Original Article

Prevalence and Barriers of Menstrual Hygiene Practices among Women of Reproductive Age Group in Rural Field Practice Areas of a Tertiary Care Center in Rishikesh

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Abstract

Background: Menstruation is a natural, physiological process experienced by all adolescent girls and women. The reproductive age group is the largest and most susceptible to various health and illness-related risk factors. This study aims to find the prevalence of satisfactory menstrual hygiene management (MHM) among women of reproductive age group and we also want to explore the cultural practices and beliefs related to menstruation and barriers to satisfactory MHM. **Material and Methods:** This study was conducted in rural field practice areas of Department of Community and Family Medicine , AIIMS, Rishikesh including 271 participants; women of reproductive age group using a mixed method study design (*sequential quan–qual*). Quantitative data were collected by household surveys and government schools using a validated structured questionnaire. Descriptive statistics were used to analyze the data. Focus group discussions (FGD) were conducted to have insights about understanding menstrual hygiene and barriers to satisfactory hygiene practices. **Results:** It was found that only 70 (29.6%) participants adhered to satisfactory menstrual hygiene practices. The age group of 20–24 years had a higher proportion compared to other groups. Through FGD, the main themes derived were practices related to menstruation (maintenance of personal hygiene), daily activities (physical and mental problems during menses), and barriers faced (cultural, economic, privacy concerns, and shyness). **Conclusion:** The prevalence of satisfactory menstrual hygiene practices was very low only 29.6%, which is a cause of concern; either Taboos associated with menstruation, socio-cultural, economic barriers, or lack of awareness related to menstrual hygiene in the community can be contributing factors for low prevalence.

Keywords: Menstrual hygiene management, menstrual hygiene materials life cycle segments, menstruation, reproductive age group

Introduction

Menstruation is a physiological phenomenon in females which takes place through the controlled, coordinated activities of Hypothalamus Pituitary axis (HPO), and plays a crucial part in female reproductive life.[1] Women of the reproductive age group (WRA) constitute 22.2 % of the total population.[2] Reproductive age group is the largest and most susceptible to various health and illness related risk factors. Hence they need a safe environment that offers protection and guidance to guarantee their basic health, well-being, and educational opportunities. Adolescent girls and WRA is the largest and the most vulnerable to various risk factors associated with health and illness. Hence there is need to address reproductive health issues in early stages to avoid complications in later life.[3,4] Adolescence is the transition phase between childhood and adulthood from 10 to 19 years. It is marked by physical, psychological and social changes. Adolescence is the healthy phase of life however due to paucity of information, misconceptions, related with menstruation they are not able to seek the right advice and unfortunately loaded with undue mental stress.[5]

In many communities menstruation is not only a part of physiological process but also a taboo and form of purifying process, which in turn imposes many misconceptions and unscientific practices that may sometimes become a horrifying

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experience for adolescence and WRA.[6] The concept of Menstruation give rise to the most important aspect: Menstrual Hygiene and its Management. Menstrual hygiene comprises all the principles carried out to clean the body during menstrual flow. It needs basic facilities such as appropriate clothing or good adsorbent, water & soap for washing, toilet with privacy.[7-9]

Most of the studies in India have been focused on the menstrual hygiene practices among adolescent girls as Raina & Balodi *et al*, and not the whole reproductive age group . Therefore, this study aims to assess the prevalence of satisfactory menstrual Hygiene practices among WRA in rural field practice areas of Community and Family Medicine Department AIIMS Rishikesh using house to house survey. We also want to explore the prevailing cultural practices and beliefs related to Menstruation and barriers.

for satisfactory menstrual hygiene management through Focus group discussions. Thereby Sequential mixed method was used to fulfil our objectives. This will help to understand the status of programme implementation and identify the ways of improving it.

Materials and Method

A mixed method study *(sequential quan–qual)* was conducted in rural field practice areas of Department of Community and Family Medicine, AIIMS Rishikesh from Jan 2022 to June 2022 with a full study duration of 6 months.

Participants were recruited from government schools and a house-to-house survey was conducted; two subcenters with 275 households were selected for the survey after considering the following eligibility criteria. In this study, inclusion criteria were females between 15 and 49 years of age, while all those female participants who denied consent, not attained menarche, females with history of hysterectomy, females undergone menopause, pregnant and lactating mothers, known case of any psychiatric illness, and unable to understand or converse in Hindi were excluded.

Sample size

Phase I: Quantitative part

We could not find a study of menstrual hygiene practices among WRAs in rural areas and considering the socio-economic status of resettlement colonies to be in approximation with rural areas, Kumar's study was taken into account. Good sanitation practices in reproductive age were found to be 81% in resettlement colonies of Delhi.

Using the formula $Z^2 P (1 - P)/D^2$ with 95% confidence limit, 5% absolute error, and 10% nonresponse rate, the sample size came to be 271.

Phase II: Qualitative part

FGDs were conducted till the time of data saturation when no new codes were generated.

Study tool

Phase I

The validated structured questionnaire included socio-demographic information such as age, residence, type of family, marital status, education, occupation, and economic status. Part two consists of gynecological information—age at menarche, parity, and information on menstrual hygiene practices. It includes menstrual material used at home, away from home, frequency of changing material, place of changing, washing of hands before and after change of material, washing of private parts, material used to wash the same, place of disposing menstrual material, and material used to wrap the same. If cloth/re-use material is used then how is it washed, dried, and stored, place of drying and storage of the same?

Phase II

FGD with the help of an interview guide took place and included questions related to understanding of menstrual hygiene and experiences and any barriers faced for maintaining hygiene during this time.

Data collection

Phase I: Quantitative study

Schools: For catering females under the age group 15–20 years, two government schools were selected. After obtaining permission from the principal and with the consensus of class teacher, time and date of data collection were planned accordingly. Each interview started with greetings and explained the purpose of the study. Participants were informed about voluntary participation. A health education session was also planned on menstrual hygiene and its significance after collecting the data from the required participants.

House survey: A house-to-house survey was done to cater married females. From each household one female was selected. If there is more than one female, then randomly one was selected preferably above 20 years as below 20 years were recruited from schools.

Phase II: Qualitative study

Females attending health centers, school/college-going girls, and shop owners who were willing to speak on the topic were invited to participate in FGD. FGD was held for a minimum of 45 min, having six to eight participants in each group. In each FGD similar age group and socio-economic status were included, and overall heterogeneous groups of different age group and socio-economic status were included. The investigator (B.S.) acted as the moderator and the co-investigator (M.K.) was the rapporteur. It started with the introduction of all participants and explaining the ground rules followed by opening the topic for group discussion. A discussion was conducted in Hindi (local language). Every effort was made to facilitate the discussion and give voice to everyone, and after getting a similar response to a question, the discussion was smoothly transitioned to another one. In the end, the rapporteur summarized the discussed points and asked for confirmation, clarification, and any leftover points.

Field notes and memos were taken during the discussion. The discussion ended with a thanking note.

Data analysis

The data was entered in an Excel sheet and analysis was done using SPSS free trial version 23 for Windows. While scoring MHM missing values were removed (N = 237), however included in the descriptive part (N = 271). For continuous variable like age, mean with standard deviation was reported. Categorical data like menstrual material used at home, frequency of changing menstrual material used at home, and place of disposal of material at home are presented as proportion.

Females who followed satisfactory menstrual hygiene practices were scored in Table 1. For the qualitative part, data was recorded by using paper and pen/pencil interviewing and audio recording with field notes and memos. Transcripts were written on the same day and later translated into English. Transcripts were read and re-read line by line to generate the codes.

On subsequent FGD further coding and recoding were done to finally arrive at categories and themes, that is, a constant comparison method. Data was analyzed using content analysis. Coding was done by two researchers (B.S. and M.K.) independently and disagreement was resolved by discussion and a third researcher (S.K.). Some verbatim are presented to provide additional insight into the topic and to voice the participants carefully.

Operational Definitions

- Population could be segmented using two broad paradigms: Geographic and Social segmentation (GSS) and the Life-Cycle Segments (LCS).
- The Life cycle segments (LCS): it would involve classifying population segments on along the human lifecycle such as gender, age, and disability and PLHIV.[10,11]
- For study purpose we included Age group Puberty (adolescence): it roughly corresponds to ages of students from junior high school through college. The first half of this period may specifically be called puberty, and the second half adolescence.[12]
- Reproductive age: the time interval from menarche to menopause (in number of years) also called the reproductive age.[12,13]
- Menstruation or menses: It is the natural bodily process of releasing blood and associated matter from the uterus through the vagina as part of the menstrual cycle.[14]
- Menarche: it is the onset of Menstruation, the time when a girl has her first menstrual period.[14]
- Adequate menstrual practices– Menstrual Hygiene Management (MHM) is defined as[15]
- "Women and adolescent girls are using clean menstrual management materials to absorb or collect blood that can be changed in privacy as often as necessary for the duration of the menstruation period, using soap and water for washing the body as required, and having access to facilities to dispose of used menstrual management materials" (JMP 2012).[12-15]
- Women and adolescent girls are using a clean menstrual management material to absorb or collect menstrual blood- clean cloth and sanitary pads (reusable)-washed and dried daily, Disposable sanitary pad, tampons-no reuse
- That can be changed in privacy – latrine, bathroom or separate room as often as necessary for the duration of a menstrual period- at least twice daily.
- Using soap and water for washing the body as required-hand washing most of times before and after changing pads and washing genitals at least once in a day.
- Having access to facilities to dispose of used menstrual management materials- household rubbish, community rubbish, burned(for disposable).[16]
- For clothes satisfactory space for storage like cupboard, toilet or bathroom dried and wrapped in fabric or paper.
- (They understand the basic facts linked to the menstrual cycle

Table 1: Scoring of menstrual hygiene management as per JMP-12

Variables	Categories	Score	Number of participants (%)
Menstrual material (max point -2)	Sanitary pad	2	125 (52.7%)
	Cloth (washed and dry before use)	1	103 (43.5%)
	Else	0	9 (3.8%)
Privacy (max point -2)	Availability of washroom, toilet or another room at home and outside	2	235 (99.2%)
	Not available	0	2 (0.8%)
Frequency of change on heaviest day (max point -2)	More than two times a day	2	97 (40.9%)
Use soap and water for washing hands, (before and after) (max point -2)	Before	1	102 (43%)
	After	1	234 (98.7%)
	None	0	138 (58.3%)
Place of disposal (max point -2)	Community/household bin/burning	2	237 (100%)
	Open field	0	-
Total score		10	
Range 0–10			
Satisfactory menstrual hygiene practices ≥9			
Unsatisfactory menstrual hygiene practices ≤8			

and how to manage it with dignity and without discomfort or fear. This part of definition will not be studied)

Table 2: Characteristics of study participants

Age group (years)	Number of participants *n*=271	Percentages (%)
15-19	96	35.4
20-24	31	11.4
25-29	51	18.8
30-34	27	10.0
35-39	34	12.5
40-44	29	10.7
45-49	2	0.7
NR*	1	0.4
Age (mean±SD)	26.50±8.9 years	
Age at menarche (mean±SD)	13.5±1.4 years	

Table 3: Distribution of participants according to menstrual material used at home and outside home/away from home

Menstrual material used	At home No. of participants *n*=271 (%)	Outside home No. of participants *n*=271 (%)
Disposable sanitary napkins	127 (46.9%)	187 (69%)
Clothes	115 (42.4%)	64 (23.6%)
None	6 (2.2%)	-
NR*	23 (8.5%)	20 (7.4%)
Total	271 (100%)	271 (100%)

NR=not responded. *None category found at home

- Reproductive age: the time interval from menarche to menopause (in number of years)., also called the reproductive age.[16,17]
- Menstrual hygiene materials: are those used to catch menstrual flow, such as cloths, reusable and disposable pads, menstrual cups and tampons.
- Menstrual supplies: these are other supportive items for menstrual hygiene and health more broadly, such as soap, underwear and pain relief.[17]

Privacy and confidentiality

All data collected are kept using codes with password-encrypted files in the computer and will not be shared with any person

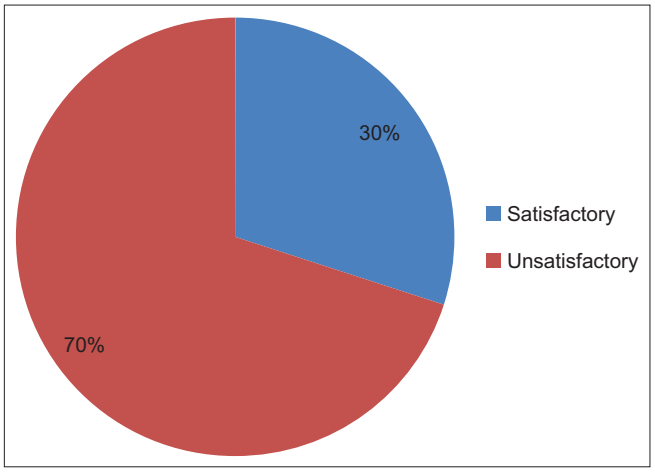

Figure 1: Distribution of participants according to satisfactory and unsatisfactory menstrual hygiene practices

Table 4: Association of socio-demographic variables with menstrual hygiene practices (*n*=237)

	Categories	Menstrual hygiene practices		Total (*n*=237)	*P*
		Satisfactory (*n*=71)	Unsatisfactory (*n*=166)		
Age (years)	15–19	29 (34.5%)	55 (65.47%)	84 (100%)	χ^2=14.34
	20–24	13 (54.1%)	11 (45.83)	24 (100%)	df=4*
	25–29	14 (32.55%)	29 (67.4%)	43 (100%)	*P*=0.0027
	30–34	7 (28%)	18 (72%)	25 (100%)	
	35–39	5 (16.12%)	26 (83.87%)	31 (100%)	
	40–44	3 (10.74%)	25 (89.28%)	28 (100%)	
	45–49	0 (0%)	2 (100%)	2 (100%)	
Socio-economic status	UC	5 (18.51%)	22 (81.48%)	27 (100%)	
	UMC	29 (29.8%)	68 (70.10%)	97 (100%)	χ^2=4.36
	MC	18 (39.13%)	28 (60.86%)	46 (100%)	df=3**
	LMC	15 (26.31%)	42 (73.68%)	57 (100%)	*P*=0.358
	LC	4 (40%)	6 (60%)	10 (100%)	
Education status	Postgraduate	2 (22.2%)	7 (77.7%)	9 (100%)	χ^2=9.14
	Graduate	28 (37.83%)	46 (62.16%)	74 (100%)	df=2***
	Higher secondary	0	3 (3%)	3 (100%)	*P*=0.24
	Secondary	24 (30.76%)	54 (69.23%)	78 (100%)	
	Middle	13 (30.23%)	30 (69.76%)	43 (100%)	
	Primary	3 (15%)	17 (85%)	20 (100%)	
	Illiterate	1 (10%)	9 (90%)	10 (100%)	

*>35 years category was merged together. **LMC and LC merged together. ***Merged categories (Postgraduate + graduate, higher secondary + secondary, middle school and primary + illiterate). Df=degrees of freedom

Table 5: Themes generated during FGD related to menstrual hygiene practices and barriers

Themes	Categories	Meaning condensed unit
Practices followed during menses	Maintain personal hygiene	• Bathing, hand washing, washing heads during menstruation at third day • Use of dettol and antiseptics • Washing of towel • Change of pads • Change of undergarments and bed sheet
	Untouchability	• Refrain from fasting • Visiting temples • Touching of Tulsi plant
	Superstitious practices at menarche	• Shower with holy water • Sprinkle cow's urine • Offer gold ornaments • Welcome the girls by singing songs
	Superstitious practices during menstruation	• Not allowed to eat pickle • Burning of menstrual material to avoid any spirit possession • Refrain from fasting • Bad Omen to visit temples or touch Tulsi plant (holy basil) • Restriction to play or visit ceremonies
Reason for affecting daily activities	Physical problems	• Pain in calve • Cutting pains in back • Sleepiness • Lethargy • Vomiting • Increased frequency of micturition • Acne
	Mental/emotional problems	• Anger • Irritability • Depression/feeling low
	Fear	• Due to poor quality of absorbent used • Concerned about staining of clothes • Not able to take part in sports during menses
Barriers to menstrual hygiene	Economic	• Lack of funds only 2000 Rs monthly income • Loss of wages during menstruation
	Lack of awareness	• Lack of awareness about proper usage of pads • Not aware of subsidized napkins under govt. scheme
	Past experience about sanitary pad	• Experienced rashes and stains when used last time
	Shyness	• Don't go to bathroom often to change the clothes in front of male members
	Privacy	• Early wake up to change and washing of clothes • No private bathroom to wash and dry clothes
	Cultural	• Confinement in secluded place • Restriction to move freely in house • Shift to relative place during menstruation • Move to relative place during menstruation • Leads to lack of access to sanitation and hygiene during menses

not related to the study. Privacy was maintained throughout the interview with participants.

Results

Phase I: Out of 271 participants in the study, 34 (12%) found as missing data [Table 2].

Ninety-six (35.4%) participants belong to the age group of 15–19 years followed by 51 (18.8%) of the participants belonging to the age group between 25 and 29 years and only 2 (0.7%) of the participants lie between age group 45–49 years. The mean age of the participants was 26.5 (8.9) years and the mean age at menarche was 13.5 (1.4) years.

Table 3 indicates that only 127 (46.9%) of the participants used disposable sanitary napkins at home, while 6 (2.2%) of the participants used nothing as an absorbent and 187 (96%) of the participants used sanitary napkins at work or away from home. At home, 115 (42.4%) of the participants used clothes compared to 64 (23.6%) at work or away from home.

Table 4 shows that 54.16% of participants in the age group 20–24 years had satisfactory hygiene practices followed by the

age group 15–19 years (34.5%) and 25–29 years (32.55%). Also, participants in the age group more than 35 years hold significantly lower proportions of satisfactory hygiene practices (13.43%) compared to other age groups.

Among graduates and higher, 30 (36%) of the participants had satisfactory menstrual hygiene practices, followed by secondary and higher secondary (29%).

Only 5 (18.51%) of the participants of upper class were following satisfactory hygiene practices. 39% and 30% of middle class and upper middle class were following satisfactory hygiene practices.

Figure 1 shows that only 70 (29.6%) of the participants were found to adhere to satisfactory MHM practices.

***Phase II*:**

Four FGDs were included with 27 participants; six to eight participants in each group. Each group included seven school girls, six married and seven unmarried females, and seven college-going girls of varying life cycle stages and socio-economic status.

Four FGDs were conducted among six to eight participants each. Three themes evolved from the transcript as *practices related to menstruation, reasons for affecting daily activities during menses, and barriers to menstrual hygiene practices mentioned in Table 5.*

Theme 1: Practices followed during menstrual hygiene

Most of the females were focused on "Cleanliness of body during menstruation" related to clothes, bed sheets, washing head, and changing napkins using antiseptics.

One of females (41 years/F) in FGD 1 told that "साफ सफाई का ध्यान रखना महिना आने पर नहीं तो बीमार हो सकती है I पैंटी बदलती है नाहकार डेटॉल सेधोते है"

"हम अपने कपड़े, तौलिये साफ करते हैं, हम सब धोते हैं ताकि बीमारी न लगे"—FGD 2, 40 years

"अगर हम रोज नहा रहे हों तो कुछ नहीं होता…"—FGD 3, 26 years.

Eng version: "There is need to look after the cleanliness during menses otherwise one get sick hence changing of all intimate wears is must."

"We use to keep our clothes, towels clean so that disease cannot catch us."

Participants quoted various superstitious practices during menarche and menstruation. On menarche, holy water or cow's urine is offered for their purification. This is considered a sign of fertility and gold ornaments too are offered and publicly announced. However, these practices are not followed nowadays.

Participants said that touching pickles and sacred plants like tulsi, and visiting temples were restricted during menses. This period is considered impure to perform any religious activities. ("तीसरे दिन बाल को धोना, तुलसी नहीं पूजा करते, आचार हाथ को नहीं हाथ लगाते

जो बड़े बुजुर्ग बोल दिए वही चला आ रहा है")—P6 (24 years/F) FGD4

Eng. version: "Washing of head at 3rd day of menses, avoid to touch Tulsi sacred plant and pickle"

"Since our ancestral times all practices follows as usual"—P6 (24 years) FGD4.

There is a practice of burning used clothes else would be possessed by Spirits if thrown in open fields. Participants of age more than 30 years who live near Nepali's colony said that during their time they were shifted to a relative's place under secluded confinements. Some school and college-going girls were restricted by mothers to play or avoid visiting the ceremonies at this time.

Theme 2: Reason for affecting daily activities

All participants agreed that menstruation affects their daily routine due to physical and mental/emotional problems. Most of the females suffer from lower back pain, aches, and cramps in the abdomen and calves, increased frequency of micturition, vomiting, and nausea. Girls were worried about the acne. Younger age participants take painkillers and carry on their routine activities. Many of the women who were the sole bread-earners had to work in pain as nobody was present to take over household chores. Very few mentions that their family members take responsibility during painful episodes. ("मेरी सास अच्छी है वो मदद कर देती है और पति भी समझ जाते हैं कमर दर्द देख मेरी हालत" P6 [24 years/F] FGD4).

Eng. version: "My mother in law is and Husband are supportive enough and they help me during menses while I am having backache."

Anger, depression (low mood), and fear of staining were other issues that were taking a toll on their health.

Theme 3: Barriers to menstrual hygiene practices

Participants (34 years) of low socio-economic status and daily wage workers were not able to afford the costs of napkins. ("*Itne paise nhi hote bss 2000 hi pagar hai, fool bechte hai sasur mere isiliye kapda dhokar hi istemaal kar lete*"—(34 years/F).

"*हम घर पर कपड़े और बाहर पैड का इस्तेमाल करते हैं*"—(FGD4 16 years/F).

Eng. version: "*We don't have much income only 2000 Rs & my father in law use to sell florist hence can use only clothes*"

"*We use Sanitary napkin outside & clothes at home…*"—(FGD4 16 years/F).

Some school students were not using napkins at home. They saved them only for schools or outside visits. Few participants were not aware of usage and few didn't know it is provided at an affordable price by some agency/government. One participant had an unpleasant experience

of staining and rashes from the napkins provided by a nongovernmental organization ("*Ek din madam ayethii who dettol ki botal aur pad dekar gayi par hum ko toh kapda hi jachta usse dag lag gaya thaa isily chod dya*" (FGD1, 29 years).

Eng. version: *Once an official health team came here who distribute Dettol bottle and pads but staining started while using those sanitary pads hence we left that product prefer only clothes* (FGD1, 29 years).

"*Hum toh yeh bhi nhin jaante pad kitne kaa aate hai pehle kahan thein yh sab abhi aya*"

"*Kapda hi hmari saas hum aur beti bhi yhi leti*".

Eng. version: "In earlier times there were no products like sanitary napkins just in trend now a days however we all in our family use clothes as a means during menses."

Participants shared they woke up early to wash their clothes to avoid embarrassment from male members of family ("शर्म तो आती है बचे बड़े हैं कहीं उनको पता न चल जाए दाग का डर होता है। कपड़ा कहीं खराब नहीं हो जाएअपना जल्दी उठके सब धोते हैं") (FGD4, 42 years/F).

Eng. version: There is a sense of shame if children get to know about it or if clothes get stained so we used to get up early and wash all the materials spoiled during menses.

One participant (FGD1, 42 years) told that she avoids using bathroom if a male member is present at home.

Females who use clothes are forced to dry stained clothes inside rooms not in open sunlight, to avoid questions from family members. None of them had personal space for washing ("*Jab hum chote thein toh gharwalo ko pata bhi nhi chalta thaa pahado mein sab daal kar chale aatein thein*"—FGD3, 32 years/F) *and* drying clothes or changing menstrual material.

Eng. version: When we were young we used to throw away all the menstrual material used in hills and family members did not get a clue about anything about this phase of menses (FGD3, 32 years/F).

Participants said that confinement to a secluded place or restriction to move freely in the house limits their access to menstrual hygiene products. ("हम अपने रिश्तेदार के घरशर्म महसूस करते हैं jo kaam karna ho aise time par woh bhi hichak lagti karne mein" FGD3, 24 years/F).

Eng. version: "We use to feel shy at our relatives place so all work carried out with sense of hesistation"—FGD3, 24 years/F).

Discussion

The present study reveals that only 30% of the participants practice satisfactory menstrual hygiene practices. Through FGD three main themes derived were practices related to menstruation as maintenance of personal hygiene, reason for affecting daily activities, and barriers faced.

The strength of the study lies in its capability to triangulate both the quantitative and qualitative components to drive all possible sensitive reasons behind menstrual hygiene practices in this rural area among all life stage segments of a female. Most of the studies in the scientific domain were flooded with a plethora of adolescents leaving behind the reproductive age group who face various socio-cultural maladies prevalent in the society related to menses and its practices. Participants belong to the age group between 20 and 24 years, 54.16% of them practice satisfactory menstrual hygiene practices, while in other age groups, lower proportions had unsatisfactory hygiene practices compared to unsatisfactory. This may be attributed to the fact that at an early age during menarche (15–19) years, girls are not aware of the importance of personal hygiene to prevent infection. Usually, in rural areas after 24 years, most of the girls get married, so personal hygiene is neglected as they get busy with household chores. Kumar (2017) reported 81.7% of good menstrual hygiene practices in the urban resettlement colony of Delhi. It may be due to better awareness and efficient implementation of menstrual hygiene schemes in resettlement colonies by the local administration and other significant factors such as education and socio-economic status which are neglected in rural areas. The components which are used by the investigator for adequate menstrual hygiene were adequate soaked material, satisfactory storage, adequate frequency of change of menstrual material, and satisfactory disposal of menstrual material; these are similar to our study for assessment of menstrual hygiene where 69% of females were using a sanitary napkin on regular basis. Singh Amarjeet and Bhattacharya Sudeep (2016) showed that 80% of women were aware of sanitary napkins; however, only 30% were using them. Santara (2017) reported that 65% were using sanitary napkins and 30% were clothes users, and this variation can be attributed to urban settings, better awareness about schemes most significantly due to better awareness, and understanding of basic sanitation and hygiene practices like hand washing, cleanliness, etc., since childhood imparted to adolescence in those areas.

Approximately, 30% of the participants with graduation or higher degrees found with satisfactory menstrual hygiene practices. It is due to the fact that adequate education standards and hence knowledge and awareness about menstrual hygiene practices among graduate or postgraduate females were present.

Through FGD main themes derived were various practices related to menstruation as maintenance of personal hygiene, untouchability, superstitious, physical and mental problems that arise during menses, and barriers faced (cultural, economic, privacy concerns, and shyness). Untouchability is also noticed in their practices during menarche as they tend to shift their daughters to relatives' home for 5 to 7 days and refrain from all religious activities such as visiting temples, fasting, touching, and offering prayers to sacred Tulsi plant as in Hindus. Superstitions too were reflected in activities such as burning menstrual material out of the faith that it would prevent possession by spirits rather than thrown in a dustbin

or community bins. Unfortunately, considering females impure during menses, hence sprinkling holy water and cow's urine, offering gold ornament to a girl experiencing her menarche to purify her body, and eventually isolate her from the rest of housing activities were practiced. In studies conducted by Sapokta and Sharma[18], Balaji Arumungam,[19] and Balodi[20], more or less similar socio-cultural practices were reported. These practices were more prevalent in rural rather than urban areas. Paul *et al*. in India and Oche study of Nigeria among adolescents showed that talks on menstrual hygiene were also not very comfortable. There were restrictions like avoiding certain foods, celebrations, and prayers during menses.

Superstitious belief was considered an element of evil's eye, and black magic sort of things aligning with the study of Singh Amarjeet and Bhattacharya Sudeep (2016); hence avoiding disposing of in a community bin instead of burning was a preferred method. Economic concerns like affordability and loss of wages were mainly identified as barriers to MHM. For privacy and shyness concerns, females were not able to discuss menses-related issues such as pain and discomfort concerns regarding disposal of material. Many were not aware of the subsidized pads whereas Amarjeet (2016)[21] highlighted irregular supply and inadequate disposal mechanism. Females, fear of staining, and anxiety about male members while carrying out the whole process were consistent with other studies (Das *et al*. of Tripura 2019).[22] This high burden of cultural silence, also quoted in the analysis by Mueller,[23] contributes to the unmet needs of adolescents and women in a country, particularly in marginalized sections

Limitation

- Due to feasibility, participants aged 15–19 years were selected from schools and colleges. So this may not be representative as few may be school dropouts.
- Also, percentage of this age group is larger than the national average, so the findings may not be the representation of WRA in India. We calculated the weighted mean by standardizing as per the national distribution of WRA, which comes out to be 26.3% lower than the calculated mean.
- A further study with a larger sample size with proportionate sampling as per the national average is needed to find the actual prevalence of MHM. However, this finding is true to the study population and accordingly, we recommend an emphasis on menstrual hygiene schemes in India.
- Sample size may not be adequate for the study as there is wide variation between the prevalence of adequate MHM in Kumar *et al*. (81%) from which sample size was calculated in comparison to our study (30%).
- Social desirability bias may be present.
- Further research should be done with a larger sample size as the findings of the study imply only significant association with few socio-demographic factors. Hence to have broader perspectives on other factors, there is a need to enhance the understanding of other dimensions or factors contributing to low satisfactory menstrual hygiene practices in rural areas.

Conclusion

The prevalence of satisfactory menstrual hygiene practices was only 30% which is a matter of concern, either lack of implementation of government schemes or myths found in the community related to menstruation are deeply rooted and unaddressed so long. Among participants in the age group between 20 and 24 years, 54.16% had satisfactory menstrual hygiene practices, while in other age groups, higher proportions had unsatisfactory menstrual hygiene practices.

Recommendation: There is a need to change the behavior and understanding towards menses and its related practices. It will require positive commitments and collaborations along with community involvement at large. All significant stakeholders need to accomplish the very purpose of the National Menstrual Hygiene Scheme under the "Rashtriya Kishor Swasthya Karyakram" program in 2014.

Abbreviations

HPO	Hypothalamus-pituitary ovarian axis
MHM	Menstrual hygiene management
STI	Sexually transmitted infections
FGD	Focus group discussion

Ethical approval and consent to participate

Ethical approval from Institutional Ethics Committee, AIIMS Rishikesh/IEC/22/58 was sought before the conduct of the study. Written consent from the participants was obtained after informing them about the purpose of the study; voluntary participation; and no harm to the participant. All methods were performed in accordance with the relevant guidelines and regulations. To protect the confidentiality of participants, no names or positions have been reported in the manuscript.

Availability of data and materials

Data supporting the findings are presented in the manuscript. The complete data set is not publicly available since participants did not give consent for the public sharing of their information. However, summaries of the information and interview guides of participants are available from the corresponding author on reasonable request.

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Author's contribution

B.S., M.K., P.K., and S.K. conceptualized the study, contributed to study design, data collection, data analysis, and data interpretation, and drafted the manuscript. All authors reviewed and approved the final manuscript to be published.

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Conflicts of interest

There are no conflicts of interest.

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