



ISSN Print: 2394-7500  
ISSN Online: 2394-5869  
Impact Factor: 8.4  
IJAR 2021; 7(10):267-270  
[www.allresearchjournal.com](http://www.allresearchjournal.com)  
Received: 14-08-2021  
Accepted: 21-09-20221

**Dr. Nasra Shabnam**  
Associate Professor,  
Department of Adult and  
Continuing Education and  
Extension, Faculty of Social  
Science, Jamia Millia Islamia,  
New Delhi, India

**Astha Gupta**  
Ph.D. Research Scholar,  
Department of Adult and  
continuing Education and  
Extension, Faculty of Social  
Science, Jamia Millia Islamia,  
New Delhi, India

## A systematic review of adolescent girls' management of menstrual hygiene in Indian schools

**Dr. Nasra Shabnam and Astha Gupta**

### Abstract

This systematic review aims to comprehend the finding of existing researches showing adolescent girls' understanding followed in maintaining menstrual hygiene at school, common restriction faced specially in education and school absenteeism due to menstrual period. A systematic search of peer-reviewed literature published between 2010 to 2021 was conducted following PRISMA-P guidelines. Total 45 research studies were included from India. Sanitary napkin was found most commonly used absorbent. Availability of menstrual material at schools is directly related to the usage of the napkins in school time. Embarrassment and privacy were direct results of being seen disposing or washing menstrual materials, and often lead to hiding of materials, and secretive behaviour. To avoid embarrassment girls brought their absorbent waste back to home. Restriction in attending schools is found in very low percentage. Adolescent girls missed their school for initial 1-2 days of periods due to stress of getting stain, pain discomfort, tiredness.

**Keywords:** Menstruation, school, adolescent girls, India, girl friendly toilet

### Introduction

According to UNICEF, every month 1.8 billion people across the world menstruate. When a girl starts menstruate at certain age, this phase of life is called as menarche. Menarche is an important biological milestone in a woman's life as it marks the onset of the reproductive phase of her life. The average age at menarche is mostly consistent across the populations that is, between 12 and 13 years of age (Arora A. *et al.*, (2013)) [2]. Also, this age period between childhood and adulthood is called adolescent period which is thought to be a period of transition as every child faces a lot of physical, social and psychological changes in their lives. Especially girls, menarche brings new phase of life, brings new challenges and vulnerabilities. Menstruation or period is among one of these challenges and it is normal vaginal bleeding that occurs as part of a woman's monthly cycle. For managing this every woman or girl needs some kind of absorbent to handle bleeding so that they can move freely from one place to another. Besides, proper hygiene is also desired to be maintained for good health during this time period.

According to WHO 2014 'Women and adolescent girls using a clean menstrual management material 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' is Menstrual Hygiene Management (MHM). This management not only include the physical facilities for maintaining cleanliness but societal mind set and psyche of the menstruation also included. In the beginning phase, adolescents' girls face many challenges like menstrual waste handling, material used during periods, health problems, privacy issues, social taboo of discrimination from normal life. All these things are new to them and they puzzled and roaming around curelessly at school and at home.

Cultural Beliefs and Restrictions during menstruation become an add-on challenge in existing condition of girls. Many girls are not able to attend school regularly and even dropped out from formal education system due to lacking hygiene management facilities at school and social taboos. Study has presented some evidence, though self-reported, that when girls have access to safe and clean toilets and water at school, they are somewhat less likely to miss school during their menstrual cycle each month.

**Corresponding Author:**  
**Dr. Nasra Shabnam**  
Associate Professor,  
Department of Adult and  
Continuing Education and  
Extension, Faculty of Social  
Science, Jamia Millia Islamia,  
New Delhi, India

A 2014 report by the 'NGO Dasra' titled Spot On! Found that nearly 23 million girls drop out of school annually due to lack of proper MHM facilities, which include availability of sanitary napkins and logical awareness of menstruation.

Indian government has modified guidelines to tackle these lacking facilities. As per revised guidelines For Sustaining Water, Sanitation and Hygiene in Schools issued by government of India for Swachhata Action Plan in 2021, Schools should have a few of the specific provisions to ensure menstrual hygiene which includes access to menstrual products (sanitary pads), toilet complex with a rack for keeping sanitary pads, hooks on the wall, a covered foot operated dust bin, nearby water and soap for hand hygiene, facility for safe disposal of used sanitary pads like incinerators (electric or manual), deep pit burial arrangement (especially in upper primary and higher-level schools).

Numerous studies have been carried out in India to examine the status of menstrual hygiene management at schools, issues with Menstrual Hygiene (MH) that teenage girls confront at school, those students' knowledge, attitudes, and practises about MH, and the connection between MHM and academic achievement. This study looked at every article published between 2010 and 2021 to assess the prevalence of MHM among teenage girls attending school and determine how to better implement government programmes on MH. Policymakers will use the findings as a guide to develop better implementation strategies.

The current study aims to comprehend the trends of existing research shows, attitude, and behaviour of adolescent females towards MHM in schools. The quality of menstrual hygiene and management services at schools in various rural and urban locations has been addressed in recent years by a number of national policies and programmes. To address this, we carried out an in-depth analysis of the peer-reviewed literature that is currently available on menstrual hygiene management in schools to ascertain: 1. to what extent are schoolgirls aware of proper menstruation hygiene? 2. What practices do schoolgirls follow when they are having their periods at school? 3. What kind of educational limitations do they confront in their family? 4. How is the school managing menstrual hygiene in terms of creating a girl-friendly environment? 5. Does menstrual hygiene management at school have any effect on girls' absences from class, drop-out rates, or poor academic performance?

## Method

The Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) 2019 guidelines were adopted throughout this review to provide a robust and comprehensive framework of a systematic review.

## Eligibility criteria

A systematic search of peer-reviewed literature was conducted according to the PRISMA-P guidelines and included documents published from 2010 to 2021, to ensure

that findings were relevant to knowledge, attitude and practice of MHM among adolescent girls at any educational institute. Open access research articles, project reports, government reports related to the MHM are catered and studied. All collected content is open access and in English language only.

Studies having only adolescent girls' populations were included with community intervention and studies where MHM was the main topic. Surveys, personal interviews were extracted from studies. Studies held at educational institutes like school in rural as well as urban settings in India to know MHM were covered in the review process.

## Information sources & search strategy

For searching the research articles and reports, electronic databases like Scopus, JSTOR, Tylor and Francis, Pro Quest, Elsevier and Google scholar were referred. Only database researches were referred in this research review activity while searching from these databases, Adolescent girls OR Menstrual hygiene OR Menstrual hygiene management OR India OR school OR girl friendly toilets OR Menstruation OR Sanitation were the keywords which were used. Gray literature was obtained from project reports of NGOs working on MHM, annual reports, scheme records from Ministry of women and child development websites. Last date of search was 25th April, 2022.

Besides, awareness about menstrual hygiene among school going girls, knowledge, attitude and practice related to menstrual hygiene among school going girls, relation of girls' educational performance with menstrual hygiene management at school, girls' absenteeism during menstrual period, status of girl friendly toilet at school, role of teachers in managing menstruation among girls at school were the sentences used while searching on these electronic databases.

This yielded the following results for initial screening: Elsevier (1440), Scopus (507), Pro Quest Dissertations and theses (430), JSTOR (95), Google Scholar (4813) and Taylor & Francis (479).

After removing duplicates, titles and/or abstracts of 2169 publications were screened. From which 1757 publications were excluded as study place was not in India and important research information is not covered in desired way. After filtering full text open access report, we were able to access 363 reports.

51 publications were screened against Reason 1 (Age Group Adolescent Girls (11-18 years), followed by 52 publications against Reason 2 (Research area is Out of School). And by 13 publications against Reason 3 (Primarily about menstruation or sexual and reproductive health).

This led to the inclusion of 97 publications (45 studies) (Table 1 provides a summary of the included studies). Grey literature was not searched as the themes which arose from the peer-reviewed publications reached saturation. For more details please refer supplementary file named 'combined research data'.

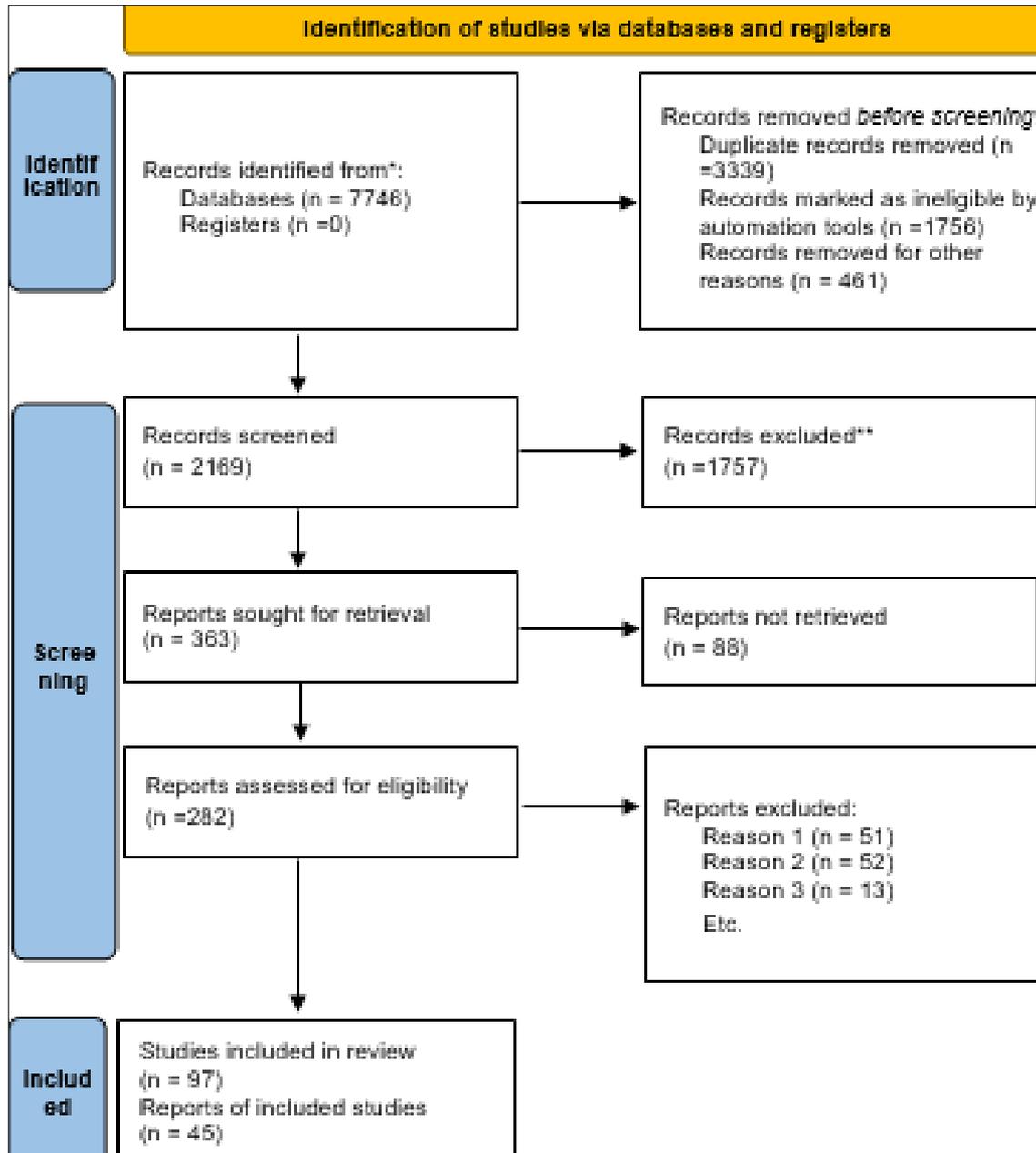


Fig 1: Prisma

\*Consider, if feasible to do so, reporting the number of records identified from each database or register searched (rather than the total number across all databases/registers).

\*\*If automation tools were used, indicate how many records were excluded by a human and how many were excluded by automation tools.

# Page, McKenzie *et al.* (2021) [32]

### Study Quality

Quality assessment of the research articles have been done by Ad Hoc Quality Assessment Methods (48). All researches were evaluated by investigator on the basis of seven criteria's: 1. Sample size calculation, 2. randomness of sample, 3. Predefined inclusion and exclusion criteria, 4. Loss to enrolment of incomplete data described, 5. Completeness of outcome data for the number which was presented, 6. Presence of participant characteristics (Age, sex, education etc.) and 7. Multivariate analysis for the outcome of the paper. The answers were in Yes and No. Answer yes was given 1 point and Answer No was given 0

Point. Total 7 points scale was prepared. Article scoring above 4 points were included in the present investigation. Out of 45 articles, 7 scored 7, 4 scored 6, 14 scored 5 and 20 scored 4 points. Supplementary file is attached with the article named 'Quality Assessment of Research Articles'.

### Data Synthesis

After quality assessment of the researches, data was synthesized on the basis of type of document, year of publication, Study design, Study area type, State in which study is doing, Method of data collection and Sample size. Almost all researches are articles (97.7%) and one is review report. 57.7% of the research articles were published in the period of 2018-2021 followed by 31.1% in period of 2014-17 and 11.1% in the period of 2010-13.

Most of studies are cross-sectional studies (73.3%) followed by 2 studies in each category of Descriptive study and Educational Invention Study. Besides, Other category include Ethnographic study, Formative study, Mixed Method study, Case Comparison, review report, Pre and

Post Comparative study and exploratory study. Maximum 62.2 percent studies were held at urban areas and 22.2 percent were held at rural areas followed by rural and urban both and slums. In 44.4% studies questionnaire was directly administered to respondents. In 15 studies (33%) data was collected by personal interview method. The other methods are survey (17.7%) and case study (4.6%). The range of sample size is 10-3500 and the median of the sample size is 384.

**Table 1:** Data Synthesis of Studies Collected

Variable	Value	Number (%) N = 45
Type of document	Article	44 (97.7%)
	Review Report	1 (2.3%)
Year of Publication	2010-2013	5 (11.1%)
	2014-2017	14 (31.1%)
	2018-2021	26 (57.7%)
Study Design	Cross-Sectional Study	31 (68.8%)
	Descriptive Study	2 (4.6%)
	Educational Intervention Study	4 (8.8%)
	Others	8 (17.7%)
Study Area type	Rural	10 (22.2%)
	Urban	28 (62.2%)
	Rural and urban both	5 (11.1%)
	Urban Slum	2 (4.4%)
Method of Data Collection	Survey	8 (17.7%)
	Personal Interview	15 (33.33%)
	Case Study	2 (4.6%)
	Questionnaire	20 (44.4%)
Sample Size	0-500	30 (66.6%)
	500-1000	2 (4.4%)
	1000-1500	1 (2.3%)
	1500-2000	2 (4.4%)
	2000-2500	1 (2.3%)
	2500-3000	1 (2.3%)
	3000-3500	3 (6.6%)

## Result

### Awareness about Menstrual Cycle

More than 50 percent of Adolescent girls are aware about menstrual cycle before menarche in 14 studies (4, 17, 19, 21, 25, 27, 30, 31, 33, 36, 38, 39, 43, 52) followed by less than 50% in 15 studies (2, 5, 8, 22, 25, 26, 27, 29, 30, 38, 42, 46, 47, 50, 51). Also, Girls are aware about the physiology of menstruation. 11 studies have shown that maximum girls are aware that source of blood during menstrual period is Uterus (6, 18, 22, 23, 30, 31, 33, 38, 39, 42, 47) followed by maximum girls are not Known about the source of bleeding (19, 24, 25, 27, 28, 38) and one of the studies heighted maximum girls know that it is from stomach (12). In Most of the studies the source of information about menstruation is mother (5, 8, 17, 18, 19, 21, 25, 27, 39, 47, 52) followed teacher (27, 38), sibling (22) and friends (2).

### Types of absorbent used

Maximum studies (22) have shown that more than 50 percent of the respondent use Sanitary napkins (2, 4, 8, 9, 10, 12, 17, 18, 19, 21, 23, 24, 26, 27, 28, 29, 31, 33, 34, 37, 38, 36, 39, 42, 50) and only 5 studies have highlighted usage of sanitary napkins less than 50% (4, 22, 30, 43, 47). The use of old cloth as absorbent is found 15 studies where 11 have shown the usage of old cloth is less than 50 percent (4, 9, 10, 17, 21, 27, 28, 29, 30, 31, 42, 47) and more than 50 percent in 4 studies (22,43, 47, 52). Other than that tampon

is the material used among adolescent girls to managing their menstrual period (20).

Adolescent girls who use cloths reuse cloth after washing them with soap and water (4, 8, 21, 29, 30, 42, 43, 50). It is found that girls wash and dry the cloth in dark room (21, 29, 30, 43, 50) or wash and dry in sunlight (4, 42). Girl using sanitary napkins has followed a healthy habit of changing absorbent 2-3 times in a day (4, 5, 17, 18, 23, 26, 37, 39, 40)

### Disposal of absorbent waste during school hours

For maintaining hygiene and good health, one must change absorbents within 5-6 hours during their menstrual period. An adolescent girl has to change her absorbent material once in a while in long school hours. If they are not able to change the absorbent, they could miss their school which effect their performance. Girls practice different medium to dispose the waste at school (14, 18, 20, 23, 26, 38, 39, 43, 49). Most of the school going girls dispose properly in dustbins (14, 23, 26, 39, 43, 49), wrap in newspaper, keep it in their bags and dispose after school (20, 39, 49), flush in toilet (23), burned the used through incinerator or any other medium (18, 38, 39, 49), store in toilet unattended (18, 49).

### Restriction during menstrual period

Social Taboos due to Menstrual period are followed in Indian scenario. There are some restrictions which a girl should follow while having their period. These restriction ranges from attending religious activities play outdoor, eating sour food, cooking at home and sleeping separately. 11 studies have shown that girls face a kind of restriction in their period in which attending to school is one of the major categories (1, 21, 23, 27, 31, 33, 40, 42, 45, 47, 52). However, the percentage of response lies between range of 5.5 to 86 percent. Other restrictions include religious activity involvement (1, 9, 21, 31, 33, 45, 47, 52), sleep separately (5, 23, 27, 29, 38, 47) cooking in kitchen (30), Household activities (27, 47) and engagement in sports activities (12). Maximum researches show that restriction in religious activities (80%) is scoring the highest in their studies.

### School absenteeism

It was found in 27 studies that girls missed their school during the time of menstrual period (1, 5, 6, 7, 8, 9, 12, 14, 16, 17, 20, 21, 23, 27, 30, 31, 33, 36, 37, 38, 39, 42, 44, 45, 46, 47, 49, 51). Most of the girls missed their school for one or two days (5, 7, 12, 14, 46). The reasons stated are fear of stains on clothes (5, 7, 14, 17, 26, 29, 36, 49), feeling tired (9, 12, 39), abdominal pains (5, 8, 9, 7, 14, 17, 21, 29, 39, 44, 49, 51), heavy bleeding (51), lack for separate sanitary latrine (17, 37, 49), non-availability of dustbin at toilet (37), inadequate water supply (37). The most stated reason was abdominal pain held during menstrual period for adolescent girls' absenteeism from the school.

### Menstrual hygiene management at schools

Girls who miss their schools due to improper menstrual hygiene management stated few reasons related to privacy, availability of absorbent, cleanliness material (Soap, water etc.) and disposal facilities (9, 12, 17, 20, 29, 36, 39, 37, 49). The percentage of girls who miss school due to this is range from 5-50 percent. The median of the percentage is 10.1%. At schools, there is no private place or lacking toilet facility or common toilet for girls and boys for changing the

absorbent during the school time (12, 17, 20, 29, 37, 39, 49). Availability of absorbents like sanitary napkins and/or clothes are difficult to find in case of changing absorbents at school (20, 36, 37). With this Cleanliness facilities like availability of water, soap, etc. were also lacking at some schools (9, 20, 49). Lack of disposal facilities at school is one of the major reasons for avoiding changing absorbents during school hours (9, 20, 36, 37).

In contradiction, Girls have no problem with available sanitation facilities at school for handling menstrual period and there are proper menstrual hygiene management facilities in their school. (9, 14, 26, 49).

### Discussion

On the basis of review process, it was found that almost half of the girls start their menstrual period without any awareness about it. It may create a kind of anxiety and stress among these adolescent girls. In school, they feel shy in sharing their discomfort having their first period with their teachers, friends. They feel unhygienic and uncomfortable in attending school (22, 30, 52). Mothers are most common source of information about menstrual phenomenon. All depends on knowledge and practices followed by the mother as it also followed by daughter in near future (21). Maximum adolescent girls aware that menstrual blood comes from uterus but still there is a significant number who are not aware from where it's come from. Some still believes that it is a curse of result of their sins, it must be private thing (30, 42, 47).

Sanitary napkins were more commonly used absorbent among adolescent girls in urban areas. More than half of the girls were using sanitary napkins with health habit of changing sanitary pad 2-3 times in a day. Availability of pad at schools is directly relate3d to the usage of the napkins in school time. However, girls still using old cloth as absorbent material in higher percentage mostly found in rural settings (12, 22, 28, 29, 40, 51). Those who use cloth generally reuse it by washing it with soap and water and dry it in their personal space due to, embarrassment of having period and privacy issue. Few of them make cloth dry in open sunny areas. These practices may lead to health and hygiene issues of girls. This behaviour can be harmful, as if menstruators hide materials when drying them (like under beds or other clothes), they may not be properly dried, and it is possible to contract infections and skin irritation. Menstruates were often aware of the dangers of incomplete drying of reusable products but felt they have no other alternative due to the stigma surrounding exposing menstrual status,

Embarrassment and privacy were direct results of being seen disposing or washing menstrual materials, and often lead to hiding of materials, and secretive behaviours. This worry was usually related to having ones' menstrual status exposed (meaning those around the menstruating individual are aware that they are currently experiencing their period). To avoid embarrassment girls brought their absorbent waste back to home by keeping waste in their school bag. This is very harmful and unhygienic practice which may lead to health hazards.

In the span of 10 years researches have shown that adolescent girls still face some kind of restriction while having menstrual periods throughout urban and rural setting. There is no effect of education or school system on social restriction like visits to religious places, movements in house, involvement in household activities, sleeping in

separate room. Restriction in attending schools is found but in very low percentage. School education did not get affected due to these social restrictions.

Adolescent girls missed their school for initial 1-2 days of periods The Most frequently stated reasons are stress of getting stain, pain discomfort, tiredness. These all are related to physical discomfort faced by adolescent girls in their early period after Menarche. Improper toilet facilities, disposal facilities are less stated reasons with very low percentage. Physical facilities were not affected girls' absenteeism. But physical discomfort directly associated with menstrual period were found as the reason to miss the school.

There is a visible impact of health education on awareness and practice of adolescent girl regarding menstrual hygiene management (2, 6, 34, 43). If there would a compulsory education program at school for menstrual hygiene management, there would be change in awareness level, attitude and practices followed by these teenagers and school absenteeism could be minimize and girls who dropped their education in mid-way due to menstrual period may stop.

### Limitations

In the study, adolescent girls' knowledge, practises of menstrual hygiene at school were examined in the context of the entire country. There have been efforts made to include all 29 states and 11 Union territories in the review process. However, a search across several platforms turned up 45 studies. These were primarily found in India's southern area. There were very few researches in the Eastern and Western regions. Additionally, this review process does not include any studies conducted in tribal settings. The study is not typical of data from the entire country because there is a shortage of data from all regions. There is potential for involvement in the states that were left behind, particularly in the tribal areas where there aren't as many MHM facilities.

One aspect of the review process involves school absences. There were few studies found. Various studies have looked into the behaviour patterns of adolescent girls who attend school while they miss class during menstrual period. The association between school infrastructure and school absenteeism needs to be studied individually. Menstruation-related absences from school were frequently ill-defined. It is necessary to analyse in depth the quality of information on how girls react to menarche or how they maintain hygiene during their periods, the frequency of changing menstruation products, and the challenges females encounter in the classroom.

### Conclusion

Through this review process, it was determined that menstruation is not a physical inconvenience for school-going adolescent girls, but rather a social taboo. They are accustomed to dealing with the physiology of menstruation, but the social anxiety and societal constraints are more difficult issues. Adolescent females gain confidence and progress toward a proper course of action for handling the situation thanks to health education. Menstruation-related absences from school were not well defined, and far more research and investigation have to be done to comprehend the situation. The behaviour of these school-going girls will

undoubtedly be impacted by the girl-friendly educational atmosphere.

Additionally, it was discovered that adolescents' awareness levels were average. Some of them lack basic information of Menarche, menstruation physiology, the various types of absorbents that are available, and the proper way to dispose of period waste. It must be improved upon in order to transform into the best area of work. There are various ways to raise awareness of it, including discussions, awareness seminars, and training. This review process shows that these studies can provide knowledge that is beneficial for developing MHM packages that support girls' menstrual requirements; they emphasise the need for raising awareness, expanding life skills training, improving WASH facilities, and encouraging better health practices.

#### Declaration of conflicting interests

The authors declared no potential conflicts of interest with respect to the research, authorship and/or publication of this article.

#### Funding

The authors received no financial support for the research, authorship and/or publication of this article.

#### Reference

- Ahuja VK, Patnaik S, Kaur M. Menstrual hygiene-adolescent girls' concerns. *National Journal of Community Medicine*. 2018;9(2):135-140.
- Arora A, Mittal A, Pathania D, Singh J, Mehta C, Bunger R. Impact of health education on knowledge and practices about menstruation among adolescent school girls of rural part of district Ambala, Haryana. *Indian Journal Community Health*. 2013;25(4):492-497.
- Baggam A, Kulkarni S. Age at menarche and secular trend in Maharashtrian (Indian) girls. *Acta Biologica Szegediensis*. 2000;44(1-4):53-57.
- Balat MS, Sahu SK, Patel M. Assessment of knowledge and practice of menstrual hygiene management among adolescent school girls in Ahmedabad City: *National Journal of Community Medicine*. 2019;10(1):30-34.
- Bali S, Sembiah S, Yadav K, Burman J. Poor management of menstrual hygiene: a leading cause of school absenteeism among adolescent girls in urban slum of Madhya Pradesh. *International Journal of Reproduction, Contraception, Obstetrics and Gynecology*. 2020;9(10):4102-4108.
- Bhudhagaonkar J, Shinde M. Impact of structured education regarding menstrual hygiene practices among adolescent girls. *International Journal of Science and Research (IJSR)*. 2014;3(5):244-252.
- Bodat S, Ghate MM, Majumdar JR. School absenteeism during menstruation among rural adolescent girls in Pune. *National Journal of Community Medicine*. 2013;4(2):212-216.
- Chajhlana SPS, Amaravadhi SR, Mazodi SD, Kolusu VS. Determinants of menstrual hygiene among school going girls in urban areas of Hyderabad. *International Journal of Community Medicine*. 2019;6(5):2211-2215.
- Chauhan P, Shaik RA, Anusha DVB, Sotala M. A study to assess knowledge, attitude and practices related to Menstrual hygiene among school-going adolescent girls in a rural area of South India. *International Journal of Medical Science and Public Health*. 2019;8(2):114-119.
- Chothe V, Khuchandani J, Seabert D, Asalkar M, Rakshe S, Firke A, *et al.* Students perceptions and doubts about menstruation in developing countries: a case study from India. *Health Promotion Practice*. 2014;15(3):319-326.
- Diaz A, Laufer MR, Breech LL. Menstruation in girls and adolescents: using the menstrual cycle as a vital sign. *Paediatrics*. 2006;118(5):2245-2250.
- Dharana A, Kale S, Mayappanavar R. A study of knowledge, attitude, practice of menstrual hygiene and its waste disposal management among adolescent school girls of Gadag District of Karnataka. *International Journal of Reproduction, Contraception, Obstetrics and Gynaecology*. 2019;8(11):4219-4223.
- Freeman MC, Clasen T. Assessing the impact of a school-based safe water intervention on household adoption of point-of-use water treatment practices in Southern India. *American Journal of Tropical Medicine and Hygiene*. 2011;84(3):370-8. DOI:10.4269/ajtmh.2011.10-0361. PMID: 21363972; PMCID: PMC3042810
- Garg S, Singh MM, Marimuthu Y, Borle A, Bhatnagar N, Basu S. School absenteeism during menstruation among adolescent girls in resettlement colonies of Delhi: a community-based cross-sectional study. *Indian Journal of Community Health*. 2021;33(1):82-89.
- Gour BP. A study of girls' school dropout in rural Gujarat. *International Journal of Scientific Research*. 2016;5(5):75-76.
- Gold-Watts A, Hovdenak M, Daniel M, Gandhimathi S, Sudha R, Bastien S. A qualitative study of adolescent girls' experiences of menarche and menstruation in rural Tamil Nadu, India. *International Journal of Qualitative Studies on Health and Well-being*. 2020;15(1):1845924. DOI:10.1080/17482631.2020.1845924. PMID: 33203319; PMCID: PMC7682741
- Kalyani S, Bicholkar A, Cacodcar JA. A study of knowledge, attitude and practices regarding menstrual health among adolescent girls in North Goa. *Epidemiology International*. 2019;4(1):1-5.
- Kailasraj KH, Basavaraju V, Kumar J, Manjunatha S. A study of knowledge and practice of menstrual hygiene among adolescent school girls in rural and urban field practice area of Raja Rajeswari Medical College and Hospital, Bangalore. *International Journal of Community Medicine and Public Health*. 2020;7(2):665-672.
- Kanchan C, Prasad VSV. Menstrual hygiene and practice among adolescent school girls. *Panacea Journal of Medical Sciences*. 2016;6(1):31-33.
- Khakhalary D, Jayalakshmi M. A descriptive study to assess the challenges faced in adhering to menstrual hygiene management practices by adolescent girls in selected rural schools of Goal Para district, Assam. *International Journal of Applied Research*. 2021;8(3):379-383.
- Khatun S, Mallik S, Roy SK, Biswas S, Bhattacharya N. A descriptive study to assess the knowledge and practice regarding menstrual hygiene among adolescent girls in a government school in Birbhum district, West Bengal. *International Journal of Research and Review*. 2020;7(2):294-302.

22. Kumar AS, Bandhani A, Malik N. Knowledge, attitude and practice about menstruation among adolescent female in Uttarakhand. *Panacea Journal of Medical Sciences*. 2013;3(2):19-23.
23. Logeswari K, Parmar J, Suryawanshi DM. Cultural barriers for menstrual hygiene management among adolescent school girls of Southern India. *International Journal of Community Medicine and Public Health*. 2021;8(4):1868-1876.
24. Mahajan A, Kaushal K. A descriptive study to assess the knowledge and practice regarding menstrual hygiene among adolescent girls of Government School of Shimla, Himachal Pradesh. *CHRISMED Journal of Health and Research*. 2017;4:99-103.
25. Malhotra A, Srinivas G, Coates S, Mosquera-Vasques M. Factors associated with knowledge, attitude and hygiene practice during menstruation among adolescents girls in Uttar Pradesh. *Waterlines*. 2016;35(3):275-305.
26. Madhumita M, Maiya RG, Akram W, Jain T. Knowledge, attitude and practice of Menstrual hygiene among school going girls in Thirumazhisai, Tamil Nādu. *PARIPEX- Indian Journal of Research*. 2019;8(11):112-114.
27. Mathiyalagen P, Peramasamy B, Vasudevan K, Basu M, Cherian J, Sundar B. A descriptive cross-sectional study on menstrual hygiene and perceived reproductive morbidity among adolescent girls in a union territory. *Journal of Family Medicine and Primary Care*. 2017;6:360-365.
28. Mitra A, Mahajan RG, Rangoonwala A, Kadri AM, Amin C, Gajera K. Awareness and practices on menstrual hygiene amongst adolescent girls in Rajkot District of Gujarat. *Health line Journal*. 2015;6(2):61-67.
29. Mokhasi VR, Mahesh V, Manjunath T, Muninarayana C, Latha K, Ravishankar S. A comparative cross-sectional study of knowledge and practice of menstrual hygiene among adolescents girls in rural and urban schools of rural Karnataka. *Indian Journal of Forensic Community Medicine*. 2016;3(3):163-167.
30. Mohapatra I, Samantaray SR, Vivekanand A, Soujanya B. Awareness of Menstrual Hygiene: Assessment of Knowledge and practice of menstrual hygiene among adolescent college going girls of Nagunoor, Karimnagar. *Perspectives in Medical Research*. 2019;7(3):22-29.
31. Nagoor K, Babu S, Raziya D. Assessment of knowledge, attitude, and practices (KAP) on menstrual hygiene among adolescent girls residing in government social welfare hostels. *D Y Patil Journal of Health Science*. 2021;9:46-50.
32. Page MJ, McKenzie JE, Bossuyt PM, Boutron I, Hoffmann TC, Mulrow CD, *et al*. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. *BMJ*. 2021;2021;372:n71. DOI: 10.1136/bmj.n71
33. Pandit D, Bhattacharyya PK, Bhattacharya R. Menstrual hygiene: knowledge and practice among adolescents school girls in rural areas of West Bengal. *Journal of Dental and Medical Sciences (IOSR-JDMS)*. 2014;13(6):19-24.
34. Parameswari PJ, Udayshankar PM, Cynthia S, Vidhyashree MD, Abiselvi A, Sultan SI. A school survey to access menstrual hygiene practices among teenage girls in Chennai, India. *Middle-East Journal of Scientific Research*. 2014;21(9):1448-1453.
35. Phillips PA, Laserson KF, Muhtusamy S, Thakur H, Thakkar MB. Review of menstrual hygiene management in schools in India- final report; c2016. <http://www.wins4girls.org/resources/2017%20India%20MHM%20Final%20Report.pdf>
36. Pradhan S, Kar K, Samal BP, Pradhan J. Assessment of knowledge and practice of menstrual hygiene among school going adolescent girls in an urban area of Odisha: a cross sectional study. *International Journal of Community Medicine and Public Health*. 2019;6:3979-83.
37. Pratibha S, Nawaz AS, Kumar A. impact of menstrual practices on the health of adolescent girls and the challenges faced in menstrual hygiene management at schools. *National Journal of Community Medicine*. 2016;7(8):636-671.
38. Seethalakshi S, Sridevi R. A study to assess knowledge, attitude, and practices related to menstrual hygiene management among school going adolescent girls in Sithyankottai and Sitharevu Govt. Higher Secondary Schools, Dindigul District. *International Journal of Humanities and Social Science Invention (IJHSSI)*. 2020;09(9):01-07. Journal Doi- 10.35629/7722
39. Sharma N, Shekhawat R, Gaur K, Meena KK, Meena GL, Rathore M, *et al*. Assessment of knowledge and practice regarding menstrual hygiene among school going adolescent girls of Jaipur City. *Journal of Medical Science and Clinical Research*. 2019;1(07):615-623.
40. Senapathi P, Kumar H. A comparative study of menstrual hygiene management among rural and urban adolescent girls in Mangalore, Karnataka. *International Journal of Community Medicine and Public Health*. 2018;5:2548-56.
41. Shamseer L, Moher D, Clarke M, Ghera D, Liberati A, Petticrew M, *et al*. the PRISMA-P Group. Preferred Reporting Items for Systematic Review and Meta-Analysis Protocols (PRISMA-P) 2015: elaboration and explanation. *BMJ*. 2015;349:g7647. (DOI: 10.1136/bmj.g7647)
42. Shoor P. A study of knowledge, attitude, and practices of menstrual health among adolescent school girls in urban field practice area of medical college, Tumkur. *Indian Journal of Health Science Biomedical Research*. 2017;10:249-55.
43. Singh P, Lazarus M, Priyadarshini S. Assessment of knowledge and practice of menstrual hygiene among adolescent girls of government school of Jabalpur and impact of health education on menstrual hygiene. *Paediatric Review - International Journal of Paediatric Research*. 2021;8(4):201-206.
44. Sivakami M, Eijk AMV, Thakur H, Kakade N, Patil C, Shinde S, *et al*. Effect of menstruation on girls and their schooling, and facilitators of menstrual hygiene management in schools: surveys in government schools in three states in India. *Journal of Global Health*. 2019;9(1):1-13.
45. Sood S, Kostizak K, Ramaiya A, Cronin C. Measuring the effectiveness of communication programming on menstrual health and hygiene management (MHM)

- social norms among adolescent girls in India. *Global Public Health*. 2020;16(4):578-589.
46. Tiwari A, Ekka IJ, Thakur R. Assessment of knowledge and practices regarding menstrual hygiene among adolescent girls of Government higher secondary school, station Murhipar, Rajnandgaon (C.G.). *International Journal of Community Medicine and Public Health*. 2018;5(4):1335-1338.
  47. Thakre SB, Thakre SS, Reddy M, Rathi R, Pathak K, Ughade S. Menstrual hygiene: knowledge and practice among adolescent school girls of Saonar, Nagpur District. *Journal of Clinical and Diagnostic Research*. 2011;5(5):1027-1033.
  48. Van Erik AM, Sivakami M, Thakkar MB. Menstrual hygiene management among adolescent girls in India: a systematic review and meta-analysis. *BMJ Open*. 2015; 2016;6:e010290. DOI:10.1136/bmjopen-2015-010290
  49. Vashisht A, Pathak R, Agarwal R, Patavegar BN, Panda M. School absenteeism during menstruation amongst adolescent girls in Delhi, India. *Journal of Family and Community Medicine*. 2018;25:163-8.
  50. Varghese M, Ravichandra L, Anandhan AK. Knowledge and practice of menstrual hygiene among adolescent girls. *Indian Journal of Youth and Adolescent Health*. 2015;2(3):35-43.
  51. Vayeda M, Ghanghar V, Desai S, Shah P, Modi D, Dave K, *et al.* Improving menstrual hygiene management among adolescent girls in tribal areas of Gujarat: an evaluation of an implementation model integrating the government service delivery system. *Sexual and Reproductive Health Matters*. 2020;29(2):1-16.
  52. Verma P, Ahmas S, Srivastava RK. Knowledge and practice about menstrual hygiene among higher secondary school girls. *Indian Journal of Community Health*. 2013;25(3):265-271.
  53. UNICEF and WHO. Post WASH Targets and Indicators: Outcomes of an Expert Consultation; c2015. [http://www.unicef.org/wash/files/4\\_WSSCC\\_JMP\\_Fact\\_Sheets\\_4\\_UK\\_LoRes.pdf](http://www.unicef.org/wash/files/4_WSSCC_JMP_Fact_Sheets_4_UK_LoRes.pdf) [accessed 09 January 2015]
  54. <https://www.dasra.org/resource/improving-menstrual-health-and-hygiene>
  55. [https://www.education.gov.in/sites/upload\\_files/mhrd/files/SOP\\_WASH\\_0.pdf](https://www.education.gov.in/sites/upload_files/mhrd/files/SOP_WASH_0.pdf)
  56. <https://www.unicef.org/wash/menstrual-hygiene>