

Original Research



Menstrual hygiene management among government school going adolescent girls in Tumakuru District, Karnataka in India: a comparative cross-sectional study

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Abstract

Introduction: Menstruation topic remains a taboo subject shrouded with secrecy and shame among adolescent girls, which leads to lack of discourse and dialogue. Improving menstrual hygiene management (MHM) practices during adolescent phases reduces reproductive morbidity in future.

Objectives: To estimate and compare MHM among urban and rural government high school adolescent girls

Methods: A cross-sectional comparative study was conducted among adolescent girls studying in 8th to 10th standard in government high schools. One urban and two rural schools were involved in the study to meet the required sample size. In total, 464 girls were assessed using an interviewer-administered questionnaire. Knowledge and hygienic practices, school absenteeism, restrictions during menses and socio- demographic factors were compared between the two groups. Chi-squared test was used to calculate statistical significance at $p < 0.05$.

Results: The girls were in the age group of 12-17 years; mean age of 14.6 (SD=0.92) years with the mean age of attainment of menarche 12.6 (SD=0.94) years. Knowledge on MHM was good in 157 (62.6%) rural girls compared to 116 (54.5%) urban girls. Pads were the main type of absorbents used by girls (rural- 128, 51.0%; urban- 167, 78.4%), however, 43% (n=108) rural girls used both cloth and pads during menstruation compared to 16.4% (n=35) urban girls. Dysmenorrhea was the common complaint for being absent from school. This difference between the two groups was significant ($p < 0.0006$). More than 50% of girls in both groups complained that they were not permitted to enter ritual places; however, 13.14% (n=28) urban and 22.3% (n=56) rural girls had no restrictions during menstruation.

Conclusions & Recommendations: Girls have less knowledge on menstruation; many are still using cloth as sanitary pads and do not practice the correct method of washing and drying. A multi-pronged approach to improve MHM is essential.

Keywords: adolescents, government high schools, menstrual hygiene management

Introduction

India has the largest adolescent population in the world, 253 million; every 5th person is in the age group of 10-19 years (1). Adolescent girls' population in India is 119.34 million (2), representing 17% of the total female population (3). Adolescence is defined by the World Health Organization as the age group of 10-19 years. Adolescent period is a transition phase characterized by rapid physical growth along with psychological and behavioural changes (4).

Menstruation or menses is the natural bodily process of releasing blood and associated matter from the uterus through the vagina as part of the menstrual cycle (5). Menstrual hygiene management (MHM) refers to management of hygiene associated with the menstrual process. It is defined as Women and adolescent girls are using a clean menstrual management material to absorb or collect menstrual blood, that can be changed in privacy as often as necessary for the duration of a menstrual period, using soap and water for washing the body as required, and having access to safe and convenient facilities to dispose of used menstrual management materials. They understand the basic facts linked to the menstrual cycle and how to manage it with dignity and without discomfort or fear (6).

Menstrual hygiene depends upon the educational, socio-economic and cultural status of family. Poor menstrual hygiene practices are the causes of stress associated with menstruation and various reproductive tract infections. Often because of stigma and taboo, many girls know scarcely about menstruation when they get their first period. They rely on scant information from their mothers or peers. At worst, they fear and worry and manage inadequately (7). School curricula are guiding instruments for what is taught at school. Teachers' capacities to address menstruation and associated reproductive health topics in a factual manner and without stereotypes are crucial elements in deciding health of girls. Yet, many teachers themselves are ill-

equipped to address menstruation and MHM in the classroom (7).

The onset of menstruation, lack of adequate water, sanitation and hygiene facilities at school, fear of staining due to inadequate menstrual materials, or not having access to medication against period pains can all be factors that make girls stay out of school during their menstruation (8).

In India, government schools are largely accessed by children of poor and lower-middle-income groups such as farmers, clerks, security guards, urban slum dwellers, vegetable vendors, daily wage labourers, seasonal migrants, and other socially disadvantaged groups (9). Studies show that there is a gap in the knowledge and practice during menstruation among rural and urban areas (10); private and government school going adolescent girls (11). However, there are no comparison studies on MHM among adolescent girls attending government schools in rural and urban areas so as to evolve appropriate strategies. Hence, this study was conducted to estimate and compare the knowledge and practices during menstruation among government school going rural and urban adolescent girls.

Methods

A comparative cross-sectional study was conducted in the urban and rural field practice areas of a tertiary care centre, Tumakuru District, Karnataka in India between 2021-2022. Adolescent girls studying in government high schools (8th to 10th class) were chosen as the study population. Girls who had attained menarche at least six months prior to the study and were present in school during the interview time were included in the study. Girls who did not have parental consent were excluded from the study.

As per the NFHS-4 (2015-16) Survey Report, among 15–24-year age group women, overall, 58% use hygienic methods for menstrual protection (12). Considering 95% confidence interval (CI) and 5%

absolute error, the calculated sample size was 390. Considering a non-response rate of 10%, the minimum sample required for the study was 430. Purposive sampling method was used to select three government high schools in the urban and four government high schools in the rural field practice areas of Shridevi Institute of Medical Sciences and Research Hospital, Tumakuru.

A pre-tested, semi-structured self-administered questionnaire with close ended questions was used for data collection. The questionnaire was framed in English language, translated into local language (Kannada) and the translation was validated after re-translation with the help of language experts. A pre-test was done to identify any changes needed and to check for the validity. Information was collected regarding socio-demography, knowledge on menstruation prior to attainment of menarche and sources of information, age of menarche, knowledge and hygienic practices during menstruation. In the questionnaire, there were 8 questions to assess the knowledge and 11 questions on practice. The number of students who had given a correct answer for each question was analyzed to interpret their knowledge. Data were also collected about school absenteeism, cultural restrictions and illness associated during menstruation.

The study purpose was explained to all the adolescent girls along with assurance of confidentiality. The questionnaire was explained, and their doubts were cleared. A time limit of 20 minutes was given to fill the questionnaire. A health education session was conducted regarding optimal MHM after data collection using audio-visual aids.

Data analysis

Data collected was coded and analysed using Epi Info version 7. Results were interpreted in percentages for categorical data and in mean and standard deviation (SD) for continuous variables. Knowledge on menstruation, type of absorbents used and method of its disposal, availability of toilet

facilities, hand hygiene practices, reasons for school absenteeism, presence of dysmenorrhea and other illnesses and restrictions during menstruation were assessed and compared between urban and rural girls. Girls who scored <4 for questions on knowledge were considered as having 'poor knowledge' and those who scored >4 were considered as having 'good knowledge' on menstruation. Statistical significance was calculated using the Chi-squared test at 5% significance level.

Results

Of the 470 girls approached, two from an urban school and four from rural schools were excluded as their parents refused consent, giving a sample of 464 girls (213 in urban areas and 251 in the rural areas). The girls were in the age group of 12-17 years. Their mean age was 14.6 (SD=0.92) years and mean menarche attainment age was 12.64 (SD=0.94) years.

Study participants were predominantly Hindus (89.2% urban and 90.8% rural) and from nuclear family backgrounds (78.4% urban and 66.9% rural); more than half of the participants' mother had studied up to high school only (47.9% urban and 57.8% rural) and homemakers (62.9% urban and 55.8% rural). The influence of these socio-demographic variables on knowledge and practices among girls in rural and urban areas is shown in Table 1.

Knowledge on menstruation was compared between urban and rural girls (Table 2). Menstruation was a natural phenomenon for 40.2% urban and 66.1% rural girls; 41.6% urban and 31.1% rural girls did not know why menstruation happens; and only 22.4% urban and 20.5% rural girls knew that bleeding comes from the uterus. However, >90% rural and urban girls had knowledge that menstrual blood would normally flow up to 3-5 days. Almost 78% urban and 75% rural adolescents accept that the usual interval between two consecutive cycles would be

Table 1: Socio-demographic factors and menstrual hygiene management in urban and rural government school adolescent girls

Variable	Knowledge						Practice					
	Rural n=251 (%)			Urban n=213 (%)			Rural n=251 (%)			Urban n=213 (%)		
	Good	Poor	OR (95% CI)	Good	Poor	OR (95% CI)	Pads	No pads	OR (95% CI)	Pads	No pads	OR (95% CI)
Religion												
Hindu	147 (93.6)	81 (86.2)	0.83	108 (93.1)	82 (84.5)	1.55	118 (92.2)	110 (89.4)	0.5	156 (93.4)	34 (73.9)	2.55
Non-Hindu	10 (6.4)	13 (13.8)	(0.27, 2.5)	8 (6.9)	15 (15.5)	(0.59, 4.1)	10 (7.8)	13 (10.6)	(0.2, 1.51)	11 (6.6)	12 (26.1)	(0.92, 7.0)
Family type												
Nuclear	104 (66.2)	64 (68.1)	0.92	91 (78.4)	76 (78.4)	1.01	80 (62.5)	88 (71.5)	0.66	132 (79.0)	35 (76.1)	1.19
Non-nuclear	53 (33.8)	30 (31.9)	(0.53, 1.59)	25 (21.6)	21 (21.6)	(0.52, 1.94)	48 (37.5)	35 (28.5)	(0.4, 1.13)	35 (20.9)	11 (23.9)	(0.55, 2.57)
Mother school education												
>7 years	101 (64.3)	81 (86.2)	0.65	80 (68.9)	75 (77.3)	0.77	95 (74.2)	87 (70.7)	1.84	117 (70.1)	38 (82.6)	0.74
<7years	56 (35.7)	13 (13.8)	(0.37, 1.14)	36 (31.0)	22 (22.7)	(0.42, 1.4)	33 (25.8)	36 (29.3)	(1.08, 3.15)	50 (29.9)	8 (17.4)	(0.35, 1.56)
Mother occupation												
Working	79 (50.3)	32 (34.0)	2.51	46 (39.7)	33 (34.0)	1.47	56 (43.8)	55 (44.7)	1.14	62 (37.1)	17 (36.9)	1.35
Home maker	78 (49.7)	62 (65.9)	(1.46, 4.33)	70 (60.3)	64 (65.9)	(0.83, 2.59)	72 (56.3)	68 (55.3)	(0.69, 1.87)	105 (62.9)	29 (63.0)	(0.67, 2.72)

28-42 days; 8.41% urban and 13.9% did not know the usual age of menarche attainment; however, 88.32% urban and 66.5% rural girls were well aware that unhygienic of private parts during menses can lead to genital and urinary tract infections. Interestingly, they felt that blood of menses is impure (87.85% urban and 80% rural). The differences observed between urban and rural girls were

statistically significant ($p < 0.05$) except the usual number of days of menstrual bleeding and interval between two consecutive cycles. The overall knowledge on menstruation was analysed (Figure 1). It was observed that 62.6% of rural girls had good knowledge compared to 54.5% of urban girls, with no significant difference ($p = 0.776$).

Table 2: Comparison of knowledge between urban and rural government school adolescent girls

Knowledge on menstruation	Urban** (n=213)		Rural** (n=251)		χ^2 value	p value
	Yes (%)	No (%)	Yes (%)	No (%)		
Menstruation is a natural phenomenon	86 (40.2)	127 (59.8)	166 (66.1)	85 (33.9)	39.89	<0.01*
Hormones are the cause for menstruation	94 (43.9)	119 (56.1)	151 (60.1)	100 (39.9)	12.87	0.005*
Uterus is the organ from which bleeding occurs	48 (22.4)	165 (77.6)	52 (20.5)	199 (79.5)	21.26	0.001*
Normal menstruation days in each cycle is 3-7	203 (94.9)	10 (5.1)	228 (90.8)	23 (9.2)	3.058	0.383
Normal interval between 2 consecutive cycles is 28-42	166 (77.6)	47 (22.4)	189 (75.2)	62 (24.8)	0.50	0.779
Normal menarche attainment age is 10-15 years	161 (75.2)	52 (24.8)	168 (66.9)	83 (33.1)	11.47	0.009*
Poor menstrual hygiene leads to infections	189 (88.3)	24 (11.7)	167 (66.5)	84 (33.5)	31.79	<0.001*
Menstruation blood is impure	188 (87.9)	25 (12.2)	201 (80.0)	50 (19.9)	5.69	0.017*

*p value <0.05 is statistically significant

The types of menstrual absorbents used, and its disposal methods were compared between rural and urban girls (Table 3). Pads were the main type of absorbents used (78.0% urban and 50.9% rural); however, 43% of rural girls were using both cloth and pads compared to only 16.4% urban girls. Among those who use cloth as absorbents, only 8.7% wash it with soap and water and dry under sun in rural areas compared to 45.7% urban areas. These differences were statistically significant except the frequency of changing pads during menstruation.

With regards to sanitation (Figure 2), significant differences were observed for toilet facilities ($p = 0.017$) and hand washing practices ($p = 0.021$). School absenteeism remained similar in both areas (29.11% urban and 28.6% rural). Dysmenorrhea as the common complaint for being absent from school was seen more in urban girls (58.22%) compared to rural girls (42.2%) ($p < 0.006$).

More than 50% of girls in both groups complained that they were not permitted to enter ritual places like

puja rooms in homes and temples. Other restrictions observed were isolation, avoiding certain foods, entry into kitchen and not being permitted to go to

school. In 9.9% urban girls compared to 1.9% rural girls, more than one type of restrictions was present ($p=0.003$).

Table 3: Comparison of practices among urban and rural Government school adolescents during menstruation

Practice		Urban** n=213	Rural** n=251	χ^2 value	p value
Type of absorbent used	Clothes	11 (5.1)	15 (5.9)	40.19	0.001*
	Pad	167 (78.0)	128 (50.9)		
	Both clothes & pads	35 (16.4)	108 (43.0)		
Frequency of changing absorbents	Once daily	25 (11.7)	28 (11.1)	0.08	0.994
	Twice daily	92 (43.0)	108 (43.0)		
	Thrice daily	72 (33.6)	85 (33.8)		
	4 and more daily	24 (11.7)	30 (11.9)		
Methods of pads disposal (202 urban; 236 rural)	Burning	142 (66.7)	215 (85.6)	31.33	<0.001*
	Dustbin	53 (24.8)	18 (7.1)		
	Open field	7 (3.3)	3 (1.1)		
Methods of cleaning and drying of cloth absorbents (46 urban; 123 rural)	Wash in water, dry in shadow	7 (15.2)	78 (31)	7.7	0.021*
	Wash with soap & water, dry in shadow	18 (39.1)	23 (9.1)		
	Wash with soap & water, dry under sun	21 (45.6)	22 (8.7)		

* $p < 0.05$ is statistically significant

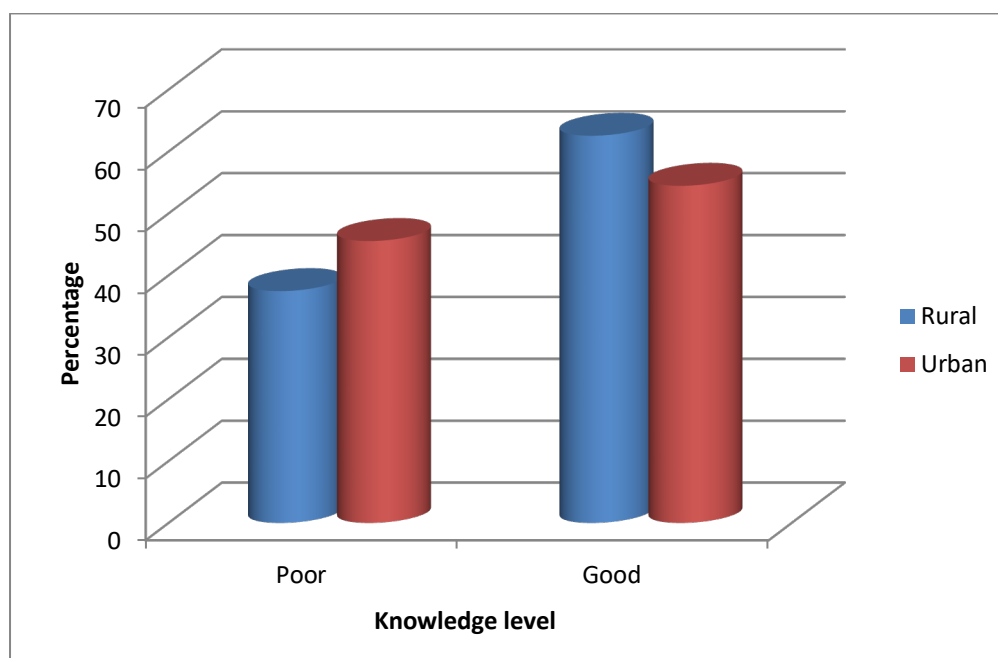


Figure 1: Knowledge on menstruation among girls studying in rural and urban government high schools

Discussion

In spite of the Government of India's effort to improve menstrual hygiene through various programmes, it still remains a neglected area due to poor dissemination of information. Studies say that there is a decline in age of menarche attainment in

India. It may be influenced by geographical location, education, wealth status, caste and religious affiliations (13). In a study conducted in Tamilnadu, the mean age of menarche was 12.7 (SD=0.66) years (14) similar to our study result while in a study done in West Bengal, it was much higher, 15.38 (SD=1.7) in urban and 15.49 (SD=1.6) in the rural areas (15).

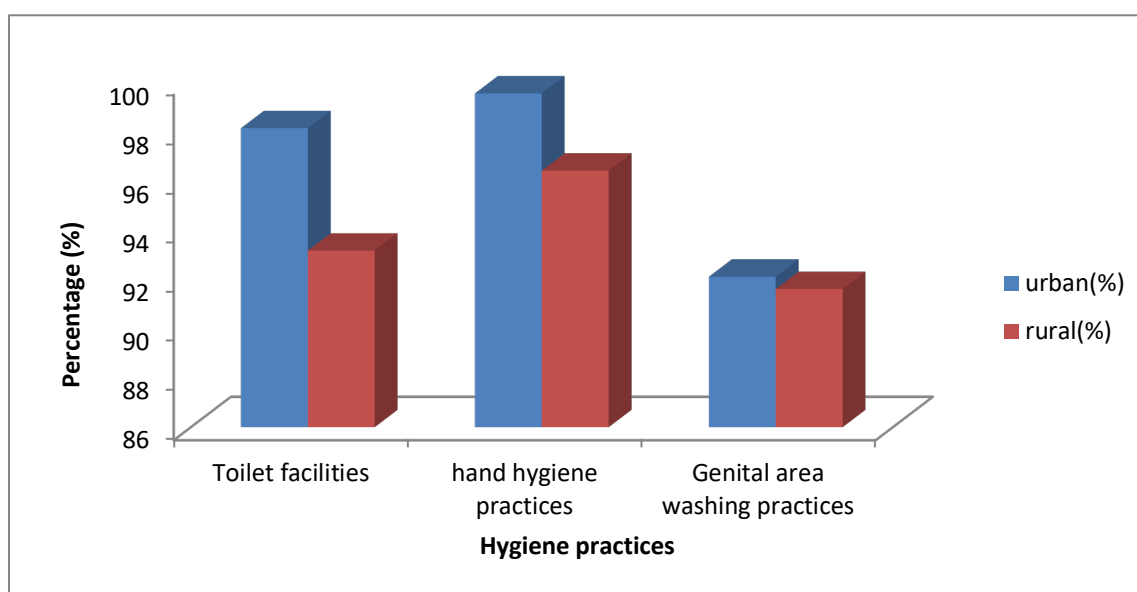


Figure 2: Hygiene practices during menstruation among urban and rural high school adolescent girls

Menstruation is considered as an impure phenomenon. Many girls know nothing about menstruation when they get their first period. With fear and worry, they manage inadequately due to insufficient and incorrect information (7). Different studies showed that adolescent girls try to seek information from various methods. As a cultural practice, the information is passed from mother to daughter which is often not sufficient and sometimes even incorrect (16). In our study too, mother was the main source of information on menstruation topic to schoolgirls similar to other study results of West Bengal and Varanasi (15, 17) while in another study, elder sister was the main source of information (14). In a study conducted among schoolgirls in Egypt, mass media was the main source of information (18) and in another study, it was the teacher (19). In our study, 20.9% of urban and 14% of rural girls were aware about menstruation prior to the attainment of

menarche, much lower than the study results of Indian human development survey reports, 63.4% urban; 47.56% rural (13).

A study reported that the difference in the knowledge about menstruation between urban and rural adolescent girls varies from 30% to 75% (20). In our study, 40.2% of urban and 66.1% rural government high school adolescents accept menstruation as a natural phenomenon. Rural area girls had shown significantly better knowledge than urban girls similar to other study reports (21-22), while in some other studies, urban girls were having better knowledge on what menstruation is (15, 23).

In the present study, 5.9% rural adolescents perceive menstruation as Gods' curse while in one study, it was 17% in rural area (22). Similar to our study result on source of bleeding, a systemic review and meta-

analysis report stated that half of Indian adolescent girls were unaware of its cause while only a quarter had an understanding of the source of bleeding (24); around 80% of both urban and rural adolescents perceive as menstrual blood is impure, which is much higher than the study done in tribal of Meghalaya 42% (25).

Commercial sanitary pads usage during menstruation is much higher in urban girls (78.03%) compared to rural adolescent girls (50.9%) similar to another two studies (15-16). However, in one study, only 8.3% in urban areas and 1.7% in rural areas were using commercial pads (26). Usage of cloth in an inappropriate way without proper washing and drying can lead to genital tract infections. In a study conducted in North Karnataka, the majority of the urban girls (60%) and rural girls (51%) who were using reusable cloth as an absorbent, dry it in shadow (27), but in the present study, 54.34% urban and 17.8% rural girls dry the clothes in shadow. It was observed in the present study that even though the clothes used as absorbent is less in urban area, drying it in shadow was in much higher percentage compared to rural area.

In our study, school absenteeism due to menstruation was observed in 29.11% (urban) and 28.6% (rural) girls, much higher than the other two study results (24, 27). A study reported that menstrual hygiene as a significant predictor of gynaecological problems among adolescents (28). In the present study, more than 90% of adolescents had the practice of cleaning genitals during menstruation both in rural and urban areas, much higher than in a study done in Maharashtra; however, higher restrictions during menstruation were observed in the present study compared to another study (29).

As a limitation, the number of schools studied was small. Study on infrastructure facilities, teachers' understanding and attitude towards MHM and their

communication skills assessment would have given sufficient evidence in developing strategies for improvement MHM among high school going girls.

Conclusions & Recommendations

The knowledge on MHM among both government rural and urban high school girls is good only in nearly half of the study participants. Even though pads are the main type of absorbents used during menstruation, proper disposal mechanism is lacking. Many are still using cloth and do not practice the correct method of washing and drying. It is essential that the right information passes to adolescent girls at the right time, so as to achieve MHM adequately, efficiently and effectively.

School teachers and Media have a greater role to play in improving MHM. Even though the Government of India initiated 'menstrual hygiene scheme' and 'menstrual health day' with an aim to increase awareness on menstruation hygiene and free distribution of pads, it has not been successful. MHM education should become part of the life skill education program to girls so that it enhances their confidence, dignity and improve their quality of life. The inclusion of a chapter on MHM in textbooks, accessibility of education materials like flip charts and booklets etc. for high school students will help in improving knowledge among adolescents. Sensitization of adolescent boys' community in schools helps to improve the MHM among women in a long term. Toilets should have sufficient water supply with privacy, soaps for hand washing, dustbin for disposal of pads; drug as pain killers and accessibility and utilization of napkin vending machines and incinerators in schools greatly reduces the school dropout rates. Mothers also should be involved in awareness sessions as they are the main source for passing information.

Public Health Implications

- Poor menstrual hygiene practices due to insufficient and incorrect information are the causes of stress associated with menstruation; reproductive and urinary tract infections. Due to the lack of knowledge on menstruation and preparedness for its management, the situation becomes worse for school going girls, which results in school dropouts.
- A multi-pronged, inter-sectorial approach involving various departments and working in co-ordination will help to improve MHM among adolescent girls and empower them. Improving social conditions will indirectly help in improvement of MHM among adolescents.

Author Declarations

Competing interests: The authors declare that they have no competing interests.

Ethics approval and consent to participate: Institutional Ethics Committee of Shridevi Institute of Medical Sciences and Research Hospital, Tumkuru had granted approval to conduct the study. Permission was taken from the school authorities. Informed consent from parents, verbal assent from 12–14-year age group girls and written assent from >14-year age group adolescents were taken.

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Author contributions: The corresponding author has designed the study; co-ordinated data collection; data analysis and drafted the first version of manuscript.

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