

# Exploring menstrual practices and potential acceptability of reusable menstrual underwear among a Middle Eastern population living in a refugee setting

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**Purpose:** Menstruation is a biological process that approximately half of the world's population experiences over a significant period of their lifetime. As a displaced female, managing menstruation can be challenging as limited resources and changes in context confront the cultural norms of communities. This study explores the hypothetical acceptability and potential utility of a reusable menstrual underwear product through examining the beliefs, behaviors, and practices toward menstrual hygiene in a Middle Eastern population living in a refugee setting.

**Participants and methods:** A qualitative study employing a questionnaire, semi-structured interviews, and focus group discussions was conducted with 30 refugee women and 5 humanitarian staff in Ritsona, Greece. All 30 refugee women completed a questionnaire, six refugee women and five humanitarian staff participated in individual semi-structured interviews, and four focus group discussions were held containing five to six refugee women per group. Inductive analysis led to the development of key themes.

**Results:** Primary data analysis of narratives around the beliefs, behaviors, and practices of menstrual hygiene in this population revealed key themes related to the physical environment, the social environment, cleanliness, comfort, and health, and adaptation and coping. Themes related to the potential use of menstrual underwear included comfort, appearance, and concept, absorbent capacity and selected use, hygiene, and knowledge and implementation.

**Conclusion:** Menstrual hygiene beliefs, behaviors, and practices are mostly consistent with existing literature. An acceptance of the concept of reusable menstrual underwear was expressed, although the perceived benefits of this product did not outweigh customary practices. The use of menstrual underwear as a complimentary product to traditional absorbents was expressed as helpful for promoting dignity.

**Keywords:** menstrual hygiene, emergency, menstrual underwear, refugee, displacement, humanitarian emergency, humanitarian relief

## Introduction

In 2016, 10.3 million people were newly displaced, increasing the global total to 65.6 million individuals who are currently forced from their homes.<sup>1</sup> As populations flee, they are often forced to leave their homes with few possessions, travel difficult routes, and live in precarious situations for significant periods of time. Biological processes do not generally cease during these times, and managing menstruation can be an additional challenge for displaced females of reproductive age. A loss of

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normal coping strategies, changes in socioeconomic status, experiencing changes in their physical and social environments, and a lack of access to structural and material sanitation needs can compound menstrual hygiene management (MHM) issues among refugee populations. Incorporating MHM into humanitarian aid efforts has become an increasingly discussed topic in recent years<sup>2,3</sup> with some literature reviews highlighting the lack of existing peer-reviewed evidence examining the impact of MHM interventions in emergency contexts.<sup>4-8</sup>

There is a lack of literature discussing commonly used menstrual materials in a given population and the challenges and benefits associated with menstrual hygiene materials.<sup>7,9</sup> A recent report examining female rights to menstrual health presents the importance of access to quality menstrual hygiene products and states that innovative commodities require assessment for acceptability and utility among women in low-resource settings.<sup>10</sup> Theories describing the characteristics of product adoption<sup>11</sup> can be beneficial in framing these assessments.

Multiple reusable menstrual products exist in the current market at varying costs. Menstrual underwear is a reusable menstrual hygiene product which resembles female underwear and has a built-in menstrual pad. The popularity of menstrual underwear products is growing in western countries as a stand-alone menstrual absorbent or as a complimentary product to tampons, menstrual cups, or pads. The menstrual underwear product used in this study (ThinX Inc., New York City, NY, USA) was chosen based on the hypothesis that the discreteness of this particular product style (Figure 1), the low complexity for use, the absorbent capacity, and the reusability could be beneficial in a context with decreased privacy and low access to resources.

The product used in this study has four layers in the areas which collect menstrual blood. The first layer, closest to the

body, is a wicking material which pulls liquid in. The second layer is antimicrobial and is followed by a third absorbent layer. In the “Hiphugger” style chosen for this study, the absorbent capacity is reported as two regular tampons worth of blood. The outermost layer provides leak resistance. Instructions advise to soak in water after use, hand or machine wash, and hang to dry.<sup>12</sup>

## Aim and objectives

This study aimed to explore the hypothetical acceptability and potential utility of menstrual underwear among the female refugee population currently living in Ritsona, Greece through examining the beliefs, behaviors, and practices related to MHM from the perspectives of female refugees and humanitarian staff in this context.

## Methodological approach

### Study area and population

This study was conducted in Ritsona, Greece, between June and August 2017. The Ritsona refugee site is located in a rural area north of Athens, Greece, situated 15 km away from the nearest commercial center of Chalkida. The site was established in March 2016 in response to the increase in refugees arriving from Middle Eastern countries, mainly Syria, and the closure of borders into the countries neighboring Greece. The population was first hosted in tents with limited sanitation facilities. In October 2016, container caravan structures replaced tents and families were provided with a living space inclusive of air-conditioning/heating units, running water, and a private bathroom. At the time of data collection, 160 container built homes hosted an estimated 1,000 residents. Non-governmental organizations (NGOs) were responsible for overseeing the camp coordination and activities with little interference from the Greek ministry. Until May 2017, regular distribution of food and hygiene items was occurring in Ritsona. This distribution was replaced by increasing the amount of money provided through an existing cash program. Several organizations supplemented cash transfers by continuing to make selected hygiene products available.

### Recruitment and participants

Primary data were collected using a qualitative questionnaire, semi-structured interviews, and focus group discussions (FGDs). Data were collected from two participant groups: female refugees and humanitarian staff. No potential participant refused enrollment into the study.

The qualitative sampling strategy was guided by Miles et al<sup>13</sup> recommendations. A minimum of 35 participants



**Figure 1** ThinX® brand menstrual underwear, Hiphugger style.

**Note:** Photo provided with permission from Crystal VanLeeuwen.

were sought. The sample size was chosen based on feasibility related to study limitations and according to the London School of Hygiene and Tropical Medicine guidance for maintaining confidentiality, which suggests that qualitative research subgroups should not contain less than five individuals. Female refugee participants were recruited using non-probability sampling via a convenience and snowball method. Challenges with the snowball method were encountered when the first two participants recruited were not able to identify further participants in the limited time available. Additional participants were identified by an NGO community worker with only some participants providing references for recruitment according to the snowball method. A total of 30 refugee participants were recruited over 7 days. Eligibility criteria for the refugee population included being a female between 18 and 50 years of age, currently living in Ritsona, have menstruated in the past 2 months, provided informed consent, and spoke English or Arabic.

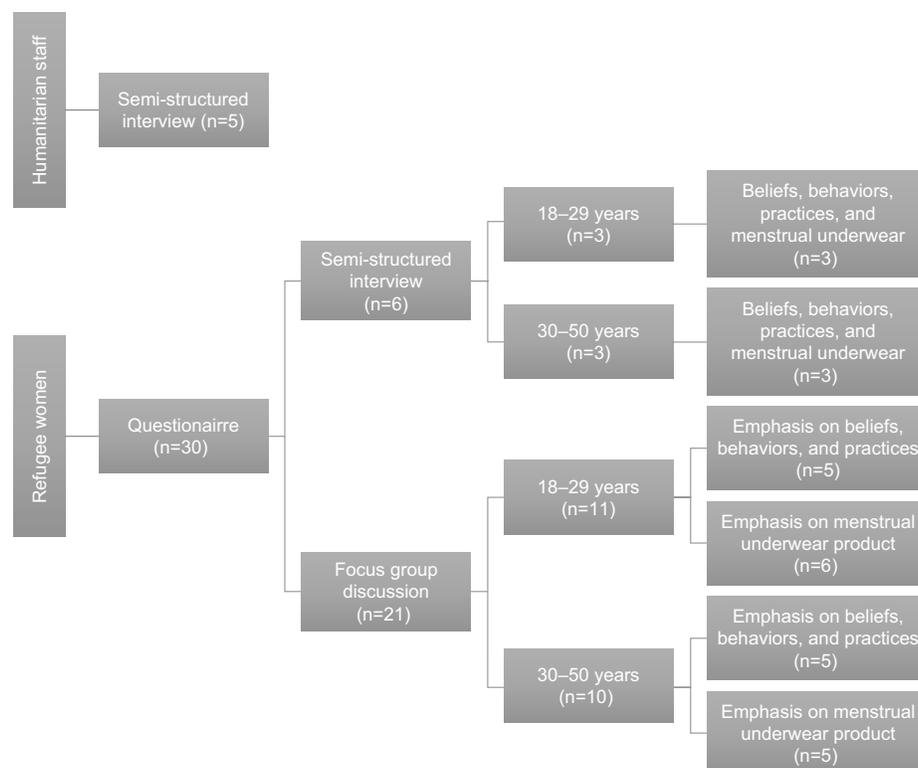
The 30 refugee women selected to complete a questionnaire were further assigned to participate in either a semi-structured interview or an FGD. Assignment was done based on participants' age, where they were divided into categories of 18–29 and 30–50 years. These age ranges were chosen to

assess for variation between younger and older females of reproductive age. Participants were first assigned to their age category and then sequentially assigned to either an interview or a group discussion until recruitment was completed. Each of the four group discussions had between five and six participants each, with two groups hosting the age range 18–29 years and the other two groups hosting the age range between 30 and 50 years. Three women who completed the questionnaire were not able to participate in discussions related to competing priorities.

Five humanitarian staff from three different NGOs were recruited using convenience sampling. Staff were approached via the management teams of relevant NGOs working in the study location. Criteria for participation of humanitarian staff were English speaking, currently working in the study location, and providing informed consent. This subgroup participated in semi-structured interviews. Figure 2 shows an overview of primary data collection methodology.

## Data collection

Two participant information sheets and informed consent forms were created; one for refugee participants, which was translated into Arabic, and the other one for humanitarian



**Figure 2** Overview of primary data collection methods.

**Notes:** Separated by two main participant groups followed by data collection method. Participant age group is noted for interviews and focus groups, followed by primary topics addressed. n=the number of participants.

staff. Informed consent forms were signed by consenting participants and the primary investigator. Copies were provided to participants. Informed consent forms of women self-declaring illiteracy were cosigned by a witness. Themes emerging through a literature review<sup>14</sup> conducted by the primary researcher were considered when developing qualitative data collection tools. All data collection tools were translated into Arabic and checked by a third party for accuracy. Discrepancies in translation were resolved by consensus. The final translated document was reviewed by an NGO staff working in the study location for cultural appropriateness. All data were collected in locations which enabled privacy.

## Questionnaire

Immediately after obtaining informed consent, the 30 refugee participants were assisted in completing a questionnaire collecting demographic details and information on preferred menstrual products, normative and recent practices, and challenges managing menstruation in this setting.

## Semi-structured interviews and FGDs

Topic guides for interviews and FGDs were not used rigidly, but rather adapted to the idiosyncrasies of the participants and groups, as well as adjusted based on themes which arose in discussions prior in sequence.

The following information was collected from the refugee participants through four FGDs and five semi-structured interviews. Emphasis varied depending on the interview or group discussion assignment: 1) beliefs, behaviors, and practices related to MHM; 2) perceived challenges in practicing culturally acceptable MHM in this setting; and 3) exploration of the hypothetical acceptability and potential utility of the newly introduced menstrual underwear product. Discussions were conducted by the primary researcher using an English–Arabic translator. The translator was chosen based on her gender (female), acceptance within the community, and capacity to act as in this role. The translator agreed to abide by the same confidentiality guidelines as the researcher.

Five interviews were held with the humanitarian staff. Discussions were conducted in English by the primary researcher. Interviews aimed at collection of information about the following topics: 1) understanding of humanitarian staff on the refugee populations' beliefs, behaviors, and practices in MHM; 2) understanding of humanitarian staff on the challenges associated with managing menstruation in this setting; and 3) perceived benefits and challenges associated with the provision of menstrual underwear to this population.

All participants who engaged in discussions about the menstrual underwear product topic were shown samples of the product and were able to handle it throughout the discussion. The concept and instructions for use were explained to participants. Due to time restrictions, the participants were not given a sample to try the product prior to discussions.

The use of semi-structured interviews and FGDs allowed for women's MHM experiences and the meaning attached to those experiences to emerge. Flexibility in discussions allowed women to present issues meaningful to them, while also revealing differences in narratives between group and individual discussions as well as between age categories. Using multiple methods for qualitative data collection added to the validity and reliability of the results and improved the potential for triangulation.<sup>13</sup>

## Data analysis

Interviews and FGDs were audio recorded using two encrypted devices and transcribed into Word documents. Questionnaire results were transcribed to an Excel file, and informed consent forms were photographed. Originals of all paper documents were then destroyed. All research data were stored on a dedicated encrypted hard drive for which only the primary researcher has the passcode. Confidentiality was maintained by removing identifying information from the transcripts, including the organizations for which the humanitarian staff worked. All participants consented to be quoted without attribution to any individual.

An inductive thematic approach was used in analysis to identify and explore recurring themes and concepts from all primary data sources. Data immersion took place through transcribing discussions on the same day which they occurred. Further immersion and an integrity check were completed through listening to the audio recording at the same time as reading transcripts. The transcripts were then read and reread, and following the guidance of Miles et al,<sup>13</sup> were descriptively, topically, and analytically coded with revisions applied as understanding and interpretation deepened. This process was facilitated using NVivo software.<sup>15</sup> Differentiation between the narratives of females participating in individual interviews versus FGDs can be identified through noting the age or age range, respectively, which accompanies quotations in this paper.

## Ethical considerations

Ethics approval was obtained from the London School of Hygiene and Tropical Medicine Research Ethics Committee

and written approval was provided by the Red Cross, who facilitated this research under the umbrella of their current activities.

## Results

### Research participant demographics

Thirty female refugees with ages ranging from 18 to 50 years (mean 31.9 years) participated in this study. Half of the participants fell into each of the two age range categories. The average length of time participants had lived in Ritsona was 11 months (range 1–20). All women identified themselves as of Islamic faith. One participant was from Iraq, one from Somalia, and all others were of Syrian origin. Ten participants reported having received no formal education, 16 had completed primary school (ninth grade), two had completed secondary school, and two held university degrees. The majority of the women were married (n=21). The others reported being widowed (n=3), single (n=3), or divorced (n=3).

Five female humanitarian staff from three NGOs active in Ritsona participated in the study. The length of time working in this setting ranged from 2 to 17 months.

### Beliefs, behaviors, and practices toward menstrual hygiene

Questionnaires, interviews, and FGDs were analyzed to reveal four intertwined typologies related to beliefs, behaviors, and practices toward menstrual hygiene: 1) the physical environment; 2) the social environment; 3) cleanliness, comfort, and health; and 4) adaptation and coping.

#### The physical environment

The physical environment encompasses sanitation infrastructure and access to menstrual hygiene products.

#### Sanitation infrastructure

Narratives of challenges with sanitation infrastructure most often recalled periods of living in tented communities and linked heavily to the social environment, cleanliness, shame, and adaptation.

The toilets were very far from the tents and we must go to the toilet to change and come back to the tent. It was very hard because every time you must change you must go with your pads. And a lot of people were on the way and it was very hard for us to go and hide the pads. [43 years old]

Participants, particularly those in the 30–50 age range and staff working at the camp long term described the

improvements in sanitation infrastructure, while at the same time highlighting continuing challenges with access to hygiene materials.

Thank Allah it is better than in the beginning. The problem that we have now is that we have no underwear, pampers, pads, and toilet paper. [30–50 years old]

Coinciding with improved sanitation infrastructure, privacy and security concerns were also perceived as improved. Previous concerns were related to the distance of the toilets from the tents, the lack of gender segregation, and the wait time required to use the toilets due to long queues. These were commonly articulated with strong links to culture, shame, and poor health outcomes.

#### Preferred menstrual hygiene products

Absorbent menstrual materials were the most commonly discussed requirements for MHM. Questionnaire results revealed the majority of women (n=25) prefer disposable sanitary pads as an absorbent product. The use of baby diapers was noted as a theme in all primary data collection methods, with several participants reporting either exclusive use of diapers or use in combination with pads. Menstrual flow, the time of day, and physical location (at home or traveling) were the factors affecting product choice.

On heavy days I use pampers and on light days I use pads. This was the same in Syria as it is in the camp. [35 years old]

Approximately half of the women used the same absorbent product, regardless of the day of their cycle. The others chose products to match their changing menstrual flow. Interestingly, using pads on a daily basis, including non-period days, was a common theme linking to beliefs about cleanliness and religious practice.

I use big pads with my period and small pads when I do not have my period to protect my underwear because without I have a lot of secretions and infection. [30–50 years old]

More women discussed preferences based on the absorbent capacity than the quality of pads, although several participants did mention the brand or quality specifically.

I use whatever size of Always brand that I have. [28 years old]

In Syria, we didn't know which one was good. We just used whatever we found. [18–29 years old]

Humanitarian staff demonstrated an understanding of women's absorbent product preferences, although they did not mention the use of diapers or daily pad. Staff related the preference of disposable pads to culture, custom, and a lack of knowledge about alternative products. Community participants attributed product choice to cost and comfort.

It is based on money to buy what you can afford and what is comfortable for you. [18–29 years old]

Discourses around using cloth as an absorbent revealed that this was the least preferred option, mainly related to discomfort. When necessary due to a lack of other product availability, cloth pieces were cut from old clothing and discarded after use.

Underwear, feminine hygiene wash, toilet paper, and razors for shaving pubic hair were also mentioned as items required for adequate MHM. Of these items, underwear was most commonly mentioned, and in narratives which highlighted the insufficient quantity available.

Humanitarian staff discussed the activities of the NGOs for whom they work in providing menstrual hygiene items (namely, sanitary pads, and also soap and underwear). Some staff were unaware of similar activities being carried out by other organizations.

[...] we provide some pads [...] I think we are the only ones who do it. [Humanitarian staff]

Most community participants knew how to access sanitary pads from NGOs, although many of these same women still claimed a lack of product availability. NGO staff claimed that women did not go to collect products available:

[...] we have them [sanitary pads] in these dignity packs and they just don't take them. [Humanitarian staff]

Refugee participants who discussed access challenges accredited this to insufficient provision of items by NGOs, financial hardship, prioritization of children's needs over their own, and the distance from stores, which included the cost of transportation to reach stores to purchase items. Few women felt that their menstrual hygiene needs were met by the NGOs or through personal purchasing of items.

### The social environment

The social environment, for the purpose of this study, is defined as the interaction between beliefs, knowledge, tradition, and social norms in a community and links closely to the physical environment.

All community participants self-identified as being of Islamic faith and the majority as belonging to the Kurdish culture. Women generally expressed that they had few cultural or religious restrictions dictating how they managed their menstrual hygiene.

In our Kurdish culture it is no problem, you can use what [menstrual product] you prefer. You have the liberty to choose what you want. [23 years old]

Despite the lack of overarching restrictions identified by the participants, several specific beliefs and practices were described by individuals.

The underwear that you use during your period you must clean it and store it to only use when you have your period. Because if not, in my experience, if I used it when I did not have my period I had an infection and allergy. [30–50 years old]

Exploring this concept further with the group, all participants agreed with the exception of one. She described that she used small pads, regardless of the presence of menses, to keep her underwear clean. This allowed her to use the same underwear with or without her period. She associated this practice to her religion.

I use this small pad because I pray, and I use it to have clean underwear when I pray. [30–50 years old]

When raised by the researcher in subsequent discussions, participants were either unaware of, or did not practice, the use of designated menstrual underwear for the purpose of improving cleanliness.

We can use our underwear during the period and without the period because if it is clean we can use it no problem. [42 years old]

Yes, we try to have some special underwear to use during our period, because we need ones that are secure and comfortable to put the pad. [30–50 years old]

Conservativeness and cultural diversity were mentioned by the humanitarian staff, but these were not well noted in discussions around MHM with the refugee participants.

[...] inside the Kurdish, it is divided into other cultures or way of behaving. And inside Ritsona you have the Syrian Arabic population, and some are conservative, and the others are less conservative. [Humanitarian staff]

The cultural homogeneity noted among the participants may have been a product of selection bias.

Trust was described as a resource for enabling women to discuss menstruation. One staff member who felt she had developed trusting relationships with the population described a sense of openness from the women in the community in conversations about menstrual products and hygiene practices. One participant suggested that gender and age played a role in deciding whom she was able to discuss menstrual hygiene with.

I can only talk about this with women, and we can share and talk about our period and what we use and how we wash, but only with women and only with women my age. [23 years old]

A general tone of indignity accompanied narratives about the conditions of camps on route to, and in, Greece.

It was an inhumane experience. [30–50 years old describing sanitation infrastructure in various camps on her journey to Greece]

Concepts of dignity and shame were most often expressed in relation to a lack of privacy created by the physical environment, with undertones of cultural beliefs and taboo. A lack of gender or familial segregation in sanitation infrastructure was noted to be associated with shame and social exclusion.

There was a girl of 16 years who lived behind my tent. She was going to the toilet to change her pad. Just when she arrived, there were a lot of young men and she dropped her pad in front of them. She came back crying. I asked her what happened and she told me the story. For many days, she did not leave her tent. [43 years old]

Dialogue frequently emerged around bleeding at night. A lack of absorbent products, clothing, and small shared living spaces were presented as contributing factors to feelings of shame should women bleed through clothing at night.

We would not be comfortable if someone saw our bloody clothes. [18–29 year old]

I only have one pair of clothing and when blood soaks through I have to wash it and wait in the caravan until they are dry. [44 years old]

The potential for bleeding through absorbents was linked to feelings of anxiety.

Three days ago, when I had my period I could not sleep soundly because I was thinking about if my cloths would be wet. [18–29 years old]

## Cleanliness, comfort, and health

As stated clearly by one participant,

All women have the same goal, to be comfortable during their period. [18–29 years old]

Most participants jointly expressed concepts of cleanliness and comfort.

For our hygiene, we must change our pads often and not be with the same pad all day because it is not comfortable and not good for our hygiene. [42 years old]

The general physical environment was conveyed as important to women's comfort during menstruation.

In the tent, if it is very cold and you have your period, you are going to feel sick and it is not comfortable. If it is hot, you are not going to feel comfortable. [18–29 years old]

An exchange between participants in the age range 18–29 years focused on menstrual pain, while also demonstrating a clear openness to discuss personal experiences in a group forum and the evident differences in levels of health knowledge.

I have my period now and I have pain.

Why sometimes do you have a lot of pain and others do not during their period?

I always have pain that impairs the way that I can think.

During my period I have no pain.

Maybe this pain is from infection? If you have infection, you can have pain.

You can have infection before you lose your virginity?

Health concerns of heavy bleeding, irregular periods, and infection were mentioned frequently and were linked to intrauterine devices, mood disorders, and personal hygiene, as well as the use of cloth as an absorbent and long wait times for community toilets.

The bad condition in this setting gave me a problem and my period changed from regular period to irregular period. [23 years old]

When I use cloth, when you walk you have a problem in the groin and it is very moist and you have problems and itching. [27 years old]

## Adaptation and coping

Narratives around challenges led naturally to descriptions of adaptation and coping strategies in the new environment. Subthemes of selective menstrual product use, community support, and knowledge acquisition emerged in discussions.

### Selective menstrual product use

Adapting products to the physical and social environment was presented as a result of necessity or desire to maintain discreteness.

Some women, because the pads are too small, layer the pads. [18–29 years old]

I normally use pampers, but I use pads when I travel so that people cannot see the pampers. [27 years old]

Maintaining hygiene in the absence of adequate sanitation infrastructure was discussed as an important practice to women, who spoke about adapting cultural or customary practices as required.

We always look to be clean with water or without water, we looked for wet wipes, we always try to find something to be clean. [30–50 years old]

We do not have enough underwear and this is a problem for us. That is why we are obligated to clean our underwear and use it with or without our period. [30–50 years old]

Coping strategies mentioned in response to the lack of access to menstrual products were to stockpile products given to them, having family send money to enable purchasing, and using the community for support.

### Community support

There was a perceived sense of bonding within the refugee population, and supporting each other through sharing of resources was expressed as common practice.

Every month I have my period and I use pampers. I ask my friends who have children as I do not have children. [30–50 years old]

Not only were physical resources shared, but also the participants described support in maintaining each other's dignity.

I took my bottle of water and I put it under my arm. And I took my underwear and pad and put it in my bra and I went to look in the toilets. And you look, and you look, and you look. If you didn't find one that was clean, you come back to your tent and you find someone to guard the door and you change your pad in the tent. [30–50 years old]

In group discussions, laughter often accompanied narratives of hardship and shame, as if this was both a coping strategy and a form of bonding among the women.

### Knowledge acquisition

The knowledge-based challenges related to arriving in a foreign country and the coping strategies used to adjust were articulated by one participant:

You know when you arrive in some new place, you will not know how or where to buy things so you must have a stock to use while you search for how you can buy the things that you need for your period. [30–50 years old]

Several participants referred to NGO activities as a source of information. From the humanitarian staff perspective, educational activities had positive effects on improving the hygiene among women. Community members described attending activities as a necessity in order to access materials. The Internet was also mentioned as a source of information on menstrual products and hygiene practices.

They are all the time on the phones and they watch Instagram, Facebook, and YouTube, and they do have advertisement about the cup, for example, and they ask me what it is. [Humanitarian staff]

The overlap between themes of the physical and the social environment, cleanliness, comfort, and health, and adaptation and coping in response to challenges ran deep in participant discourse. Themes arising through these narratives developed the base for which the hypothetical acceptance and potential utility of menstrual underwear were explored.

## Acceptability and utility of menstrual underwear

Discourse related to the newly introduced menstrual underwear revealed four interwoven themes: 1) comfort, appearance, and concept; 2) absorbent capacity and selected use; 3) hygiene; and 4) knowledge and implementation.

### Comfort, appearance, and concept

The comfort and appearance of the product, sometimes discussed in comparison to pads, were perceived positively by all participants. The black color was appreciated to mask the visibility of blood and the material was perceived as comfortable and easy to wash.

Pads are uncomfortable, these are a good idea. [43 years old]

Appreciation for the design of the product was commonly expressed by both humanitarian staff and community participants and both mentioned the desire to use aesthetically pleasing underwear.

[...] although they are refugees, I do hear that they love to wear for their men, you know [...] because of the lace, it's very nice and attractive. [Humanitarian staff]

We would need to use it with the same color and same style bra (group laughter). [30–50 years old]

The concept of the product was accepted by the participants, but the preference to use customary products was commonly expressed alongside those statements.

There is no problem to use it, but I am accustomed to pads. [37 years old]

### Absorbent capacity and selected use

Perceptions regarding the absorbent capacity were frequently articulated. Most women felt that the product would not be sufficient for heavy menstrual bleeding and others questioned the absorbent capacity altogether.

It is very thin. I wonder how it can absorb anything. Maybe I can use it only on the first and last days of my period when I only have a little blood. In the middle days I have a lot of blood and maybe it cannot absorb a lot of blood. [43 years old]

Selected use of the product was discussed in terms of cycle days and the physical environment. A lack of privacy related to sanitation infrastructure, the inconvenience of having to remove clothing to change the product, and a lack access to water and soap were mentioned in these narratives. Many women felt that the product would not be appropriate for settings with poor sanitation infrastructure, although others mentioned benefits of using the product in such a setting to prevent bleeding through their clothing at night.

In the beginning [when living in tents] it would be hard to clean it because we did not have water and somewhere to dry it. [23 years old]

[...] at night we cannot go to the toilet because it was far and it was very dark, and we had a lot of fear that our daughters would have a problem at night. It would be good to have this product and a pad and you can be sure that you will not bleed through your clothing. [30–50 years old]

Narratives suggested that the product would be better utilized with access to a private toilet, although using this product when away from private facilities came with differing views. Some women thought it was beneficial by providing extra security while traveling and others thought that it would be inconvenient to remove their clothing when not at home.

Selected use was not only based on the physical location, but also the season.

When you clean it, you cannot dry it during the winter. [18–29 years old]

The inconvenience associated with the need to remove trousers in order to change the absorbent product and the frequency of washing was expressed.

It is not convenient for during my period because you must change all of your underwear all the time. [18–29 years old]

I do not have a lot of time to be washing these. It is better for me to use pads and throw them in the garbage. [18–29 years old]

The quantity required was brought up by several participants.

I must have a lot of them, because every time I must change it. [42 years old]

So how many would you need? At least seven a day if you are young. [Humanitarian staff]

The perceived attractiveness of the product led to discussions about using the underwear for both menstrual and non-menstrual days, with the majority of participants believing that this would be a useful product for the absorption of vaginal secretions on non-menstruating days. Improved hygiene and eliminating the need to wear small sanitary pads were common in these narratives. Humanitarian staff expressed that the dual purpose could be beneficial for the women and pragmatic for NGOs who could replace sanitary pad and underwear distributions with a single product.

### Hygiene

Only two community participants expressed concerns about washing menstrual blood by hand. When prompted, all others denied that there were cultural, religious, or hygienic concerns associated with hand washing and reusing this product. Examples of washing blood from their clothing after leaks were provided to validate statements that hand washing menstrual blood was not an issue. While most felt that hand washing would be an effective and acceptable way to clean the product, there were concerns from the older participants about younger girls' capacity to do so.

Maybe in teenagers they wouldn't know how to clean it well and it won't be hygienic and it would be better for them to use pads. [30–50 years old]

In relation to hygiene and health outcomes, there were some concerns that laundry detergent would become stuck in the absorbent layer resulting in a rash. One participant expressed the benefit of this product for women who had allergies to disposable sanitary pads.

### Knowledge and implementation

Humanitarian staff described the need to properly inform the population how to use the product for successful implementation. Questions of clarification arose in most discussions, even after the product concept and instructions for use were explained, validating this statement. Concept acceptance improved with deeper understanding of the product's composition and use.

When you told us about it, I didn't like the idea, but now maybe I can use it to try it [...] you explained about the layers. [18–29 years old]

The need to try the product before giving an opinion on usefulness was highlighted by many.

We cannot give good points because we must use it, and maybe when you use it you can have another point of view about advantages and disadvantages. [23 years old]

Financial implications were raised with differing views about the cost-effectiveness and capacity for NGOs to supply them.

Probably it's cheaper than buying all the time pads, I don't know the price or how long it lasts, but I think this is an advantage. [Humanitarian staff]

[...] as an organization it would be very difficult to fund it unless we found a sponsor. [Humanitarian staff]

Humanitarian staff were prompted to explore the requirements for initiating activities to provide menstrual underwear to women in the camp. The limited opinions about what would be beneficial included having research showing positive health outcomes, using female staff for distributions, and combining distributions with workshops on sexual health. As also mentioned by community participants, the need to trial the product was deemed important to understand acceptance and utility.

There might be something that I am not thinking now [...].  
So I would love to see that in action. [Humanitarian staff]

## Discussion

This qualitative study revealed the value which participants place on access to menstrual materials as well as the importance of sanitation infrastructure design and menstrual hygiene education, and is consistent with literature

outlining the required components of an adequate MHM intervention.<sup>4,16</sup> Also, consistent with the literature were themes of secrecy and shame<sup>17,18</sup> and that the existence of cultural and religious beliefs was not expressively shared by all, regardless of similarities in country of origin and religious or cultural identity.<sup>7</sup> Practices were, however, homogenous in that external absorbent products were preferred.

The preference for absorbents seemed to be based on menstrual flow, comfort, custom, socioeconomic status, and product exposure. Interestingly, the preference of using baby diapers as a menstrual product was neither mentioned in any literature reviewed, nor was the use of sanitary pads on all non-menstruating days as a cultural or religious-based practice related to cleanliness. Cloth was viewed as the last option for absorbency, contrary to claims of this being a commonly accepted product among displaced populations.<sup>19</sup> The dislike for cloth as an absorbent was linked to perceived negative health outcomes and discomfort.

Challenges in managing menstruation in a refugee context were attributed to lack of access to hygiene products and poor infrastructure, both sanitation infrastructure and general camp infrastructure. A lack of privacy was associated with a lack of adequate or appropriate infrastructure. Accessing MHM products was hindered by a lack of purchasing options created by the isolated location of the camp, a lack of knowledge in navigating purchasing in a foreign country, and by competing priorities in purchasing decisions.

Adaptive behaviors were commonly discussed and social solidarity was viewed as a coping mechanism. There was an openness to discuss menstrual hygiene in groups which did not differ from individual interviews. This may be related to culture, but is difficult to discern without exploring further. Shame, strongly linking to taboo, was evident in discussions and particularly noted through narratives of anxiety around bleeding through clothing and being seen with menstrual products on route to toilets. This confirms the importance of adequately meeting absorbency needs, providing gender or familial segregation of toilets, and the need for adequate privacy required for managing menstruation with dignity.<sup>4,7,16</sup>

MHM interventions should be based on change theory which accounts for both individual and contextual factors in a given population.<sup>20</sup> The participant narratives generated in this study can be framed by using Rogers et al<sup>11</sup> "diffusion of innovation theory", which considers five elements important in the adoption of new ideas: compatibility, relative advantage, complexity, trialability, and observability.

Menstrual underwear was viewed as compatible with participants' cultural beliefs. Washing menstrual blood and reusing the product was not an expressed concern for this

population. Despite cloth being seen as a last option for the participants, the perceived acceptability of the product used in this study suggests that this opinion is based on comfort rather than cultural incompatibility. Compatibility can also be viewed in light of the product and the environment in which it is used.<sup>3,4,21,22</sup> Analysis revealed that the compatibility of menstrual underwear with the physical and social environment of a refugee camp was questionable and linked to the relative advantages and selected use.

A low relative advantage or, “the degree to which an innovation is perceived as better than the idea it supersedes”,<sup>11</sup> was expressed in comparison to traditional disposable absorbents. Consistent with existing literature,<sup>16</sup> findings suggest that the benefits of menstrual underwear for this population include providing an extra layer of protection against leakage, thus reducing anxiety and feelings of shame. The potential for dual use of normal underwear as well as a menstrual product was high, which can be seen as pragmatic in humanitarian responses. The inconvenience of having to remove clothing to change the reusable product was a disadvantage not mentioned in current literature. The need for privacy for drying the product, regardless of the discreteness of the style, was also seen as a disadvantage in settings with poor infrastructure and those located in cold climates.

The low complexity of the product was seen as advantageous, although providing adequate instructions for use was deemed necessary and viewed as most effective and culturally appropriate if information was delivered through female staff. Trialability, defined as the potential to try a product without commitment, was a theme expressed by participants who felt that only through personal use could a valid opinion about the benefits and disadvantages be revealed.

One may think that taboo beliefs around menstruation may hinder the potential for observability, which is the ability to “see” results of a product. Considering the perceived social cohesion and openness for discussion among participants, it is possible that this population would independently share their thoughts about the product with each other.

There was a general willingness to implement activities which incorporated the provision of menstrual underwear to females living in Ritsona, demonstrated through humanitarian staff presenting ideas of combining the distribution with sexual health education programs and sharing insights on improving uptake by understanding and applying cultural considerations. Funding required to provide the product to the population was a recurring barrier expressed by humanitarian staff. This may be due to the nature of the organizations they work for; several of which function primarily using volunteer staff and donated items.

## Limitations

This study did not allow for the time required to allow women to use the introduced menstrual product prior to collecting narratives around the products acceptability and utility in this setting. Introducing a product to a population which will not have further access to it can be seen as unethical. After careful consideration on giving the product as an incentive to participate in the study, it was decided that the product would not be given to reduce the potential for recruitment bias (only women who want the product agreeing to participate) and to avoid animosity among the population as not all women in the camp would be asked to participate in the study.

The use of diapers and menstrual pads on non-menstruating days was noted as a recurring theme. Further examination of this finding from a cultural and a medical perspective would have been interesting, with potential factors of incontinence being further explored.

Differences in levels of education were noted in the demographic information collected from community participants, and varying degrees of knowledge about body and menstruation was evident in discussions. It would be interesting to further examine the relationship between the two.

Given the short duration of the project, data saturation was not possible. Research findings are context bound. This study did not allow space for exploring the differences between cultural, customary, and religious practices. Due to the use of a translator, the idiosyncrasies of women’s narratives may have been missed.

## Recommendations

Several practical actions for improving the MHM in this setting are recommended. Primarily, ensure clarity exists in the roles and responsibilities of different actors in MHM responses and communicate activities clearly with the target population and with other organizations working in this setting. Secondly, exploration, understanding, and adaptation of MHM programming based on the population’s practices and preferences should be made standard practice. This includes examining the use of diapers by adults as well as daily pad use regardless of a woman’s menstrual cycle, and how this can impact the supply needs per person. Thirdly, programs with objectives of promoting dignity and comfort should consider stocking a range of sanitary products and pad sizes to meet the variations in menstrual flow of users. Lastly, dynamics around access to purchasing options should be carefully considered when replacing distributions with cash program.

This study examined a hypothetical user acceptability and potential utility of the product introduced. Further studies examining the actual utility of menstrual underwear for

refugee populations through providing the opportunity to test the product can be beneficial. The expressed disadvantage of having to remove trousers in order to change this menstrual product can be re-examined and potential product adjustments can be considered to facilitate easier removal (side snaps or another reusable adherent mechanism). Actively sharing any future research findings and program evaluations in humanitarian crisis should be encouraged in order to build on the existing knowledge base. This should be used to update key reference documents as significant findings are presented.

## Conclusion

The menstrual hygiene beliefs, behaviors, and practices of this population are mostly consistent with existing literature. The female refugee population expressed an acceptance toward the concept of menstrual underwear, although the relative advantage was not perceived to outweigh customary practices. The use of this product as a compliment to traditional external absorbents was perceived as helpful for promoting dignity through preventing leaks, in particular, while traveling and at night.

## Disclosure

The authors report no conflicts of interest in this work.

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