

# Knowledge, attitude, and practice of menstrual hygiene at a medical and health sciences university

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## ABSTRACT

The practice of menstrual hygiene (MH) is a public health issue and depends on various factors. Taboos and incorrect MH practices can lead to health hazards. This study aimed to assess the Knowledge, Attitude, and Practice of MH among the female students and faculty of Medical and Health Sciences University in UAE. This cross-sectional survey was done between February and June 2023 by consecutive sampling using a structured questionnaire and open questions. Univariate and multivariate analyses and comparisons were done with a significant  $p$ -value  $< .05$ . A total of 253 women participated in the study. There was good knowledge and proper practices of MH among participants. There were significantly more irregular ( $p = .0005$ ), heavy ( $p = .005$ ), and painful periods in younger females ( $p = .0278$ ). Younger women also felt that their menses were adversely affecting their day-to-day activities. 89% of women used commercially available disposable pads and least used menstrual cups. Younger women were unaware of menstrual clothing. The attitude towards menses varied, with younger females feeling annoyed ( $p = .0018$ ), and older females happy but embarrassed ( $p < .05$ ) at menarche. Having painful menses, and irregular or heavy periods are associated with being annoyed and perception of tolerating menses [ $p = .0002, .007, .003$ ]. About 1/3<sup>rd</sup> of participants perceived menstrual blood as unhygienic. The reasons were mostly sociocultural. Younger women were more open about talking regarding menses ( $p = .00007$ ). There were differences in menstrual history and attitude among older and younger women. The attitudes and beliefs vary among the participants, due to sociocultural factors and age differences.

**Keywords:** Menstrual hygiene, Knowledge of menstrual hygiene, Attitude about menstrual hygiene, Practice of menstrual hygiene, Menstrual hygiene in health science University

## Introduction

Menstruation is a physiological phenomenon and is described as the natural part of the reproductive cycle in which blood from the uterus gets discharged through the vagina [1]. The first onset of menstruation usually occurs in girls between the ages of 11 and 14 years and is often considered an indicator of puberty and sexual maturity. Previous studies have indicated that menstruation is subjected to several forms of stigma and is also

considered a source of pollution and impurity, in some communities [2-5]. Girls in some countries follow myths, taboos, and socio-cultural restrictions in relation to clothing, food, and physical activities during menstruation, and even fear revealing about it [3]. Some of these practices may be helpful, but others have potentially harmful implications [6]. In addition to these, symptoms like menstrual cramps, mood changes, and feeling sick (which can occur normally during menstruation), significantly contribute to women having unpleasant feelings and attitudes towards menstruation [4, 7]. These menstrual beliefs and practices have a significant impact on various aspects of women's life including health, emotional and mental well-being, and lifestyle [7]. The failure to fully acknowledge the physical reality of women has a range of serious impacts alongside experiences of shame [8]. The management of menstruation is also a public health issue since the cumulative duration of menstruation represents almost eight years of a woman's entire life span [9].

Even in this age of information, there are barriers to acquiring

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Website: [www.japer.in](http://www.japer.in)

E-ISSN: 2249-3379

**How to cite this article:** Dube R, Zaidi H, Khan SS. Knowledge, attitude, and practice of menstrual hygiene at a medical and health sciences university. J Adv Pharm Educ Res. 2024;14(1):63-72. <https://doi.org/10.51847/LiB0rTlcE4>

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accurate information about menstruation due to sociocultural issues which is a hurdle to the advancement of knowledge on the subject [10]. Although we assume that educated women and college-going girls have the basic knowledge and positive attitude towards this natural phenomenon and follow healthy and hygienic habits, we may be wrong. Adult women themselves are unaware of the biological facts of menstruation or the good hygienic practices required, in many cases. So, it is likely that they pass on cultural taboos and restrictions to be observed by the next generation [11-14].

Menstrual hygiene (MH) practices depend on factors such as geographic origins, cultural and socioeconomic influences, education, and information received. The choice and use of products such as type of sanitary protection, also depend on multiple factors specific to each woman (e.g., menstrual flow, duration of menstrual period, and personal preferences) [15-17]. Incorrect MH practices also pose health hazards like urinary and reproductive tract infections, which can have both short and long-term health implications [18].

### *Rationale*

Despite being a normal part of development, females around the world have many preconceived notions and misconceptions about menstruation. The population in the United Arab Emirates (UAE) consists of different nationalities, religions, and cultures. No study is done in UAE to assess the Knowledge, Attitude, and Practice (KAP) of MH. In a recent study in UAE, it was found that mothers of girls with a disability commonly seek medical help to delay/halt puberty due to concerns about MH [19]. The Middle East and Central Asia Guidelines on Female Genital Hygiene only mentions sanitary napkins, menstrual cup, and tampons as menstrual hygiene products with their usage guidance [20]. Having comprehensive evidence on the KAP of MH in a multicultural community will help us to compare the beliefs, practices, and taboos. This will help us formulate awareness strategies and help the community as a whole. Physicians and healthcare professionals are cornerstones of healthcare in any country. Their KAP of MH is very likely to influence their approach and advice in clinical practice.

### *Objective*

This study is aimed at assessing the KAP of MH among the female students and faculty of RAK Medical and Health Sciences University (RAKMHSU) in the UAE.

- To assess the level of knowledge of menstrual hygiene, attitude about menses and MH, and practices of MH among the females in a medical and health sciences University.
- To find out the differences between faculty and students in the KAP measures for MH.

## Materials and Methods

### *Study design*

This is an observational, cross-sectional questionnaire survey conducted among the students and faculty of the Medical, Dental, Pharmacy, and Nursing colleges of RAKMHSU between February and June of 2023. The ethical approval was obtained from the RAKMHSU Research and Ethics Committee [RAKMHSU-REC-167-2022/23-F-M]. Consecutive sampling was used to include all the eligible persons.

### *Study setting*

This study is done among the faculty and students of RAK Medical and Health Sciences University, Ras Al Khaimah, United Arab Emirates. The UAE consists of 7 emirates, with Abu-Dhabi as the capital city. Ras Al Khaimah (RAK) is the northernmost emirate and the farthest from the capital city. RAKMHSU is the only medical and health sciences University in RAK, consisting of RAK College of Medical Sciences, RAK College of Nursing, RAK College of Dentistry, and RAK College of Pharmacy.

### *Study participants*

Inclusion criteria included all female faculty and students of RAKMHSU.

Exclusion criteria- 1. Male faculty and staff 2. Postmenopausal women.

To determine the sample size, power analysis using Sample Size Calculator software available at Calculator.net was carried out. In this study, the significance level ( $\alpha$ ) for p-values was set at 5%; population size at 600, and confidence intervals (CI) at 95%. This calculation provided the minimum required sample size ( $n = 245$ ) that is to be recruited to generate adequately sized subgroups to ensure the statistical robustness of analyses. For the convenience of comparison, the participants were divided into 2 categories; those who are less than 30 years of age, and those who are 30 years of age or older.

### *Data collection*

All female students and faculty meeting the criteria were approached for informed consent. Once they agreed and gave written consent, the questionnaire was used to collect responses. A structured questionnaire was used to collect the responses. Data was collected between February and June of 2023.

### *Study instrument*

The researchers followed the guidelines for developing a questionnaire [21] and prepared a structured self-administered questionnaire based on the available literature [22, 23]. It was then validated in a pilot group. The initial version of the questionnaire was prepared after a review of the relevant literature [22, 23]. It contained 32 items (Questionnaire version 1). We invited faculty members ( $N=10$ ) from the institution to screen the questionnaire for content. We then invited 10 other participants to test the questionnaire for general readability and comprehension. We tested the overall reliability and the Cronbach  $\alpha$  obtained was 0.78, suggestive of acceptable internal consistency. The final Questionnaire consisted of 21 questions

including the demographic data of students and faculty, characteristics of their menstrual cycle (2 questions), items related to KAP related to menstruation (10 questions), and items related to MH products (9 questions). open-ended question was asked to explore their views on MH. At the end of the survey, information was given to the participants about the different MH products and facilities in the University, for those who were unaware.

### Data analysis

The Statistical Package for Social Sciences (SPSS) version 24.0 was used for data analysis. Descriptive statistics (percentage) and univariate analysis were used to describe the characteristics of the respondents. A bivariate analysis using a chi-square test and odds ratio was done for the comparisons and multivariate analysis was done for assessing the strength of the association. In our study, we considered a p-value less than 0.05 as significant.

## Results and Discussion

### Demographic profile of participants

In this study, two age categories (more than 30 years and less than 30 years) were used. The 1<sup>st</sup> category mainly included female faculty and the 2<sup>nd</sup> category included students.

A total of 253 females participated in the survey, the majority being students and less than 30 years of age (Figure 1). The participants were from all 4 constituent colleges of RAKMHSU [College of Medicine, Nursing, Pharmacy and Dentistry]. 94.5% of category-1 were postgraduates (n=37) and 92% (n=197) of category-2 were undergraduates. The majority of participants in each category were from the Middle East and Africa (30%), followed by Indians (25.8%). All the participants were literate and of middle to higher socioeconomic status.

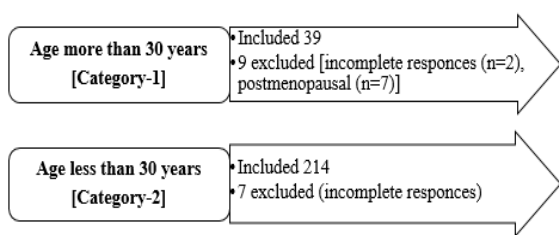


Figure 1. Participants

### Menstrual history

In this section, the age of the onset of first menstruation (menarche), the menstrual pattern, and pain during menstruation among the participants are discussed. The answers in ranges are put to identify abnormalities in menstruation if present. When abnormalities were found, participants were counseled and referred for consultation in the health care facility. The age of the menarche among the respondents in both categories was between 11-15 years and the duration of bleeding was between 2-7 days. The categories did not also significantly differ regarding cycle length. The cycles were also regular in the

majority of the participants in both groups [(i.e. 37 (94.9%) in group -1 and 145 (67.7%) in group-2]. However, the majority of younger women had dysmenorrhea [n=137 (64.1%)]. Also, significantly more women below 30 years of age had irregular and heavy periods [p<.05 for both]. Younger women felt that their menstrual cycles were significantly more likely to adversely affect their day-to-day lives (Table 1).

Table 1. Menstrual History

Parameters	Category-1 [n=39] n (%)	Category-2 [n=214] n (%)	Comparison
<b>Menarche</b>			
10 years or less	2 (5.1)	10 (4.6)	
11- 15 years	34 (87.1)	203 (94.8)	
16 years or more	3 (7.6)	1(0.46)	
<b>Bleeding days</b>			
1-2 days	1 (2.5)	3 (1.4)	p>.05
2-7 days	35 (89.7)	192 (89.7)	
More than 7 days	3 (7.6)	19 (8.8)	
<b>Gap between periods</b>			
Less than 21 days	1 (2.5)	2 (0.9)	
21-35 days	34 (87.1)	192 (89.7)	
More than 35 days	4 (10.2)	20 (9.3)	
<b>Amount of bleeding</b>			
Heavy	3 (7.6)	62 (29)	p= .005
<b>Regularity of cycle</b>			
Irregular	2 (5.1)	69 (31.3)	p= .0005
<b>Painful periods (dysmenorrhea)</b>			
Yes	7 (17.9)	137 (64.1)	p= .0278
No	32 (79.1)	77 (35.9)	
<b>Does your period adversely affect your day-to-day life?</b>			
Yes	8 (20.5)	92 (43)	p= .0082
No	31 (79.5)	122 (57)	

### Knowledge about menstrual hygiene

#### Sanitary measures available

All the participants were well aware of disposable sanitary pads as a product used during menstruation (100%). The knowledge of the homemade pads, cloth, and menstrual cups was limited in general in all participants. The older women were significantly more aware of menstrual clothes than the females under 30 years of age (p<.05) (Table 2).

Table 2. Knowledge of MH

Parameters	Category-1 [n=39] n (%)	Category-2 [n=214] n (%)	Comparison
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Knowledge of MH products			Knowledge of cloth $P = .015$
Disposable pads	39 (100)	214 (100)	
Homemade pads	15 (38.4)	44 (20.5)	
Cloth	21 (53.8)	49 (22.8)	
Tampon	14 (35.8)	90 (42)	
Menstrual cup	10 (25.6)	55 (25.7)	
Dispensing facilities in the University			$P > .05$
Yes	36 (92.3)	209 (97.7)	
No	3 (7.7)	5 (2.3)	
Disposal facilities in the University			
Yes	39 (100)	212 (99)	
No		2 (0.9)	

### Disposal and dispensing facilities in the university

All the participants were well aware of these facilities available in the university, although older women were less aware of dispensing units in the university.

### Reliable sources for medical information

The most reliable sources of information for participants were physicians and health care providers followed by journal articles. While women in category 1 preferred books and television more than the younger women, the latter relied on the internet as a source of information. However, the differences were not statistically significant (Figure 2).

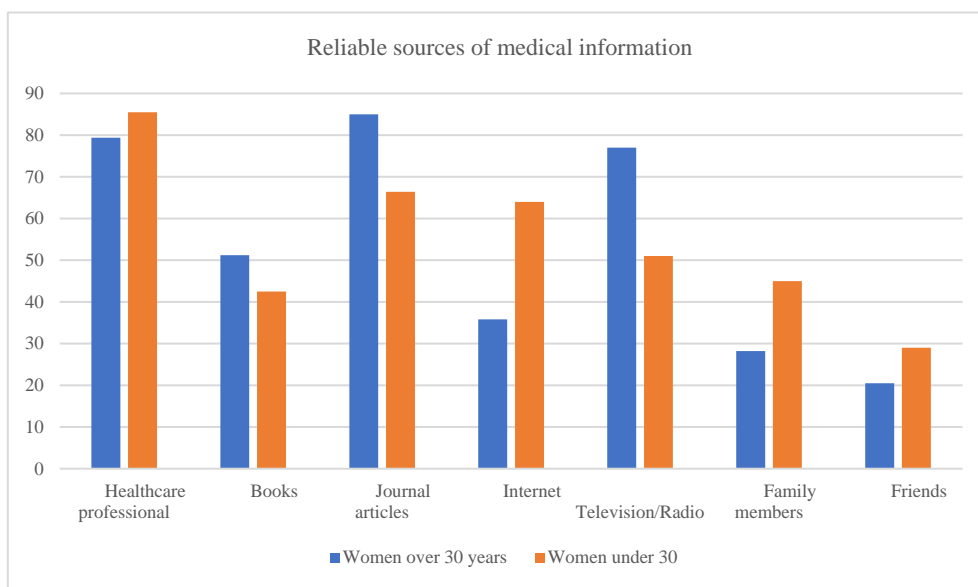


Figure 2. Sources of medical information

### Implications of improper menstrual hygiene practices

Almost everyone had some knowledge of the implications of

improper MH, but it was inadequate. The features of genital infection were known to participants in both categories but more than 70 % were unaware of dysmenorrhea, intermenstrual bleeding, lethargy, and anemia as the consequences (Figure 3). It was not different between the groups ( $p > .05$ ).

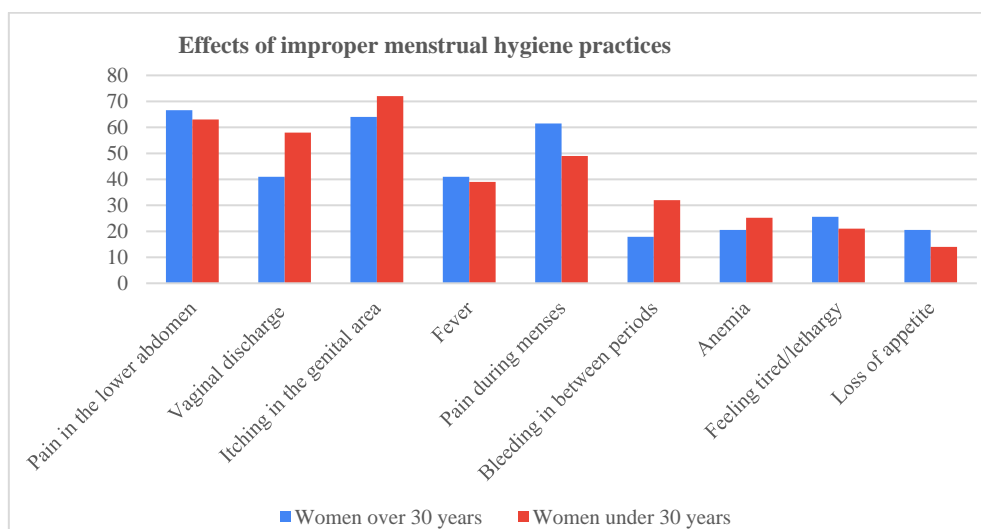


Figure 3. Effects of improper menstrual hygiene practices

## Attitude

### Reaction when first menstruated

While the most common reaction was being scared and telling another female in the household like a mother, grandmother, or sister, almost 10%-15% did not remember their first reaction. Most of the participants have mixed interplay of reactions. Women younger than 30 years were significantly more annoyed than women above 30 years, whereas older women were significantly more embarrassed but happy (Table 3).

Table 3. Attitude of menstruation and MH

Parameters	Category-1 [n=39]n (%)	Category-2 [n=214]n (%)	Comparison
<b>First reaction at menarche</b>			
Scared	18 (46.1)	106 (49.5)	-Annoyed p=.0018 -Embarrassed p=.00001 -Happy p=.0004
Cried	5 (13)	48 (22.4)	
Annoyed	1 (2.5)	53 (24.7)	
Embarrassed	11 (28.2)	5 (2.3)	
Happy	4 (10.2)	2 (1)	
Did not tell anyone/do not remember	4 (10.2)	31 (14.4)	
Told mum/ sister/ grandmother	30 (76.9)	155 (72.4)	
<b>Do you think menstrual blood is unhygienic?</b>			
Yes	13 (33.3)	85 (39.7)	p=.00007
No	26 (66.7)	129 (60.3)	
<b>Do you think menstruation is a female/ personal matter, to be kept to oneself only, not to talk about openly?</b>			
Yes	12 (30.7)	18 (8.4)	p=.0003
No	27 (69.3)	196 (91.6)	
<b>Do you feel menstruation is very annoying and you are just tolerating menses?</b>			
Yes	5 (12.8)	105 (49)	p=.00007
No	34 (87.2)	109 (51)	

### Is menstrual blood unhygienic?

The attitude was mixed with almost 1/3<sup>rd</sup> of women in each category thinking menstrual blood was unhygienic. There was however no difference between the two categories of women in their attitudes.

### Is menstruation a personal/ female matter?

About 1/3<sup>rd</sup> of women above the age of 30 years had the opinion that menstruation is a female/ personal matter, to be kept to oneself only, not to talk about openly. Younger women were more open to talking about it. The difference was statistically significant

(p=.00007).

### Do you feel menstruation is very annoying and you are just tolerating menses?

Almost half of the women under 30 years (49%) perceived menstruation as annoying. Younger women were significantly more likely to think that they were only tolerating menstruation than older women (p=.0003). The odds of attitude of annoyance are significantly higher in younger women with menstrual abnormalities compared to those with normal menses [p=.0003]. Multivariate analysis of the group of women feeling annoyed about menses showed that having painful menses is significantly more strongly associated with being annoyed compared to having irregular or heavy periods [p=.0002, .007, .003].

## Practice

### Use of products, cleaning, and drying

Commercially available disposable sanitary pads were most commonly used by women irrespective of age (89-90%). Tampons were preferred by younger women and menstrual cups were preferred by older women, but the absolute use is less as compared to pads. The difference was not statistically significant. However, menstrual cloth was exclusively used by women above 30 years of age, and homemade pads were significantly more used in older women compared to younger women (Table 4).

Table 4. Practice of MH

Parameters	Category-1 [n=39]	Category-2 [n=214]	Comparison
<b>What do you mainly use during menstruation?</b>			
Commercial disposable pads	89.7%	89.3%	-Use of homemade pads or menstrual cloth p<.05
Homemade pads	10.2%	0.9%	
Cloth	17.9%	0	
Tampon	2.5%	8.6%	
Menstrual cup	5.1%	1.4%	
<b>If you are using clothes, how do you clean it?</b>			
Soap and water	69.2%	42%	p>.05
Only water	0	0.9%	
I use disposable clothes	30.7%	57%	
<b>If you are using clothes, how do you dry it?</b>			
Sunlight	69.2%	42%	p>.05
Inside the house	0	0.9%	
I use disposable clothes	30.7%	57%	
<b>How often do you take a bath during periods?</b>			
First day only	5.1%	16%	p>.05
Second day only	12.8%	16%	
Daily	66.6%	59.8%	
I don't take bath during menses	15.3%	8.4%	

<b>Do you clean your genitalia during menstruation?</b>		
Yes	92.3%	97.7%
No	7.6%	2.3%
<b>Do you wash your hands with soap and water before and after changing the sanitary measures?</b>		
Yes	97.4%	97.7%
No	2.5%	2.3%
<b>How often do you change the cloth/pad/ tampon/ cup in a day during periods?</b>		
Once a day	5.1%	0.9%
Twice a day	17.9%	14%
Three times or more	89.7%	84.7%
<b>Where do you dispose of your pads?</b>		
Dedicated bins	74%	96.2%
Toilet bins	2.5%	1.4%
Others	23%	2.3%
<b>Type of wrap used for disposal</b>		
Paper	33%	48.9%
Plastic	41.2%	44.2%
No wrap	2.5%	4.6%
Others	23%	2.3%
<b>Do you use the sanitary dispensing and disposal facilities at the university?</b>		
Yes, always	56.4%	39.7%
Yes, Sometimes	28.2%	56.5%
No, never	15.3%	3.8%

p &lt; .05 for others

p &gt; .05

Although the use of reusable material is very limited in this study, when participants were asked about cleaning and drying, should they be using a reusable one, everyone agreed on washing with soap and water with sun drying.

### *Taking a bath during menses and cleaning*

The result is mixed with the majority of women agreeing that they take baths daily during menses. 8% of younger women and 15% of older women do not take baths during their periods. There was almost an equal proportion of females taking a bath only on the 1<sup>st</sup> or 2<sup>nd</sup> day. Almost all the participants in our study (>90%) clean their genitalia regularly during menses and wash their hands before and after changing sanitary measures. There was no statistically significant difference between the groups regarding this.

### *Frequency of changing*

The majority of participants use disposable sanitary pads and change them 3 or more times a day as required. Those who use menstrual cloth and homemade pads are used to changing it more often, whereas those using tampons change it twice daily. 3 participants were using menstrual cups in our study, and it is changed once or twice daily as required.

### *Disposal and use of university facilities*

Except for those participants using menstrual cups and reusable measures, almost all the participants use dedicated bins for

disposal, toilet bins when such bins are unavailable, and none in the toilet or outside. However, the preference for paper or plastic is equal among participants. These results are not different among the groups. The “others” belong to those using reusable measures. The university disposal and dispensing facilities are used by the majority of participants either always or sometimes. 15% of women in Category 1 and 4% in Category 2 had never used these facilities.

### *Key findings*

Our study indicates normal menstrual history in the majority of the participants including menarche and characteristics of the cycles but significantly more irregular, heavy, and painful periods in younger females. Younger women also felt that their menses were adversely affecting their day-to-day activities. 89% of women used commercially available disposable pads and least used menstrual cups. Younger women were unaware of menstrual clothing. The attitude towards menses varied, with younger females feeling annoyed ( $p = .0018$ ), and older females happy but embarrassed ( $p < .05$ ) at menarche. Having painful menses, and irregular or heavy periods are associated with being annoyed and perceiving that they are tolerating menses [ $p = .0002, .007, .003$ ]. About 1/3rd of participants perceived menstrual blood as unhygienic. The reasons were mostly sociocultural. Younger women were more open about talking about menses ( $p = .00007$ ).

### *Strengths and limitations*

This study is the first one to assess the KAP measures in UAE and also in a Medical and health sciences University with students and faculty from multicultural backgrounds reflecting the population of UAE. It assesses knowledge, attitudes, and practices and further explores the beliefs. It also compares the differences between younger and older women. Awareness was created at the end of the survey, about MH products and facilities among those who were unaware. However, the study is limited by a smaller sample size of women over 30 years of age. The beliefs and taboos were not fully explored by further psychological analysis.

### *Comparison with similar research*

Menstruation is a normal physiological process and MH practice is an essential component of health in females. This study was done at a medical and health sciences university, and anatomy and physiology of menstruation is a part of the curriculum. Hence, these questions although initially a part of version 1 of the questionnaire, were not included in the final version. This is in contrast with other studies done among students where knowledge of menstruation was assessed [24, 25].

Our study indicates normal menstrual history in the majority of the participants including menarche and characteristics of cycle. This is in accordance with the studies in South Asian, Middle Eastern, and African countries having similar populations [18-22]. Furthermore, more than half of the women had

dysmenorrhea. It is similar to other studies in the same age group [25-31].

As the study was conducted at a medical and health sciences university, the participants, in general, had adequate knowledge about MH. However, the younger women were relatively unaware of menstrual clothes and older women were relatively unaware of menstrual cups. No single material product is likely to be preferred by all females always and the preferences vary due to different reasons. In our study the knowledge and use of menstrual cups as well as cloth are minimal.

- **Menstrual cloth-** These are fabric pieces (new or old) worn externally, in underwear, or tied to the waist. It can usually be reused for up to 1 year. It is cheap, environmentally friendly, and universally available. Proper washing and drying are crucial for safe use, to avoid abnormal vaginal discharge, skin irritations, and urogenital infections. When single-use clothes are used, proper disposal facilities are essential [32].
- **Reusable pad-** Reusable pads are worn externally in underwear, and held in place usually by snaps. They can be reused for approximately one year. Proper washing and drying are crucial for safe use. Improper use is associated with skin irritation, urinary tract infections, and bacterial vaginosis. They produce significantly less solid waste than single-use, disposable materials [32].
- **Disposable sanitary pads-** Disposable pads are worn externally to the body, and are available in most places. They are disposed of after a maximum of 8 hours or earlier if required. They are often preferred as they are reliable, hygienic, comfortable, easy to use, and do not require to be cleaned. As pads are disposed of after one use, proper disposal facilities are essential. Affordable, high-quality biodegradable disposable pads are the need of the hour but not readily available [32].
- **Tampons-** Tampons are absorbent materials that are inserted into the vagina. They expand by absorbing menstrual flow and also avoid leakage. They can be worn maximum for up to 8 hours, after which they are removed, and disposed of. They can be worn with an intrauterine device. The prevalence of its use is low due to fear of pain, fear of tampons getting stuck and sociocultural barriers as they have to be inserted into the vagina. Tampon use is associated with toxic shock syndrome, a rare but potentially fatal disease, especially if not changed on time. Acceptability is gradually increasing with proper education and discussions. Soap for handwashing and access to clean water is important to avoid UTIs and vaginal infections. They create large amounts of waste as they need to be disposed of after a single use [32].
- **Menstrual cup-** The menstrual cup is a non-absorbent bell-shaped device made of silicon that is inserted into the vagina to collect menstrual flow. It creates a seal and is held in place by the walls of the vagina. It collects three times more blood than pads or tampons and needs to be rinsed and re-inserted every 6-12 hours. After each menstrual cycle, the cup must be boiled for 5-10 minutes. These cups can be reused for 5-10 years. Use is low due to fear and sociocultural issues but

there is increasing interest in the acceptability of cups as a convenient, environmentally friendly option. Menstrual cups are perceived as better than pads or cloths due to ease and discretion of washing, drying, and storing, comfort, leakage protection, odor development, quality, and length of wear. No underwear is needed for its use. Based on literature from high- and low-income countries, no significant health risks like toxic shock syndrome, infections, and skin irritations are reported, since they do not disrupt vaginal flora and pH. They can be worn with an intrauterine device. The amount of water required for boiling is far less than reusable pads or clothes [32].

The knowledge about the implications of improper MH was also not adequate. While Urinary tract infection and reproductive tract infections were well recognized as complications of poor MH manifested by vaginal discharge, itching in the vulva, lower abdominal pain, and sometimes fever. Improper MH practices can lead to menstrual abnormalities and, anemia manifested by tiredness and loss of appetite [33]. This can also lead to long-term consequences like chronic pelvic pain and subfertility.

In our study, women younger than 30 years were significantly more annoyed, whereas older women were significantly more embarrassed. This can be because the older were more likely to be unaware of menstruation at the time of their menarche. The prevalence of dysmenorrhea and irregular menses is higher in younger women in our study, favoring the feeling of annoyance in a set-up of up high-stress educational environment like a University.

A third of the participants in our study perceived menstrual blood as unhygienic. This may be due to deep-rooted social and cultural beliefs. In further discussion, the exact words were "It is unhygienic as the inadequate flow can accumulate in the body and cause obesity". Another participant said, "It is unhygienic as we are not allowed to pray". Other statements were "It is unhygienic and needs to come out as it is not normal blood". Most of the women in our study think it is unhygienic as there are restrictions on religious activities. The physiology of menstruation is well known for a very long time. Therefore, there seems no reason for this notion to persist that menstruation is unhygienic or that menstruating women are "impure" [3]. Cultural norms and religious taboos on menstruation are often compounded by traditional associations with evil spirits, shame, and embarrassment surrounding sexual reproduction [6, 34, 35]. Gender discrimination also plays a part in the belief of menstruation or female reproductive issues as impure [36]. This can also explain the reluctance of participants to talk about it openly and perceive it as a personal or female matter. The younger women in our study felt significantly less likely to think so and were open about talking about it.

Most of the participants in our study used commercially available disposable products. This is in accordance with an analysis carried out by FSG in 2016 showing over 75% of women and girls in high- and upper-middle-income countries use commercially produced products [37]. A study in Korea among nurses also showed that 89% use disposable sanitary pads and use of

menstrual cups in only 1.6% of participants [38]. Participants were well aware of the importance of proper cleaning and drying of reusable products in our study. There are considerable differences in practice regarding taking a bath during menses. There is no clear evidence in the literature regarding this. While sharing a bath is considered not acceptable due to deep-rooted beliefs about impure blood, it is important to maintain hygiene during menses [39, 40]. Around 66% of women in our study reported that they take a bath daily during menses. This is in accordance with other studies from Afghanistan, India, Pakistan, and Iran [25, 26, 41, 42]. As long as the genital area is regularly cleaned, hand wash hygiene is maintained and products are cleaned/ changed regularly following the recommended time, MH can be maintained.

There are a few other studies showing beliefs about menstruation among students affecting MH practices [43]. A study in Nepal indicates factors influencing MH KAP were cultural beliefs, stigma, poverty, and illiteracy. Various qualitative studies also point to cultural beliefs as the cornerstone of MH practices [24]. However, in our study, the beliefs are not explicitly explored and poverty and illiteracy did not play a role in the KAP measures.

## Conclusion

As this study was carried out in a medical and health sciences University, good knowledge and practices of MH were expected. This study revealed differences in menstrual history and attitude among older and younger women. The attitude and beliefs vary among the participants, due to sociocultural factors and age differences, despite being in medical and health sciences. Physicians and healthcare providers play a vital role in providing appropriate evidence-based knowledge about healthy practices and overcoming taboos.

**Acknowledgments:** We would like to thank the participants for their participation in this important survey and give their honest views.

**Conflict of interest:** None

**Financial support:** None

**Ethics statement:** The research was approved by the institutional research and ethics committee.

## References

1. Wateraid.org. Module one: Menstrual Hygiene Basics. 2012. Available from: [http://www.wateraid.org/~media/Files/Global/MH/M%20files/Module1\\_HR.pdf](http://www.wateraid.org/~media/Files/Global/MH/M%20files/Module1_HR.pdf). [Last accessed on 2022 July 09].
2. Crawford M, Menger LM, Kaufman MR. 'This is a natural process': managing menstrual stigma in Nepal. *Cult Health Sex.* 2014;16(4):426-39.
3. Garg S, Anand T. Menstruation-related myths in India: strategies for combating it. *J Family Med Prim Care.* 2015;4(2):184-6.
4. Padhye S, Karki C, Padhye SB. A profile of menstrual disorders in a private setup. *Kathmandu Univ Med J.* 2003;1(1):20-6.
5. Yagnik A. Theorizing a model information pathway to mitigate the menstrual taboo. *Health Promot Int.* 2019;34(3):410-9. doi:10.1093/heapro/dax089
6. Kaiser S. Menstrual Hygiene Management. 2008. Available from: <http://www.sswm.info/content/menstrual-hygiene-management>. [Last accessed on 2022 Aug 09].
7. Hennegan J, Montgomery P. Do menstrual hygiene management interventions improve education and psychosocial outcomes for women and girls in low and middle-income countries? A systematic review. *PLoS ONE.* 2016;11(2):e0146985.
8. Goldblatt B, Steele L. Bloody unfair: inequality related to menstruation — considering the role of discrimination law. *SSRN Electron J.* 2019. doi:10.2139/ssrn.3485987
9. Gavriluk O, Braaten T, Weiderpass E, Licaj I, Lund E. Lifetime number of years of menstruation as a risk index for postmenopausal endometrial cancer in the Norwegian Women and Cancer Study. *Acta Obstet Gynecol Scand.* 2018;97(10):1168-77. doi:10.1111/aogs.13381
10. Patil R, Agarwal L, Khan MI, Gupta SK, Vedapriya DR, Raghavia M, et al. Beliefs about menstruation: A study from rural Pondicherry. *Indian J Med Specialities.* 2011;2(1):23-6.
11. House S, Mahon T, Cavill S. Menstrual hygiene matters: A resource for improving menstrual hygiene around the world. First Edit. London, UK: WaterAid; 2012. 1-354 p. 3.
12. Morrison J, Basnet M, Bhatta A, Khimbanjar S, Baral S. Analysis of menstrual hygiene practices in nepal: The role of WASH in Schools Programme for Girls Education 2016. Nepal; 2018.
13. Mohammed S, Larsen-Reindorf RE. Menstrual knowledge, sociocultural restrictions, and barriers to menstrual hygiene management in Ghana: Evidence from a multi-method survey among adolescent schoolgirls and schoolboys. *PLoS One.* 2020;15(10):e0241106. doi:10.1371/journal.pone.0241106
14. WaterAid. Is menstrual hygiene and management an issue for adolescent school girls? WaterAid/Anita Pradhan A comparative study of four schools in different settings of Nepal [Internet]. Kuponole, Lalitpur, Nepal; 2009. Available from: [www.wateraid.org/nepal](http://www.wateraid.org/nepal)
15. Romo LF, Berenson AB. Tampon Use in Adolescence: Differences among European American, African American and Latina Women in Practices, Concerns, and Barriers. *J Pediatr Adolesc Gynecol.* 2012;25(5):328-33.
16. Czerwinski BS. Variation in Feminine Hygiene Practices as a Function of Age. *J Obstet Gynecol Neonatal Nurs.* 2000;29(6):625-33.



17. Czerwinski BS. Adult feminine hygiene practices. *Appl Nurs Res.* 1996;9(3):123-9.
18. Nabwera HM, Shah V, Neville R, Sosseh F, Saidykhan M, Faal F, et al. Menstrual hygiene management practices and associated health outcomes among school-going adolescents in rural Gambia. *PLoS ONE.* 2021;16(2):e0247554. doi:10.1371/journal.pone.0247554
19. Deeb A, Akle M, Al Zaabi A, Siwji Z, Attia S, Suwaidi HA, et al. Maternal attitude towards delaying puberty in girls with and without a disability: a questionnaire-based study from the United Arab Emirates. *BMJ Paediatr Open.* 2018;2(1):e000306. doi:10.1136/bmjpo-2018-000306
20. Arab H, Almadani L, Tahlak M, Chawla M, Ashouri M, Tehranian A, et al. The Middle East and Central Asia Guidelines on Female Genital Hygiene. *BMJ ME.* 2011;19:99-106.
21. Artino AR Jr, La Rochelle JS, Dezee KJ, Gehlbach H. Developing questionnaires for educational research: AMEE guide no. 87. *Med Teach.* 2014;36(6):463-74. doi:10.3109/0142159X.2014.889814
22. Upashe SP, Tekelab T, Mekonnen J. Assessment of knowledge and practice of menstrual hygiene among high school girls in Western Ethiopia. *BMC Women's Health.* 2015;15:84. doi:10.1186/s12905-015-0245-7
23. Alam M, Luby SP, Halder AK, Islam K, Opel A, Shoab AK, et al. Menstrual hygiene management among Bangladeshi adolescent schoolgirls and risk factors affecting school absence: results from a cross-sectional survey. *BMJ Open.* 2017;7(7):e015508. doi:10.1136/bmjopen-2016-015508
24. Thapa S, Bhattarai S, Aro AR. 'Menstrual blood is bad and should be cleaned': A qualitative case study on traditional menstrual practices and contextual factors in the rural communities of far-western Nepal. *SAGE Open Med.* 2019;7:2050312119850400. doi:10.1177/2050312119850400
25. Sakhi R, Jalalzai S, Ahmadi Z, Almaszada R, Zarghoon FN, Mohammadi R, et al. Knowledge, Beliefs, and Practices Related to Menstruation Among Female Students in Afghanistan. *Int J Womens Health.* 2023;15:1139-49. doi:10.2147/IJWH.S410660
26. Mansoor H, Salman M, Asif N, Mustafa ZU, Nawaz AS, Mohsin J, et al. Menstrual knowledge and practices of Pakistani girls: A multicenter, cross-sectional study. *Heliyon.* 2020;6(1):e03157. doi:10.1016/j.heliyon.2020.e03157
27. Adinma ED, Adinma JIB. Perceptions and practices on menstruation amongst Nigerian secondary school girls. *Afr J Reprod Health.* 2008;12(1):74-83.
28. Akter M, Khatun S, Biswas HB, Kim HS. Knowledge of menstruation and the practice of hygiene among adolescent girls in Bangladesh. *East African Scholars J Med Sci.* 2020;2(10):605-12. doi:10.36349/EASMS.2019.v02i10.038
29. Neyazi A, Faizi G, Afzali H, Ahmadi M, Razaqi N, Frough Z, et al. Assessment of knowledge, attitude, and practice about the menstruation among secondary school girls in Herat, Afghanistan - A cross-sectional study. *Research Square;* 2021. doi:10.21203/rs.3.rs-847912/v1
30. Kumari S, Sood S, Davis S, Chaudhury S. Knowledge and practices related to menstruation among tribal adolescent girls. *Ind Psychiatry J.* 2021;30(Suppl 1):S160-S5. doi:10.4103/0972-6748.328808
31. Kanchan Y, Rizwana S, Charu S, Kalpna G, Jitendra J, Goury C. Menstrual pattern in medical students and their knowledge and attitude towards it. *Int J Med Health Res.* 2018;4(6):19-22.
32. Guide to menstrual hygiene materials. United Nations Children's Fund. First edition. May 2019. Available from: [www.unicef.org](http://www.unicef.org)
33. Bali S, Sembiah S, Jain A, Alok Y, Burman J, Parida D. Is There Any Relationship between Poor Menstrual Hygiene Management and Anemia? - A Quantitative Study Among Adolescent Girls of the Urban Slum of Madhya Pradesh. *Indian J Commun Med: Off Publ Indian Assoc Prev Soc Med.* 2021;46(3):550-3. [https://doi.org/10.4103/ijcm.IJCM\\_73\\_21](https://doi.org/10.4103/ijcm.IJCM_73_21)
34. UNICEF. Bangladesh: Tackling menstrual hygiene taboos. Sanitation and Hygiene Case Study No. 10. 2008. Available from: [http://www.unicef.org/wash/files/10\\_case\\_study\\_BANGLADESH\\_4web.pdf](http://www.unicef.org/wash/files/10_case_study_BANGLADESH_4web.pdf). [Last accessed on 2022 Aug 12].
35. Mukherjee A, Lama M, Khakurel U, Jha AN, Ajose F, Acharya S, et al. Perception and practices of menstruation restrictions among urban adolescent girls and women in Nepal: a cross-sectional survey. *Reprod Health.* 2020;17(1):81. doi:10.1186/s12978-020-00935-6
36. Ten VT. Menstrual hygiene: A neglected condition for the achievement of several millennium development goals. Europe External Policy Advisors. 2007. Available from: [http://www.eepa.be/wcm/component?option,com\\_remository/func,startdown/id,26/](http://www.eepa.be/wcm/component?option,com_remository/func,startdown/id,26/).
37. FSG, 2016. Available from: <https://www.fsg.org/publications/opportunity-address-menstrual-health-and-gender-equity>.
38. Choi H, Lim NK, Jung H, Kim O, Park HY. Use of Menstrual Sanitary Products in Women of Reproductive Age: Korea Nurses' Health Study. *Osong Public Health Res Perspect.* 2021;12(1):20-8. doi:10.24171/j.phrp.2021.12.1.04
39. Sadiq MA, Salih AA. Knowledge and practice of adolescent females about menstruation in Baghdad. *J Gen Pract.* 2013;2:138. doi:10.4172/2329-9126.1000138
40. Morley W. Common myths about your period. 2014. Available from: <http://www.womenshealth.answers.com/menstruation/common-myths-about-your-period>. [Last accessed on 2022 Aug 12].

41. Savanthe A, Nanjundappa V. Menstruation: a cross-sectional study on knowledge, belief, and practices among adolescent girls of junior colleges, kuppam, Andhra Pradesh. *Int J Med Sci Public Health*. 2015;5(01):22-7. doi:10.5455/ijmsph.2016.100620157
42. Siabani S, Charehjou H, Babakhani M. Knowledge, Attitudes and Practices (KAP) regarding menstruation among school girls in West Iran: a population-based cross-sectional study. *Int J Pediatr*. 2018;6(8):8075-85. doi:10.22038/ijp.2018.28633.2495
43. Alharbi KK, Alkharan AA, Abukhamseen DA, Altassan MA, Alzahrani W, Fayed A. Knowledge, readiness, and myths about menstruation among students at the Princess Noura University. *J Family Med Prim Care*. 2018;7(6):1197-202. doi:10.4103/jfmpc.jfmpc\_279\_18