Chapter 13
Menstrual Hygiene Management During Times of Complex Humanitarian Crisis: Listening to the Voices of Rural Adolescent Girls of Assam

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Abstract Menstrual hygiene management (MHM) is an integral component of the reproductive health and hygiene of adolescent girls. Despite being a vital issue that has a multifaceted effect on the well-being of girls, it is often overlooked in the household and community environment. In a disaster-prone zone, the situation further aggravates at the time of emergency situation. The first section of the chapter examines the knowledge, perception, and practices of MHM prior to the coronavirus (COVID-19) pandemic. The second section explores the impact of the COVID-19 pandemic and annual flood on menstrual hygiene practices. The first phase of extensive primary survey using mixed sampling method was done in Biswanath district of Assam in 2019. Furthermore, the second phase of the survey was conducted in 2020 to investigate the impact of a biological and climatic disaster.

Poor menstrual hygiene practices are the outcome of knowledge gap, unfavorable cultural milieu, and inadequate resources. In general, menstrual hygiene needs of adolescent girls are neglected in rural settings. Respondents' ability to deal with their menses is severely altered during unprecedented crisis situation. Humanitarian agencies also overlook gender-specific needs of hygiene and sanitation facilities, thus amplifying existing vulnerabilities in the relief camps.

Keywords Menstrual hygiene management (MHM) · Adolescent health · Humanitarian crisis · COVID-19 pandemic · Flood

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M. I. Hassan et al. (eds.), *Social Morphology, Human Welfare, and Sustainability*,
https://doi.org/10.1007/978-3-030-96760-4_13

13.1 Introduction

Adolescence brings with it numerous physiological as well as psychosexual changes among girls. Puberty in girls is marked with the onset of menstruation and it becomes an important phenomenon in the life cycle of women. Inadequately informed girls, residing in resource-scarce settings, experience psychological stress and embarrassment with the onset of menstruation. Perception and response of the girls towards menstruation largely depend upon appropriate knowledge and awareness of the process. In most cultures, there is a lower degree of awareness on menarche and menstruation among adolescents (Ahuja and Tewari 1995; Tiwari et al. 2006). Mostly in the low- and middle-income countries, girls enter into puberty with a considerable amount of misconceptions and knowledge gap regarding menstruation, hence unprepared to handle it and unsure about when and where to seek help.

In most of the cultures, menstruation is considered a mother-daughter affair. Mothers, sisters, and friends are often the primary source of information on menstruation. Adult women are hesitant in discussing issues related to menstruation; consequently girls are not adequately informed about physiological changes, their skillful management, and maintaining self-esteem (NIPCCD 2014). Information shared by female family members and peer group are influenced by their own limited and often erroneous knowledge based on deep-seated cultural myths and therefore reinforcing the negative and distorted perception and menstrual practices. Adult women with limited biological facts and knowledge on appropriate hygiene management pass on cultural beliefs, taboos, and restrictions to be followed by adolescent girls.

Information inaccessibility on safe and hygienic management practices makes menstruation a traumatic experience for adolescent girls. Menstruation has been considered a tabooed topic to be openly discussed till the present time. Social and cultural bearing has emerged as the major obstruction in the advancement of understanding on the subject (House et al. 2013). Taboos and beliefs are found to be transcultural that range widely from mild discomfort and disbelieve to extensive complexes of restrictions that may ultimately extend up to isolation (Montgomery 1974; Hammond and Jablow 1976; Dharmalingam 1994). Even though menstrual taboos and myths vary in different societies; however, some commonalities exist across space. Restrictions from certain activities, avoiding open discussion on menstruation, and maintaining secrecy on the matter are some of the similar actions expected in most of the cultures (Ten 2007). Menstrual blood is often perceived as an "abomination" of the body and in some societies; women are considered to be impure during menstrual periods (Snoden et al. 1983; Jogdand and Yerpude 2011). In some communities, girls are advised to wash menstrual material when others are asleep at night as it is believed that menstrual blood may be used for black magic (Sommer et al. 2013). It is also believed that menstrual fluid is linked to witchcraft as the witches go after human blood; therefore, used menstrual items must be buried to eliminate the risk of witchcraft (Umeora and Egwuatu 2008). Cultural

deprivation in the form of misinformation and restrictions, in addition to limited material resources, causes devastating consequences on hygiene practices.

The dichotomy of auspicious-inauspicious exists in Assamese culture where menstruation at certain occasions is perceived as auspicious and pure while it is considered as highly polluting during other periods. *Ambubachi* festival is celebrated annually in the month of June in Kamakhya Temple. The festival is celebrated in the particular days when goddess Kamakhya is believed to be menstruating. Goddess Kamakhya represents feminine power and fertility in Hindu culture. It is believed that the goddess undergoes menstrual bleeding for three to four days annually. During this period, the water is said to flow red with iron-oxide, dripping over the *yoni* in the inner sanctum; therefore it seems as if the goddess Kamakhya is menstruating. During this phase, people do not practice farming or any devotional activities (Kakati 2020; Dutta 2021).

Apart from *Ambubachi* festival, menarche celebration known as *tuloni biye*, is practice in Hindu Assamese communities. In Assam menarche, celebration varies across regions and communities but normally persist. At the time of menarche, a girl is kept in a separate room where men are not allowed. The girl is predominantly kept on a diet including fruits, boiled potatoes, and rice for a week. Almost after a week, the girl is bathed with turmeric and married to a banana tree in some communities. The celebration symbolizes of transitioning of a girl into womanhood (Patgari and Patgiri 2020; https://thenortheasttodat.com 2017).

In one hand, there is the concept of a menstruating goddess; their supposed menstrual blood is regarded as the holiest thing in the Assamese tradition. Additionally, menarche celebration is practiced to celebrate womanhood in the community. Nevertheless, the dichotomy of purity and impurity attributed to menstruating women is evident in the taboos and norms to be followed during menstrual flow after menarche celebration.

In general, menstruation is considered as impurity and known as *suwa* in Assamese culture. It is believed that if a menstruating girl touches any substance, it might become impure too. Thus, in order to protect the social order of the society, various restrictions are imposed on the girls during periods. Her mobility is restricted to her room and one must be careful of not touching anything that comes in her way in case she goes out of her room. A menstruating girl is strictly not allowed to enter the kitchen and offer prayers, attend cattle, or touch plants. She is supposed to use separate utensils during periods and wash it separately. A married woman is not allowed to sleep with her husband when she is on her periods because it believed that by doing so the man can be exposed to the risk of some incurable diseases that may put his life at risk (Das 2008; Sonowal and Talukdar 2019).

Menstrual hygiene management (MHM) requires the provision of material resources to absorb menstrual flow, arrangement for maintaining personal hygiene, and disposal of menstrual waste with privacy and dignity (Sahin 2015). The fear of staining requires regular changing of menstrual absorbents, undergarments, and clothing. Regular bathing and cleaning of the genital area are essential for hygiene management.

Managing menstrual hygiene is a challenge especially for women in developing nations (Krenz and Strulik 2019). Poor menstruation hygiene management among adolescent girls is a public health issue in low- and middle-income countries (Sommer et al. 2013). About half of the girls and women in low- and middle-income countries practice poor hygiene during periods due to the factors beyond their control like inadequate knowledge on menstruation, cultural restrictions, and poor availability of menstrual hygiene products and facilities (Hennegan et al. 2019; Mahon and Fernandes 2010). Unhygienic and inefficient menstrual practices have emerged as one of the barriers in reaching their full potential due to a range of negative impacts like additional anxiety, fear, and embarrassment, mobility restrictions, restrictions on attending community congregation and school, and compromised safety and security (UNICEF 2019). In less developed regions, women's ability to handle their menstrual needs is further aggravated during humanitarian emergency settings.

13.2 Menstrual Hygiene Challenges During Natural Disaster

During the public health emergency concomitant of natural disasters, primary focus of the government is on the rescue of the affected population and rehabilitation in relief camps. Physiological processes do not cease during emergency situations and managing menstruation can be an additional burden for displaced women and girls (Van Leeuwen and Torondel 2018). Lack of adequate coping strategies, changes in the social and physical milieu, and inadequate access to material and structural resource needs can complicate the hygiene management issues during menstruation among displaced women. Maintaining the expected standard of hygiene and menstrual etiquette are challenged when practices get altered in new environmental settings during the crisis (Al-Shurbji 2017; Budhathoki et al. 2018). There is limited research on the issue of menstrual hygiene management in humanitarian emergency situations. The conundrum of menstrual hygiene management not being integrated as a standard component of emergency response has remained unanswered (Sommer 2012; Krishnan and Twigg 2016). In a normal situation, water and sanitation needs of a community are predominantly managed by men. Due to a lack of personal experience and understanding of menstrual needs, it has been inadvertently overlooked by men, and it continues to be overlooked in the emergency context. Cultural barriers concerning menstruation prevent adequate assessment and identification of a culturally and contextually appropriate solution. And finally, the priority of immediate life-saving needs in emergency settings may be because of the training and focus within the domain of public emergencies. It usually fails to treat menstrual hygiene management as an integral aspect of immediate need (Sommer 2012; Schmitt et al. 2017). Constrain in maintaining menstrual needs is intensified when natural catastrophes are accompanied by the events of biological disasters.

Novel coronavirus (COVID-19) pandemic has emerged as a major biological disaster of the century. During the initial stage of the pandemic, governments were

focused on controlling the transmission of the virus. In the process, certain vulnerable sections of the population were deprived of their specific needs. The COVID-19 pandemic created a disproportionate risk to women in the reproductive age group as the available resources were shifted from routine services including the services for reproductive and sexual health needs (Jahan 2020).

13.3 Material and Methods

13.3.1 Overview

The study is based on quantitative method that is exploratory in nature and attempts to investigate into the range of challenges in practicing MHM from the perspective of adolescent girls. This chapter aims at examining the knowledge, perception, and practices of MHM prior to the COVID-19 pandemic and also to identify the barriers in appropriate management of menstrual hygiene. It also attempts to explore the impact of the COVID-19 pandemic and annual flood on menstrual hygiene practices.

13.3.2 Study Design and Settings

This study was conducted among 300 adolescent girls in eight villages of Biswanath district of Assam in India. According to National Family Health Survey-IV (http://rchiips.org/nfhs/NFHS.org-4reports/Assam.pdf), the state average of rural adolescent girls having correct practices of menstrual hygiene is 25.7%; therefore it has been assumed that 25% of the adolescent girls were having correct practice of menstrual hygiene in the rural milieu. Based on 25% of the prevalence of correct menstrual practice, 289 samples were derived with a confidence level of 95% and a margin of error of 5%. Expected nonresponse rate is 5% (14 adolescent girls). Therefore, total sample size was considered as 303 adolescent girls and we have rounded it off to 300 for the representative sample.

Biswanath district was selected for the study since it has a predominantly rural population (more than 90%). Proportion of the female population to the male population of the selected district is much higher than the state average. Also, the entire southern part of the district is bounded by the river Brahmaputra making it prone to annual floods during the monsoon.

13.3.3 Study Population

For the study, female adolescents were selected in the age bracket of 10–19 years who had already begun their menstruation. Interviews were scheduled in the evening when the girls were available at their residence during the pre-disaster period; however, the discussions were held during the daytime in the relief camps.

All the 8 villages of Biswanath district lying in the proximity of Brahmaputra, flood-prone areas were included in the study. The number of adolescent girls from each village was based on proportional allocation. In each village, the first household was selected randomly; subsequently every third household was visited until the required number of samples was obtained. The same method was followed in each village until the required sample was obtained. All the adolescent girls present in the house were included in the study.

13.3.4 Data Collection Tool

The survey was conducted to collect information for the set of variables related to knowledge, attitude, and practices regarding menstruation. After an extensive literature review, a semistructured questionnaire was constructed for obtaining the required information. An attempt was also made to capture the cultural attribute of menstruation and its impact on MHM strategies adopted by the girls. Focused group discussions (FGDs) and in-depth interviews (IDIs) were conducted exclusively with girls and their mothers to gain better insights on cultural impacts, infrastructural impacts, and relational impacts on menstruation health and hygiene management. Eight key informant interviews (KIIs) were conducted including two community health workers (CHWs), three shopkeepers, and three drugstore employees who were focal persons for health-related matters including menstruation and were the key suppliers of feminine products. In the relief camps, only FGDs and IDIs were applied. FGDs and IDIs were conducted maintaining social distancing in the relief camps. IDIs were also conducted by applying the method of telephonic survey.

Written permission was received from the educated participants; however, for illiterate participants, the information sheet was read out, the objectives of the survey and their expected roles were explained. Their thumb impression was obtained if they voluntarily agreed to participate in the survey. Prior approval from parents was also obtained in a similar method.

Wealth index has been constructed on the basis of data collected on ownership of assets and housing characteristics. Question was asked specifically about ownership of movable and immovable assets and housing characteristics. This included livestock, plough, radio, refrigerator, TV, bicycle, mobile phone, water supply, toilet facility, roof of the house, source of light, number of rooms in the house, and ownership of land and livestock. If the household owned any of these assets, then code “1” was assigned, or else code “0” was given. All the variables were transformed into

scale variables. Subsequently, factor analysis procedure was applied to calculate the principal component that is used for creating wealth index. Wealth index is created as a continuous variable; the higher the score of the index, the wealthier is the household. For convenience, we have classified wealth index in three categories – low, medium, and high.

13.3.5 Study Area

The study has been conducted in Biswanath district of Assam. Biswanath district was carved out from Sonitpur district in 2016. It is located in the northern bank of river Brahmaputra and is surrounded by Arunachal Pradesh in north, Sonitpur district in the west, Lakhimpur in the east, and Golaghat and Nowgong in the south (Fig. 13.1). Major rivers of the district are- Brahmaputra, Ghiladhari, Burhigang, Borgang, and Behali in Biswanath Chariali subdivision and Burhoi, Solengi, Kharoi, Balijan, and Mornoi in Gogpur subdivision. Due to its geographical proximity to river Brahmaputra, the southern and eastern parts of the district are affected by annual flood in the monsoon season.

The flood hazard layer was derived that was based on the analysis of 215 satellite dataset which has been acquired during floods of 1998–2015. Figure 13.2 shows the flood hazard map prepared for Assam and Table 13.1 shows the flood hazard area

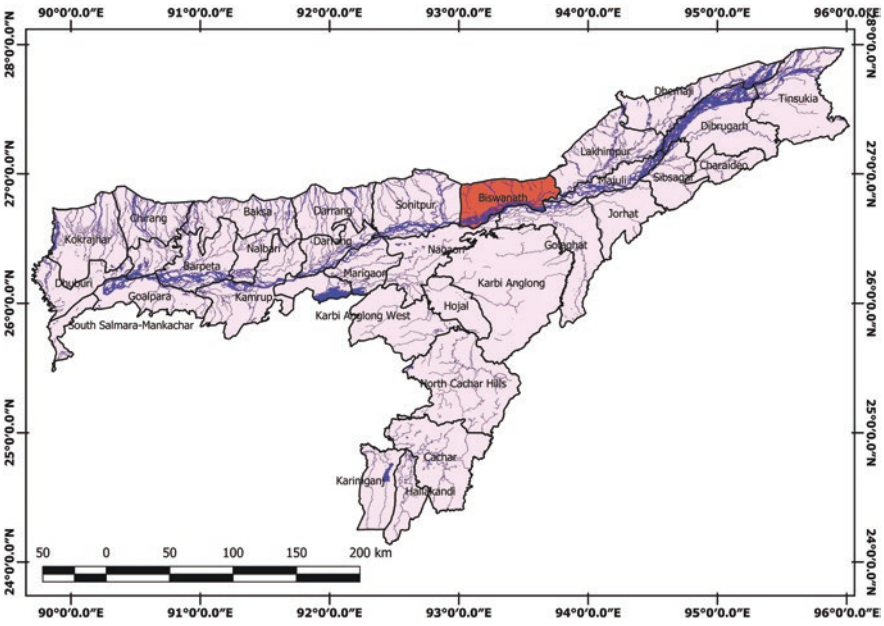

Fig. 13.1 Location of the study area

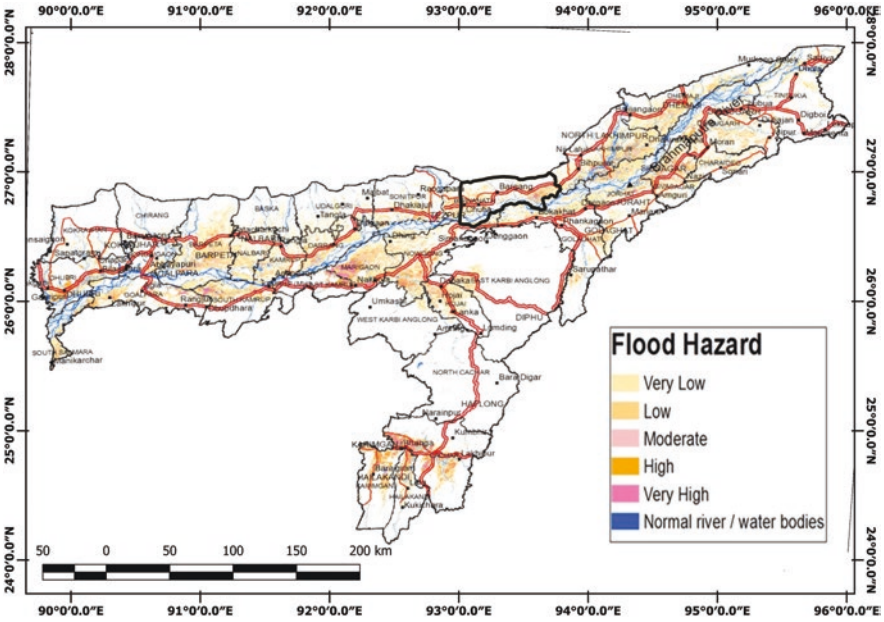

Fig. 13.2 Flood hazard map of Assam. Source: Flood hazard atlas for Assam state, 1998–2015)—a geospatial approach

Table 13.1 Flood hazard area under various categories—Assam

S. no	Hazard severity	Flood hazard area (ha)	% flood hazard (wrt state geographic area)	% flood hazard (wrt total flood hazard area)
1	Very high	48,490	0.62	2.16
2	High	106,659	1.36	4.73
3	Moderate	282,783	3.61	12.54
4	Low	556,080	7.09	24.66
5	Very low	1,260,562	16.07	55.91
	Total	2,254,574	28.75	100

Source: Flood hazard atlas for Assam state (1998–2015)—a geospatial approach.

calculated under different categories. Approximately 28.75% (22.54 lakh hectares) of land was affected by flood during 1998–2015.

Figure 13.3 shows the flood hazard map for the 17 districts of Assam affected by worst flood. Table 13.2 and Fig. 13.4 provide district-wise details of the flood hazard ranking index. On the basis of flood hazard index derived, it is found that out of 34 districts located along the banks of river Brahmaputra and river Barak, 17 districts are worst affected by flood in Assam, namely, Barpeta, Biswanath, Charaideo, Darrang, Dhemaji, Dhubri, Dibrugarh, Golaghat, Hailakandi, Jorhat, Kamrup, Lakhimpur, Morigaon, Nalbari, Sivasagar, Sonitpur and South Salmara.

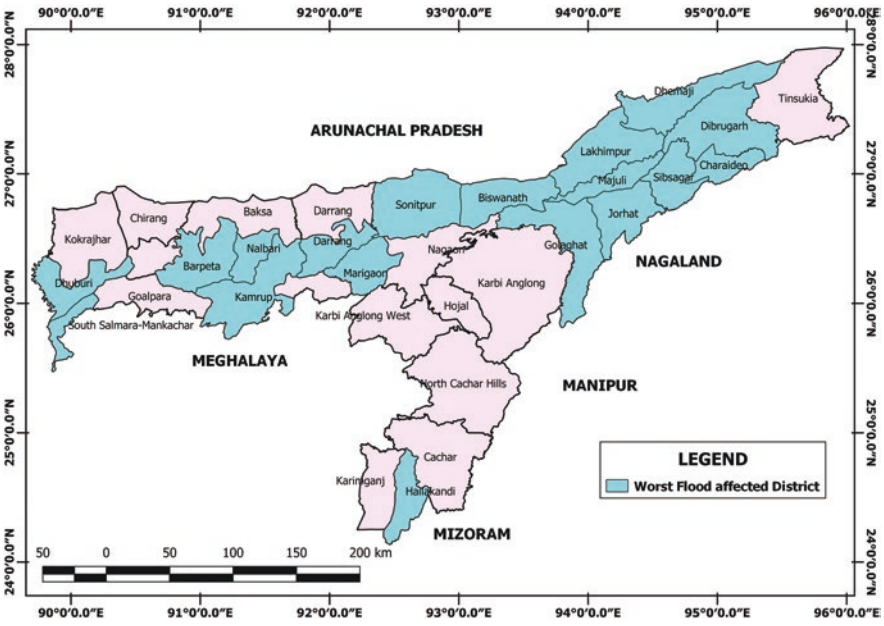

Fig. 13.3 Districts of Assam affected by worst flood

13.4 Limitations

The occurrence of the COVID-19 pandemic forced certain limitations on the smooth conduct of the study. Since, the second phase of study coincided with the outbreak of the pandemic; therefore, the study has to exclude quantitative survey. The study mainly relies on the self-perceptions and responses of the adolescent girls especially in the relief centers. The study leaves room for further exploration with respect to complete evaluation of approaches in disaster management regarding gender specific needs of the distressed.

13.5 Results and Discussion

A girl's reproductive health is largely influenced by her socioeconomic and demographic profile. More than half of the respondents belong to middle adolescent age and more than three-fourths experienced their first menstruation in this age group. Most of the respondents have completed their primary level of education. Most of the respondents belong to the lower wealth quintile. Less than half of the respondents lived in pucca houses. Households with pit latrines and semi-pucca bathing spaces were commonly reported (Table 13.3).

Table 13.2 District-wise flood hazard ranking index

S. no	District	District area (hectares)	Total flood-inundated area (hectares)	% flood inundation (hectares)	Flood hazard index	Flood annual wave index (F)	Flood hazard ranking (half)	Flood hazard ranking index
1	Kamrup	97,804	56,912	58	20	3	60	I
2	Sivasagar	156,097	91,619	59	19	3	57	I
3	Jorhat	283,860	123,037	43	19	3	57	I
4	Darrang	155,598	65,734	42	19	3	57	I
5	South Salmara	68,159	30,612	45	19	3	57	I
6	Dhubri	202,844	87,199	43	17	3	51	I
7	Biswanath	298,111	116,347	39	17	3	51	I
8	Sonitpur	229,614	71,378	31	17	3	51	I
9	Charaideo	106,559	46,969	44	17	3	51	I
10	Hailakandi	132,616	33,998	26	16	3	48	I
11	Dibrugarh	337,508	126,954	38	17	3	51	I
12	Golaghat	353,521	104,066	29	15	3	45	I
13	Lakhimpur	289,770	144,780	50	22	2	44	I
14	Morigaon	149,300	105,160	70	22	2	44	I
15	Barpeta	213,851	145,341	68	20	2	40	I
16	Nalbari	110,586	56,293	51	20	2	40	I
17	Dhemaji	252,527	115,304	46	20	2	40	I
18	Nowgong	254,479	144,289	57	29	2	38	II
19	Hojai	145,523	62,968	43	17	2	34	II
20	Karimganj	183,381	58,914	32	16	2	32	II
21	Goalpara	201,311	73,006	36	16	2	32	II
22	Bongaigaon	110,160	32,586	30	16	2	32	II
23	South Kamrup	208,903	69,873	33	16	2	32	II
24	Kamrup (metro)	41,073	6680	16	15	2	30	II
25	Cachar	377,431	101,141	27	15	2	30	II
26	East Kamrup	61,632	17,649	29	15	2	30	II
27	Baksa	158,637	25,972	16	16	1	16	III
28	Tinsukia	384,494	72,346	19	16	1	16	III
29	Udalguri	197,518	38,488	19	16	1	16	III
30	Chirang	188,189	9737	5	15	1	15	III
31	Dima Hasao	486,293	162	0	15	1	15	III
32	Karbi Anglong	730,613	38,565	5	15	1	15	III
33	Kokrajhar	258,923	24,919	10	15	1	15	III

(continued)

Table 13.2 (continued)

S. no	District	District area (hectares)	Total flood-inundated area (hectares)	% flood inundation (hectares)	Flood hazard index	Flood annual wave index (F)	Flood hazard ranking (half)	Flood hazard ranking index
34	West Karbi Anglong	312,144	14,920	5	15	1	15	III

Source: Flood hazard atlas for Assam state (1998–2015)—a geospatial approach.

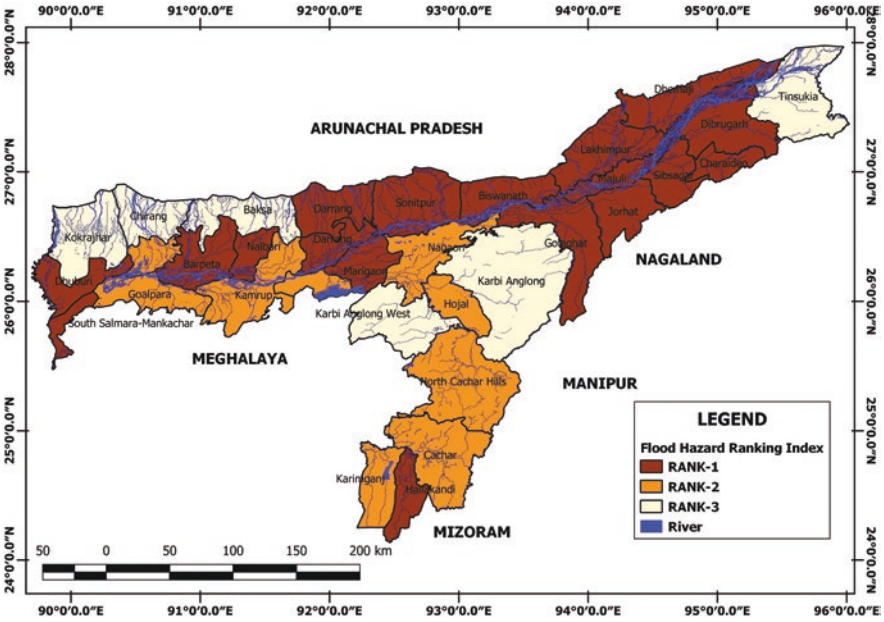

Fig. 13.4 Flood hazard by ranking index in Assam

Prior knowledge of menstruation and management skills plays a critical role in preparing girls for appropriate menstrual practices. Girls with no premenarcheal preparatory education on menstruation are likely to be scared, anxious, and confused at the time of first menstruation. The present study shows that there was almost no discussion on the physiological aspect of menstruation, for instance, the majority of the girls are unaware of the source of menstrual blood (Table 13.4). In the absence of any meaningful information to make sense of menarche, girls associated their first cycle of menstruation with excrement, wound, curse, or guilt.

Relational impacts are significant in enhancing the girl's knowledge on MHM practices. In the present study, mothers were the first to be approached at the onset of menstruation followed by sisters and friends (Table 13.4). Mothers were the main sources of information regarding hygiene practices that need to be maintained during periods. Mothers' understanding and attitude towards menstruation directly

Table 13.3 Background characteristics of the respondents and housing characteristics

Background characteristics	*N* = 300	%
Age of the respondent		
Early adolescent (10–13)	51	17
Middle adolescent (14–16)	162	54
Late adolescent (17–19)	87	29
Age at menarche		
Early adolescent (10–13)	66	22
Middle adolescent (14–16)	231	77
Late adolescent (17–19)	03	01
Respondent's educational level		
Below primary	40	13
Primary	92	31
Middle	84	28
Secondary (tenth standard)	48	16
Intermediate (12th standard)	36	12
Wealth index		
Low	147	49
Medium	114	38
High	39	13
Type of house		
Pucca	138	46
Semi-pucca	96	32
Kutcha	66	22
Sanitary facility		
Sanitary toilet	42	14
Pit latrine	165	55
No toilet	93	31
Bathroom facility		
Pucca	103	34
Semi-pucca	158	53
Kutcha	39	13
Source of water		
Piped water	114	38
Well	132	44
Tube well	36	12
Pond	18	06

influence girls' knowledge on the issues. Besides, mothers, sisters, and relatives also pass on the information on beliefs, taboos, and restrictions practiced during menstruation and socially accepted behavior after approaching adolescence.

Table 13.4 Knowledge regarding menstruation and menstrual hygiene practices

Indicators	*N* = 300	%
Premenarchal knowledge on menstruation		
Yes	93	31
No	207	69
Organ that emanates menstrual blood		
Stomach	111	37
Uterus	39	13
Urinary tract	39	13
Ovary	24	8
Don't know	87	29
Commercial menstrual items known		
Yes	279	93
No	21	7
Source of information on commercial sanitary absorbents (*N* = 279)[a]		
Mother	109	39
Sister	53	19
Friend	164	59
Mass media	234	84
Type of commercial items known (*N* = 279)		
Disposable sanitary napkin[a]	279	100
Reusable sanitary napkin	14	5
Tampon	3	1
Menstrual cup	6	2
Agent used to clean reusable absorbents (*N* = 153)[b]		
Soap and water	113	74
Only water	40	26
Drying of reusable items (*N* = 153)[b]		
In sunlight	75	49
Any other	60	39
Don't know	18	12
Disposal of used absorbent material		
Burn/bury absorbents	198	66
Dispose in latrine pit	108	36
Dispose in open space	24	8
Aware about frequent washing of genital area during menstruation		
Yes	126	42
No	96	32
Don't know	78	26
Hand washing with soap after changing or disposing menstrual absorbents		
Agree	135	45
Disagree	165	55
Duration of use of a single absorbent material		
Up to 8 hours	120	40

(continued)

Table 13.4 (continued)

Indicators	*N* = 300	%
Up to 12 hours	114	38
More than 12 hours	66	22

[a] Respondents may report multiple methods; therefore the sum may exceed 100%.
[b]Question asked to only those respondents who used traditional absorbent items.

Table 13.5 Attitude towards menstrual hygiene practices

Perception about menstruation	*N* = 300	%
Menstruation is dirty and impure		
Yes	213	71
No	84	28
Don't know	3	1
Girls must not enter temple/shrine or pray during period		
Yes	237	79
No	39	13
Don't know	9	3
Girls should not cook for family during period		
Yes	147	49
No	129	43
Don't know	63	21
Food restrictions during menstruation must be practiced		
Yes	144	48
No	114	38
Don't know	42	14
It is normal to watch the advertisement of menstrual products in the presence of males		
Yes	66	22
No	213	71
Don't know	21	7

We don't share menstruation-related information with our girls before menarche. Menarche celebration is an inevitable part of our culture. During the celebration, we instruct girls about dos and don'ts during monthly bleeding. (FGD, mothers).

The notion of purity and pollution exists in every society. In Indian culture, generally menstrual fluid and menstruating females are believed to be impure and unhygienic. The notions regarding menstruation are often imposed by the elder females of the households and subsequently get ingrained in the thoughts and beliefs of young adolescent girls. Menstrual stigma gradually perpetuates among girls and they start practicing self-exclusion. Their belief of menstruation being impure restricts them from practicing religious and other sacred activities. It is believed they must keep their distance from the temple (Table 13.5). Moreover, mere stepping over the shadow during periods might pollute the temple.

We willingly follow the restrictions during periods because we are impure during those days. We take precautions to avoid accidentally touching the male members. (FGD, girls).

Outdoor as well as indoor mobility restrictions were imposed on girls during periods. Most of the girls believed that they must refrain from entering the prayer room and kitchen area. They restricted themselves from performing certain household chores like cooking or attending livestock (Table 13.5). It is strongly believed that menstruating girls should not touch pickles as it might be ruined. Similar findings have been traced in some of the previous studies (Puri and Kapoor 2006; Kumar and Srivastava 2011).

Knowledge and attitude towards menstruation has a significant impact on the management of menstrual events. Gradual improvement in accessibility to material resources is instrumental in the skillful management of menstrual events. There was universal knowledge about sanitary napkins however; awareness about other commercial items was found to be negligible. Most girls acquired knowledge on nontraditional menstrual items from mass media (Table 13.4). Evidences from the present study suggest greater penetration of commercial menstrual products in rural settings. Half of the respondents exclusively used commercial sanitary napkins, while 20% had mixed usage of both old clothes and commercial sanitary pads (Table 13.6). There are contradictions in the literature on the usage of different types of absorbents. Some of the available studies on the application of commercial menstrual absorbents find greater usage of sanitary pads among girls (Lawan et al. 2010; Bobhate and Shrivastava 2011). Other studies suggest substantial usage of noncommercial, homemade absorbents mainly old clothes (Khan 2012; Bathija et al. 2013). Respondents using more than one type of absorbents wish to completely transition away from noncommercial traditional methods. But affordability constraints emerge as a critical barrier preventing girls from accessing commercial absorbents. Findings from this study highlight significant contrast between knowledge of commercial menstrual products and their usage.

Irrespective of the types of materials used, there is always a risk of unhygienic use of menstrual protection materials. The absorbents should be changed at a regular interval and as per requirement. The result indicates that merely 40% of the participants agreed that an absorbent should not be used for more than eight hours (Table 13.4). Nevertheless, only one-third of them changed the menstrual materials twice or more a day (Table 13.6). Such practice puts them at a greater risk of adverse health outcomes. One-third of the respondents exclusively used old fabric to manage the flow (Table 13.6). Washing reusable clothes with soap and water and sun-drying are recommended strategies for maintaining proper hygiene. The study suggests that more than three-fourths of the respondents using cloth pads often washed them with soap and water (Table 13.6). Further investigation reveals that there is a concept of using separate soap cakes for washing blood-soaked absorbents. The soap has to be kept separately, preferably hidden under the roof in the bathroom, and wrapped with leaves or other items. There is always a risk of discovering cleaning agents by males; therefore girls attempted to hide it even in unhygienic places.

Table 13.6 Menstrual hygiene practices of respondents

Questions on menstruation hygiene practices	$N = 300$	%
First point of contact at the time of menarche		
Mother	243	81
Sister	30	10
Friend	18	6
Others	9	3
Material used during menstruation		
Sanitary napkin	147	49
Cloth pieces	93	31
Both	60	20
Main reason for not using commercial menstrual products regularly ($N = 153$)[a]		
Lack of knowledge	03	2
Cost too much	71	47
Lack of availability	18	12
Shyness in purchasing products	60	39
Person purchasing commercial menstrual protection items ($N = 147$)[b]		
Mother	63	43
Sister	31	21
Respondent herself	40	27
Father	13	9
Frequency of changing absorbent material per day		
Don't change	24	8
Once	162	54
Twice or more	114	38

Questions on menstruation hygiene practices	*N* = 300	%
Using soap for washing the used reusable absorbents (*N* = 153)[a]		
Never	18	12
Often	35	23
Always	99	65
Reusable absorbents exposed to the sun while drying (*N* = 153)[a]		
Always	53	35
Never		
1. Dry outdoor covering it with other clothes	63	41
2. Dried indoor	37	24
Disposal location of soiled menstrual items		
Waste bin	51	17
Burn	23	7.5
Bury	25	8.5
Flush in latrine	177	59
Throw in open	24	8
Frequently clean genital area during menstruation		
Always	126	39
Rarely	174	61
Agents used for cleaning genitalia (*N* = 128)		
Only water	98	78
Soap and water	28	22

(continued)

Table 13.6 (continued)

Questions on menstruation hygiene practices	*N* = 300	%
Washing hands with soap and water after changing sanitary absorbent		
Always	111	37
Sometimes	63	21
Never	126	42
Frequency of bathing during period		
Daily	282	94
Any other	18	6

[a] Question asked to those respondents who used traditional absorbent items.
[b] Question asked to those respondents who used commercial sanitary absorbents.

It feels dirty to use that soap because sometimes some insects like a caterpillar, spider or leeches crawl over it. Sometimes it wears away fast in bad weather. We are worried about male family members discovering it or accidentally touching this dirty soap. (FGD, girls).

Menstrual waste management is more challenging in household and community settings. Disposal of menstrual waste remains a challenge for all, whether using traditional or commercial absorbents. About 85% of the respondents experienced difficulty in finding an adequate and suitable place for disposing of menstrual waste. While 59% of the respondents discarded the used materials in the latrine pit, 17% of them disposed of in the waste bin. Further, 8% of them buried it, 7% burned it, and 8% discarded it in open spaces like in water bodies, bushes, or open fields (Table 13.6). Unhealthy practices are the outcome of alternate disposal options for used menstrual absorbents. The results vary significantly in the case of knowledge and practice of menstrual waste disposal. Disposal of menstrual materials is determined by waste management technology, type of menstrual products used, location of disposal, and cultural taboos and beliefs. Most of the households have pit latrines unequipped with feminine hygiene bins; besides, households also lack alternative disposal facilities that indicate structural bias (Table 13.3).

Menstrual waste should not be dumped with household wastes. It is an impure thing and can't be burned with household wastes. (Mother, KII).

Used menstrual materials are viewed as impure as and filthier than other household waste; therefore, in most of the cases, it is not allowed to dispose of in the waste bins. In addition, there is widespread belief of soiled absorbents containing menstrual blood, being used for witchcraft that may cause infertility. Such belief elevates need of hiding menstrual waste even long after it is disposed of; consequently, it employs a complex and unscientific disposal strategy. The findings are in accordance with the previous studies conducted in low-income countries (Sommer et al. 2013; Umeora and Egwuatu 2008).

We don't have much choice but to dispose of it in the latrine, burn it or bury it. But we are constantly worried about being discovered by people while discarding it or afterward. (IDI, girl, 17 years).

For maintaining proper hygiene, the genital area should be kept clean and dry. Less than half of the respondents were aware of the need for frequent cleaning of genital area during periods and the need for hand wash after handling menstrual absorbent or cleaning genitalia (Table 13.4). Though all the respondents in the study reported bathing on a daily basis, less than half of them practiced frequent cleaning of the genital area during menstruation. Only one-third washed their hands with soap and water after cleaning genitalia and changing or disposing of menstrual items (Table 13.6). Findings of the present study are in contrast to the study conducted by Pundkar et al. (2014) and Mathiyalagen et al. (2017). The outcome of the focused group discussion indicates that there is a significant information gap in the matter of maintaining physical cleanliness during periods.

The outcome of the present study on knowledge, perception, and practices of menstrual hygiene management presents a dismal condition of adolescent girls. The barriers in managing hygiene during periods amplifies when the area is submerged

under flood water in monsoon. But with the first outbreak of COVID-19 pandemic, instantaneously before the annual flood has made the situation further challenging for girls.

13.6 Menstrual Health Management in Context of Humanitarian Emergency Settings

The first wave of COVID-19 infection infiltrated India in the initial months of 2020; thereafter it gradually spread across the geographical space. This unprecedented health emergency created massive primary as well as secondary impacts, posing problems from life to livelihood. According to UNICEF, the primary effect of the pandemic is its direct and instant impact on human health. In addition, there are secondary impacts that have emerged either due to a sense of panic in the population or owing to the measures taken to control the spread (UNICEF 2020). In India, the first major step to contain and control the transmission of COVID-19 was the implementation of countrywide lockdown. Neither the healthcare system nor the supply chain of goods and services was prepared for such an unprecedented crisis situation.

The impact of the lockdown due to COVID-19 has not been gender neutral and has been felt disproportionately by adolescent girls and women. In terms of personal health and hygiene, adolescent girls and women faced greater effect of lockdown when compared to men. Menstrual hygiene management is often overlooked in prolonged emergency settings (Krishnan and Twigg 2016). With the spike in cases, humanitarian services and resources were focused towards responding to the COVID-19 emergency. As per the BBC report, menstrual hygiene products were not included in the list of essential goods in the initial phase of lockdown (https://www.bbc.com/news/world-asia-india-52718434). But after the demand from civil society organizations, menstrual hygiene products were incorporated into essential items. In the initial phase, there were severe disruptions in the supply chain resulting in a shortage of these products. Remote locations were the first to suffer the shortage of feminine pads.

Our analysis suggests that knowledge of menstrual hygiene and appropriate management was deficient and inaccurate among the sample population. To capture the secondary impact of novel corona virus pandemic on girls in terms of ability to manage their menstruation, a series of FGDs were conducted through personal interviews maintaining social distancing and also through the telephonic method. Discussion with girls revealed that lockdown has simply aggravated their plight.

In our study, a significant number of girls experienced multiple impacts of lockdown on their well-being. A large proportion of girls depend upon commercial sanitary items for managing menstrual flow. The availability of sanitary napkins was drastically curtailed in the initial phase of lockdown. Accessibility was largely controlled by perception regarding menstruation and menstrual products. It was viewed that before the outbreak of COVID-19, most of the participants relied either on their

mother or sister for buying feminine pads from nearby shops. Most of the females felt uncomfortable and lacked the confidence to buy these products from shops. They preferred to buy in the absence of male customers or when the shops were not crowded due to the stigma attached to feminine pads. In the initial period of lockdown, the shops were overcrowded by male customers therefore it was not possible to maintain privacy in purchasing sanitary pads. During lockdown, women were unable to step out of their house; therefore, access to sanitary products was severely affected. Relational challenges restricted them in approaching male members of the household to access the products needed. Some participants stated that their parents did not consider it as an essential good to be purchased during the lockdown. Consequently, some of the girls were forced to transit back to old clothes for coping with their menstrual flow.

All of a sudden lockdown was declared. We stopped going outside, only my father and brothers used to go to nearby shops to bring essential goods. We never got a chance to store sufficient packets of napkins. We can't ask them to bring those things so we started using clothes instead. (IDI, girl, 15 years).

Washing and drying was really difficult because everybody used to be at home during the lockdown. I was worried more than ever, I use to wash those clothes at night and dried it under banana plants. (FGD, girls).

Affordability barrier was another reason for girls being forced to revert to noneffective home-grown solutions during the lockdown. Due to the sudden lockdown, there was a massive loss of employment in addition to the uncertainty of income generation. Economically vulnerable families were forced to survive on whatever savings they had. It had its bearing on the purchasing power of the family and has influenced household decision-making on the distribution of limited resources. It left a conundrum whether girls' menstrual hygiene would be a priority. Some of the respondents reported that buying menstrual absorbents was viewed as a luxury and not a necessity.

My parents lost their earning due to lockdown. It was difficult for us to meet our basic needs so how can I ask them for a packet of napkin. I have to manage without it. (IDI, girl).

There was a sudden spike in demand of medicines used for treating cold, cough, and fever. Due to heavy demand, we preferred supplying these medicines and personal protective items for COVID-19, over other items (like sanitary napkins). Moreover, we could not procure sanitary pads from our suppliers as they were also out of stock for a considerable amount of time. (KII, Drug store owner).

In focus group discussions, respondents reported using sanitary napkins in the initial months of lockdown. During this phase, nearby grocery shops and medical stores managed to procure small quantities of sanitary pads and this drop in supply had serious repercussions on the accessibility of menstrual products. Concomitant shortage of sanitary napkins left girls with no option other than adopting home-grown solutions for managing menstrual flow. Unmet needs of menstrual items temporarily increased until the supply chain was normalized.

The lockdown mandated everyone to stay at home for public health reasons; however, it severely impacted girls' ability to manage their menstruation. Participants

in the discussions reported that they were left with little or no privacy in the households. They were accustomed to keeping their period secrete, but during the lockdown, they had to take extensive efforts in order to conceal it. Most of the girls complained of experiencing additional constrain while performing WASH-related activities. Even after phase-wise unlocking, the challenges in maintaining menstrual hygiene were not completely eliminated, owing to loss of livelihood and the tendency of people staying indoors in order to avoid COVID-19 infection. The supply of menstrual products was reported to be smooth after gradual unlocking of the state; nevertheless, it has not resolved the challenges of unmet need. This phase of unlocking witnessed the intersection of the COVID-19 pandemic with the event of large-scale monsoon flood in the region.

Flood is a regular annual phenomenon in India. It has been estimated by Asian Development Bank that flood is the most destructive natural phenomenon among climate-related disasters in India (Patankar 2019). It alone accounts for more than half of climate-related disasters in the country. Assam has been recorded as one of the worst-hit states in 2020 and has experienced more than two months of flooding. About 90% of the districts were flooded, affecting more than fifty-six lakh residents. More than 10,000 houses were fully damaged, whereas more than 46,000 were partially destroyed by flood, and 56,874 inmates were sheltered in 627 relief camps (Assam State Disaster Management Authority 2020).

Flood is one of the most destructive natural hazards in the Assam valley. Communities living in the floodplains, especially in close proximity to the river banks, are vulnerable to weather catastrophe. They prepare themselves ahead of time by keeping stock of an essential item; however, the need for menstrual items is generally overlooked. Every year a substantial proportion of the population in flood plains is rescued and sheltered in relief camps. In a condition hit by natural disaster overlapped with the COVID-19 pandemic, the need to practice proper hygiene and safe sanitation become a matter of life and death for menstruating women and girls. In crowded settlements like relief camps, access to water and toilets becomes a bigger challenge for women and girls, especially where there are shared facilities.

We don't have clean water to bathe and wash our stuff once the flood water enters into our area. We have to shift to relief camp for a while but there are only two latrines for a lot many people. It is difficult to manage during periods. This time, we are facing more problems due to corona (novel coronavirus pandemic). (FGD, girls).

In the discussion, it emerged that the girls were unable to access menstrual products owing to restricted mobility; therefore, they adopted home-grown noneffective solutions for managing their menstrual flow. Due to submergence from flood water, WASH facilities were disrupted within the household and consequently affected their control over menstrual hygiene practices. In the flood-prone low-lying areas, residents were forced to take shelter in disaster relief centers; however, investigators found poor structural resources in those centers. It was reported that there was only one functional toilet in one of the relief camps. Girls' safety and dignity were compromised while performing hygiene-related activities in such relief camps. They experienced constrain in hiding soap used for washing absorbent cloths, drying, and disposing it off. Corners of the room and space behind the window curtains were

privately used for drying cloth absorbents. Heavy rainfall and humid weather conditions prevented the clothes from dry fast and often girls had to apply partially dried clothes for managing menstrual fluid. Such unhygienic practices increase the risk of infection and discomfort among girls. Inappropriately dried materials can house pathogens and their usage may expose girls to the risk of infections. Due to a shortage of absorbents, some girls practiced using single cloth pieces or sanitary pads for the entire day. Some respondents complained of having rashes and itching and burning sensation in the genital area that indicates the adverse outcome of unhygienic practices in the relief camps.

Further inadequate disposal options for menstrual waste prompted girls to discard soiled napkins in the toilet or nearby spaces like drains, bushes, or water bodies. However, some girls stored used materials in plastic bags to wash them discreetly after returning to their residence. Cultural restrictions continue to be imposed on girls while residing in the relief shelters. Girls were restricted from dining with others, using common utensils, and were even compelled to sleep on the floor in the relief shelters. Being isolated in distressful circumstances caused unwanted physical and mental stress on girls. Dual impact of pandemic and flood has amplified the challenges many folds in such resource-scarce settings.

In the disaster-hit areas, government and nongovernment organizations (NGOs) prioritize rescue of the affected population followed by distribution of relief items including food items, medicines, clothes, etc. Investigators found that only a few NGOs supplied them with sanitary pads and plastic bags for the disposal of used items. Therefore, it can be derived that the agencies consider menstrual hygiene as a secondary need; thus management of menstrual events often falls off the priority list altogether during the crisis situation.

13.7 Major Findings

- Only one-third of the girls have pre-menarchal knowledge about menstruation.
- Sanitary napkins are the most commonly known and used products among rural girls and mass media is the most common source of information about menstrual protection materials.
- Girls have inadequate knowledge about maintaining menstrual hygiene during periods, for instance, changing menstrual absorbents on time, disposal of menstrual protection materials, maintaining hygiene in genital area, maintaining hygiene of reusable absorbents, etc.
- Menstruation is perceived as inauspicious and impure by majority of the girls, and nearly half of the girls have positive attitude towards restrictions imposed during periods.
- Mass media is the main source of information about commercial menstrual products; however, girls feel embarrassing to watch such commercials in the presence of males.

- Though there is almost universal knowledge about sanitary napkin, half of the girls use old cloth pieces for collecting the menstrual flow. Cost constrains and taboo attached to menstruation and menstrual products are the main barrier in accessing commercial menstrual products by these girls.
- Knowledge as well as practice of menstrual hygiene is found to be insufficient due to lack of awareness and poor infrastructure in the household and community settings.
- Poor menstrual hygiene practices among girls hampers their dignity and also exposes girls to health risks. The situation further aggravates at the time of natural disaster.
- During the first wave of COVID-19 pandemic, there has been sharp drop in the use of safer methods of menstrual absorbents. Limited availability, accessibility, and affordability appeared as the main factors for such decline.
- Annual flood compelled the population to take refuge in rehabilitation camps. But poor sanitary infrastructure, lack of sanitary products, lack of privacy, and poor weather condition in addition to cultural taboos and restrictions further exacerbated the situation of girls in relief centers.
- Menstrual hygiene management still remains a tabooed subject in the communities; thus physical and social modesty of girls is compromised in the society in general. Additionally, the absence of gender-sensitive disaster response strategies reflects failure of disaster management agencies towards identifying the specific needs of menstruating girls.

13.8 Conclusion

The findings of the study suggest that girls experience multiple challenges in adopting hygienic practices of menstrual events. Culture of shame and silence, misconceptions, and lack of affordability of menstrual items has created a significant gap between knowledge and practice of menstrual hygiene. Constrain in using WASH facilities and lack of proper disposal mechanism contributes to further distress during menstruation. Knowledge gap and faulty management practices in the pre-disaster period aggravates the condition of adolescent girls during an extended period of humanitarian emergency situation. Neither the MHM is prioritized in the household decisions on the investment of limited resources nor do the disaster management authorities, considering it has an essential service that must be provisioned during relief operations. Any response to the emergency setting must be gender responsive and address the differential needs of men and women in distress. In the pandemic situation, restricted mobility and affordability constraints forced girls to transit back to traditional methods of the menstrual hygiene management. Unmet need for menstrual hygiene is exacerbated with people's plight to the relief camps with inadequate arrangements for managing menstrual hygiene with dignity. Thus, there is a pressing need to adopt an intersectoral approach in dealing with MHM in the complex humanitarian crisis settings.

Acknowledgments This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Conflict of Interest Declaration of competing interest—none.

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