to improve menstrual health and hygiene-related behaviours of vulnerable women in the Geneva Camps in Bangladesh and elsewhere. Strategies might include providing education about MHM-related practices for both mothers and daughters to raise their awareness, and organising facilities for inculcating hygienic behaviors, such as frequent change of sanitary napkins and underwear during menstruation. The strategies may also include providing accessible and affordable sanitary napkins, adequate washrooms and toilet facilities with sufficient access to clean water, and proper disposal. These interventions for vulnerable Bihari women in the Geneva Camp may have significant implications in avoiding RTIs and contributing to the achievement of the UN SDGs (Gultie et al., 2014; Tiwary, 2018). Therefore, it is vital to incorporate MHM-related interventions into women's health development programs in Bangladesh and to undertake culturally appropriate and gender-sensitive interventions to meet the MHM-related unmet needs of vulnerable Bihari women in the Geneva Camps in Dhaka, Bangladesh and elsewhere.

### **CONCLUSION**

The findings indicate that refugee women in the Geneva Camp lacked adequate knowledge about MHM and did not maintain good menstrual hygiene. Due to financial reasons, personal preference, limited knowledge, and unavailability of sanitary napkins, most of the women did not use disposable sanitary napkins. More importantly, Bihari women maintained several unhygienic menstrual practices, including the use of old clothes, reuse of old cloths, cotton, and tissue paper,

which may cause reproductive health problems (Simanjuntak, 2008). These unhealthy menstrual practices might be prevalent due to their lack of knowledge and awareness of MHM and the economic incapacity to buy sanitary napkins. Therefore, it is critical to undertake interventions for enhancing their menstruation knowledge and providing MHM-related interventions for improving their hygienic behaviors.

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