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Knowledge and Practice Regarding Menstrual Hygiene among School Going Adolescents of Sulaimani city

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ABSTRACT

Background and Objectives: Menstrual hygiene (MH) is a crucial aspect of adolescent health, impacting both physical and mental well-being. This study aimed to evaluate MH knowledge and practices among school-aged adolescents in Sulaimani City, Iraq.

Methods: A cross-sectional study was conducted between January and March 2025, involving 195 female students aged 12–16 years from three randomly selected private schools. Participants were chosen through a two-stage random sampling process. Data were collected using a structured, pre-tested questionnaire covering sociodemographic information, menstrual history, knowledge about menstruation, and hygiene practices.

Results: Among 195 adolescent girls (mean age: 13.78 ± 0.911 years), 61% (n=119) began menstruation at 12–13 years. Prior menstrual knowledge was reported by 59% (n=115), with mothers as the primary source (52.8%, n=103). Initial reactions included fear (31.3%, n=61) and embarrassment (39%, n=76). Hygiene practices: 66.7% (n=130) knew to change pads every 4 hours, and 90.3% (n=176) emphasized handwashing. Menstrual discomfort affected 72.3% (n=141) in class, with 63.6% (n=124) reporting academic impacts. Age, maternal education, employment, and household economics influenced hygiene practices.

Conclusion: The knowledge and understanding of various menstrual aspects among the girls were moderate, with nearly 50% demonstrating adequate understanding of menstruation. Their practices and behaviors related to MH were generally satisfactory. Menstruation and its associated processes negatively impacted the comfort and participation of many adolescents in school and educational activities.

Keywords: *Cross-Sectional Studies, Health Education, Menarche*

1. INTRODUCTION

The World Health Organization (WHO) defines adolescents as those aged 10 to 19 years. This shift from childhood to adulthood is significant [1]. Adolescents, are a significant demographic, totaling almost 1.2 billion individuals, or 16% of the global population [2].

During adolescence, hormonal actions launched by the hypothalamus in the brain induce psychosocial changes and trigger pubertal developments in both girls and boys [3]. In females, adolescence signifies the beginning of the menstrual cycle,

known as menarche [2]. This is also the optimal period when females often engage in many settings, including high schools, and endeavor to plan for their forthcoming adult lives [4].

The menstrual cycle is seen as filthy, disgusting, unpleasant, and embarrassing in developing nations. This notion renders teenage females globally a susceptible demographic. Many developing nations exhibit a lackadaisical approach to menstrual hygiene (MH) care, significantly affecting young girls [2]. Additionally, the experience of menarche often induces confusion and ambivalence in teenage girls owing to insufficient access to accurate information on menstruation and menstrual hygiene management (MHM) [5]. Research in India indicates that less than half (45.7%) of the girls have knowledge about menstruation prior to menarche [6].

Poverty and inadequate education on reproductive health are two critical variables that influence girls' understanding and practices related to menstruation and menstrual cleanliness, as well as their readiness prior to menarche [2]. Women with a superior comprehension of menstruation often use safe and hygienic methods for regulating their monthly bleeding. Additionally, studies show that poor MH practices may lead to reproductive and genitourinary tract infections, cervical cancer, school absenteeism or dropout, worse academic performance, reduced self-esteem, and a decreased quality of life [4]. Therefore, education on menstruation and hygiene habits should start early and constitute a vital health education component to ensure its continuity throughout adulthood [1].

While existing research underscores the global significance of MHM, significant gaps persist in understanding its nuances within specific cultural and urban contexts. The novelty of this study lies in its focused examination of Sulaimani City, where MHM research is virtually absent. By addressing this gap, the study bridges the disconnect between generalized global findings and region-specific needs, offering insights tailored to urban adolescents' lived experiences. Therefore, this study aimed to evaluate the MH knowledge and practices among school-aged adolescents in Sulaimani City.

2. METHODS AND MATERIALS

2.1 Study design and setting

This study employed a cross-sectional design to assess the knowledge and practices of MH among school-going adolescents in Sulaimani City, Iraq. The study was conducted from January to March 2025 in three randomly selected private schools within the city.

2.2 Participants

The target population comprised adolescent girls aged 12–16 years who had experienced menarche and were enrolled in private schools. Participants were recruited through a two-stage random sampling method. In the first stage, three private schools were selected from a comprehensive list of schools in Sulaimani City using cluster sampling. In the second stage, a simple random sampling technique was applied to select eligible students from each school's enrollment registers. Students were approached during school hours, and those who met the inclusion criteria were invited to participate. The sample size was calculated and considered using other similar studies in the past [1]. A total of 195 students were included in the study.

Inclusion criteria: (1) Female students aged 12–16 years, (2) attendance at one of the selected schools, (3) having experienced menarche, and (4) provision of informed consent from both the participant and their guardian. Exclusion criteria: (1) Severe cognitive or communication impairments that could hinder questionnaire completion and (2) refusal to participate.

2.3 Data Collection

The study utilized a structured, pre-tested questionnaire divided into four sections to assess menstrual health comprehensively. The first section captured sociodemographic data, including age, maternal education, socioeconomic status, and parental occupation. The second focused on menstrual history, documenting age at menarche, cycle patterns, and symptoms. The third evaluated knowledge of menstruation, covering awareness, information sources, and physiological understanding, while the fourth examined hygiene practices, such as absorbent use, frequency of changes, handwashing, and cultural restrictions. A pilot test with 20 students from a non-participating school refined the instrument's clarity and validity, ensuring cultural relevance and reliability (Cronbach's alpha = 0.78). Data collection occurred in private school settings to safeguard confidentiality, with trained researchers administering the questionnaire and addressing participant queries.

2.4 Ethical Considerations

Ethical approval was obtained from the Sulaimani Polytechnic University, Sulaimani Technical Institute, (No: ABC). Written informed consent was secured from guardians and assent from participants. Anonymity was maintained by omitting personal identifiers, and participants were assured of their right to withdraw without consequences.

2.5 Statistical Analysis

Data were analyzed using IBM SPSS Statistics for Windows, Version 26.0. Descriptive statistics (means, frequencies, percentages) summarized sociodemographic and menstrual characteristics. Chi-square tests assessed associations between categorical variables (e.g., maternal education, economic status) and MH practices. Spearman's rank correlation coefficient evaluated relationships between age and hygiene practices. Statistical significance was set at $p<0.05$.

3. RESULTS

The mean age of the 195 school-aged adolescent girls was 13.78 ± 0.911 years. The mothers' educational levels showed that the majority, 52 (26.7%), were college or university graduates, followed by 49 (25.1%) who were institute graduates. Mothers with secondary school and primary school education comprised 37 (19%) and 27 (13.8%) respectively, while 30 (15.4%) were literate only.

In terms of employment, 100 (51.3%) mothers were government employees, 37 (19%) were self-employed, and 58 (27.9%) were housewives. Among the 195 households, the economic status was barely sufficient for 106 (54.4%), sufficient for 83 (42.6%), and insufficient for 6 (3.1%) (Table 1).

Table 1. Sociodemographic Characteristics among school-aged adolescents in Sulaimani City

Sociodemographic Characteristics		Frequency	Percent
Age		13.78 ± 0.911	
Mother's Level of Education	Illiterate	-	-
	Literate	30	15.4%
	Primary School	27	13.8%
	Secondary School Graduate	37	19%
	Institute Graduate	49	25.1%
	College/University Graduate	52	26.7%
Mother's Occupation	Government Employee	100	51.3%
	Self-employed	37	19%
	Housewife	58	27.9%
Economic Status	Sufficient	83	42.6%
	Barely Sufficient	106	54.4%
	Insufficient	6	3.1%
Total	195 (100%)		

The onset age of menstruation in the girls showed that 119 (61%) began menstruating at ages 12-13. For 59 (30.9%) girls, menstruation started at age 11 or younger, and for 17 (8.7%) at age 14 or older. The duration of menstrual bleeding was 2-3 days for 39 (20%) girls, 4-5 days for 58 (29.7%), 6-7 days for 69 (35.4%), more than seven days for 21 (10.8%), and irregular for 8 (4.1%). The mean menstrual cycle duration was 15-20 days for 74 (37.9%) girls, 21-35 days for 93 (47.7%), and more than 36 days for 8 (4.1%). Fifteen (7.7%) girls were unaware of their menstrual cycle length, and 5 (2.6%) had irregular cycles.

The most common menstrual issue was pain in the back, abdomen, legs, and headaches, reported by 136 (69.7%) girls. Excessive blood loss was an issue for 13 (6.7%) girls, while 27 (13.8%) experienced both pain and excessive blood loss. Nineteen (9.7%) girls were asymptomatic. The most preferred menstrual product was sanitary pads, used by 175 (89.7%) girls, with 129 (66.2%) changing their absorbents more than three times a day (Table 2).

Table 2. Personal Information among school-aged adolescents in Sulaimani City

Personal Information		Frequency	Percent
Age at Menarche	≤11 years	59	30.9%
	12-13 years	119	61%
	≥14 years	17	8.7%
Duration of Bleeding During Menstrual Cycle	2-3 days	39	20%
	4-5 days	58	29.7%
	6-7 days	69	35.4%
	More than 7 days	21	10.8%
Average Duration of Menstrual Cycle	Irregular	8	4.1%
	15-20 days	74	37.9%
	21-35 days	93	47.7%
	More than 36 days	8	4.1%
	I don't know	15	7.7%
	Irregular	5	2.6%
Menstrual Problems	Back, abdomen, leg pain, and headache	136	69.7%
	Excessive blood loss	13	6.7%
	Nothing of them (Asymptomatic)	19	9.7%
	All of the above	27	13.8%
	None	-	-
Ideal Thing to Use During Menstruation	Sanitary pad	175	89.7%
	Cloth	2	1%
	Both	18	9.2%
Number of Absorbents Changed in a Day	Once a day	11	5.6%
	Twice a day	55	28.2%
	≥3 times a day	129	66.2%
Total	195 (100%		

Knowledge of MH among school-aged adolescent girls is detailed in Table 3. A total of 115 (59%) girls reported having knowledge about menstruation, 49 (25.1%) claimed they had no information, and 31 (15.9%) stated they knew nothing. For 103 (52.8%) girls, their mother was the primary source of information before menstruation. Other sources included elder sisters for 39 (20%) girls, aunts for 21 (10.8%), friends for 25 (12.8%), and television/movies for 7 (3.6%). Eighty (41%) girls did not know the cause of menstruation, while 65 (33.3%) attributed it to hormones and 50 (25.6%) to physiological processes.

Before menstruation, 111 (56.9%) girls reported awareness of MH, while 42 (21.5%) had no knowledge, and another 42 (21.5%) knew nothing. Before their first menstruation, 80 (41%) had heard about menstruation, 73 (37.4%) had not heard anything, and 42 (21.5%) were completely unaware.

Reactions to the first menstruation included fear in 61 (31.3%) girls, embarrassment in 76 (39%), and no reaction in 58 (29.7%). Sixty (30.85%) girls stated they had participated in school classes related to menstruation before it started, whereas

135 (69.15%) had not attended these classes.

In this study, 86 girls (44.1%) reported that the uterus is responsible for menstrual blood flow, while 29 girls (14.9%) believed it is the fallopian tubes, and 24 girls (12.3%) thought the vagina is responsible. Meanwhile, 56 girls (28.7%) admitted they did not know which organ is responsible for menstrual blood flow. Regarding pain relief during menstruation, 86 girls (44.1%) stated that taking medication is necessary, whereas 71 girls (36.4%) disagreed, and 38 girls (19.5%) were uncertain.

A total of 63 girls (32.3%) indicated that physical activity helps alleviate menstrual pain, while 76 girls (39%) believed it does not, and 56 girls (28.7%) were unsure. Additionally, 92 girls (47.2%) mentioned the importance of a more nutritious diet during menstruation, while 46 girls (23.6%) disagreed, and 57 girls (29.2%) did not know (Table 3).

Table 3. Knowledge about Menstruation Hygiene among school-aged adolescents in Sulaimani City

Knowledge about Menstruation		Frequency	Percent
Do you have any information about menstruation?	Yes	115	59%
	No	49	25.1%
	I don't know	31	15.9%
Sources of Information About Menstruation Before Menarche	Mother	103	52.8%
	Elder Sister	39	20%
	Aunt	21	10.8%
	Friend	25	12.8%
	Television/Movies	7	3.6%
Cause of Menstruation	Hormones	65	33.3%
	Physiological process	50	25.6%
	Don't know	80	41%
Knowledge of MH Before Menarche	Yes	111	56.9%
	No	42	21.5%
	I don't know	42	21.5%
Have You Heard About Menstruation Before Menarche?	Yes	80	41%
	No	73	37.4%
	I don't know	42	21.5%
Reaction to First Menstruation	Fear	61	31.3%
	Embarrassment	76	39%
	No reaction	58	29.7%
Have You Ever Attended a Class Related to Menstruation in School Before the Onset of Menstruation?	Yes	60	30.85
	No	135	69.2%
Which Organ is Responsible for Menstrual Blood Flow?	Uterus	86	44.1%
	Fallopian Tube	29	14.9%
	Vagina	24	12.3%
	I don't know	56	28.7%
Do You Think It's Necessary to Take Medication for Reduction of Menstrual Pain?	Yes	86	44.1%
	No	71	36.4%

	I don't know	38	19.5%
Does Physical Activity Help Reduce Menstrual Pain?	Yes	63	32.3%
	No	76	39%
	I don't know	56	28.7%
Should You Take a More Nutritious Diet During Your Period	Yes	92	47.2%
	No	46	23.6%
	I don't know	57	29.2%

Menstrual hygiene practices among school-aged adolescents are detailed in Table 4. A total of 129 girls (66.2%) considered menstrual blood to be contaminated or unhygienic, while 44 girls (22.6%) disagreed, and 22 girls (11.3%) were unsure. Regarding odor during menstruation, 116 girls (59.5%) reported an unpleasant smell, while 52 girls (26.7%) disagreed, and 27 girls (13.8%) did not know. Furthermore, 130 girls (66.7%) believed that menstrual pads should be changed every four hours, while 60 girls (30.7%) disagreed, and 5 girls (2.6%) were uncertain.

Concerning irritation, allergies, and prolonged moisture exposure to the external genital area, 78 girls (40%) agreed it could cause damage and lead to rashes due to rare changes, while 37 girls (19%) disagreed, and 80 girls (41%) were unsure. A significant majority, 176 girls (90.3%), emphasized the importance of handwashing before and after changing menstrual pads, whereas 12 girls (6.2%) disagreed, and seven girls (3.6%) were uncertain. Additionally, 117 girls (60%) acknowledged the separate pathways for urination and menstruation, while 18 girls (9.2%) disagreed, and 60 girls (30.8%) did not know.

Regarding the perception of menstrual pads, 135 girls (69.2%) considered them to be contaminated or unhygienic, while 32 girls (16.4%) disagreed, and 28 girls (14.4%) were unsure. When addressing medication for menstrual-related issues, 51 girls (26.2%) reported using medication, while 120 girls (61.5%) did not, and 24 girls (12.3%) were uncertain. Furthermore, 100 girls (51.3%) believed that neglecting MHMcan be harmful, while 64 girls (32.8%) disagreed, and 31 girls (15.9%) did not know.

Regarding the use of old wipes during menstruation, 36 girls (18.5%) reported doing so, while 150 girls (76.9%) did not, and 9 girls (4.6%) were uncertain. In terms of daily bathing during menstruation, 63 girls (32.3%) preferred it, while 114 girls (58.5%) did not, and 18 girls (9.2%) were unsure. Moreover, 120 girls (61.5%) emphasized the importance of promptly wrapping and disposing of used sanitary products in outdoor trash bins to prevent disease spread, while 35 girls (17.9%) disagreed, and 40 girls (20.9%) did not know.

When addressing genital hygiene, 98 girls (50.3%) emphasized the necessity of washing the genital area with water and soap during menstruation, while 63 girls (32.3%) disagreed, and 34 girls (17.4%) were uncertain. Regarding comfort in class during menstruation, 40 girls (20.5%) felt comfortable, while 141 girls (72.3%) did not, and 14 girls (7.2%) were unsure. Finally, 124 girls (63.6%) believed menstruation affects their academic performance, while 56 girls (28.7%) disagreed, and 15 girls (7.7%) did not know.

A total of 72 girls (36.9%) reported that they could engage in their daily activities at school during their menstrual period, whereas 103 girls (59.8%) indicated that they were unable to do so, and 20 girls (10.3%) were unsure. Furthermore, 69 girls (35.4%) stated that their school had adequate facilities for changing sanitary pads, while 117 girls (60%) reported the absence of such facilities, and 9 girls (4.6%) were uncertain. Regarding waste disposal systems, 93 girls (47.7%) acknowledged the presence of appropriate waste disposal systems, such as sanitary bins, for disposing of used pads, while 83 girls (42.6%) noted the lack of such systems, and 19 girls (9.7%) were unsure.

Table 4. Practice Related to MH among school-aged adolescents in Sulaimani City

Practice Related to Menstrual Hygiene	Yes	No	I Don't Know
Do you think menstrual blood is contaminated/unhygienic?	129 (66.2%)	44 (22.6%)	22 (11.3%)
Is there a foul smell during menstruation?	116 (59.5%)	52 (26.7%)	27 (13.8%)
Should menstrual pads be changed every 4 hours?	130 (66.7%)	60 (30.7%)	5 (2.6%)
Does abrasion, allergy, and prolonged wetness injure the external genitalia and cause rashes due to infrequent changes?	78 (40%)	37 (19%)	80 (41%)
Is hand washing important before and after changing menstrual	176 (90.3%)	12 (6.2%)	7 (3.6%)

pads?

Is the path of urine and menstruation separate?	117 (60%)	18 (9.2%)	60 (30.8%)
Do you think menstrual pads are contaminated/unhygienic?	135 (69.2%)	32 (16.4%)	28 (14.4%)
Do you take medications for problems associated with menstruation?	51 (26.2%)	120 (61.5%)	24 (12.3%)
Is a little negligence in MH management harmful to the body?	100 (51.3%)	64 (32.8%)	31 (15.9%)
Do you use old wipes during your period?	36 (18.5%)	150 (76.9%)	9 (4.6%)
Do you prefer taking daily baths during menstruation?	63 (32.3%)	114 (58.5%)	18 (9.2%)
Should used sanitary products (pads or bloody rags) be wrapped quickly and disposed of in an outdoor dustbin to prevent the spread of disease?	120 (61.5%)	35 (17.9%)	40 (20.9%)
Should genitalia be washed with soap and water during menstruation?	98 (50.3%)	63 (32.3%)	34 (17.4%)
Do you feel comfortable in class during your period?	40 (20.5%)	141 (72.3%)	14 (7.2%)
Does menstruation affect your academic performance in the classroom and school?	124 (63.6%)	56 (28.7%)	15 (7.7%)
Can you carry out your daily activities at school during your period?	72 (36.9%)	103 (52.8%)	20 (10.3%)
Is there a suitable toilet in your school for changing sanitary pads?	69 (35.4%)	117 (60%)	9 (4.6%)
Is there a suitable waste disposal system (like a sanitary bin) in your school for disposing of dirty pads?	93 (47.7%)	83 (42.6%)	19 (9.7%)

Factors restricting students' activities are illustrated in Figure 1. A significant number, 141 girls (72.3%), expressed discomfort during class due to menstruation, and 124 girls (63.6%) reported that menstruation adversely affected their academic performance. Moreover, 103 girls (59.8%) mentioned their inability to perform daily school activities during their menstrual period. Additionally, 117 girls (60%) reported the lack of adequate restroom facilities for changing sanitary pads, and 83 girls (42.6%) noted the absence of suitable waste disposal systems for used pads.

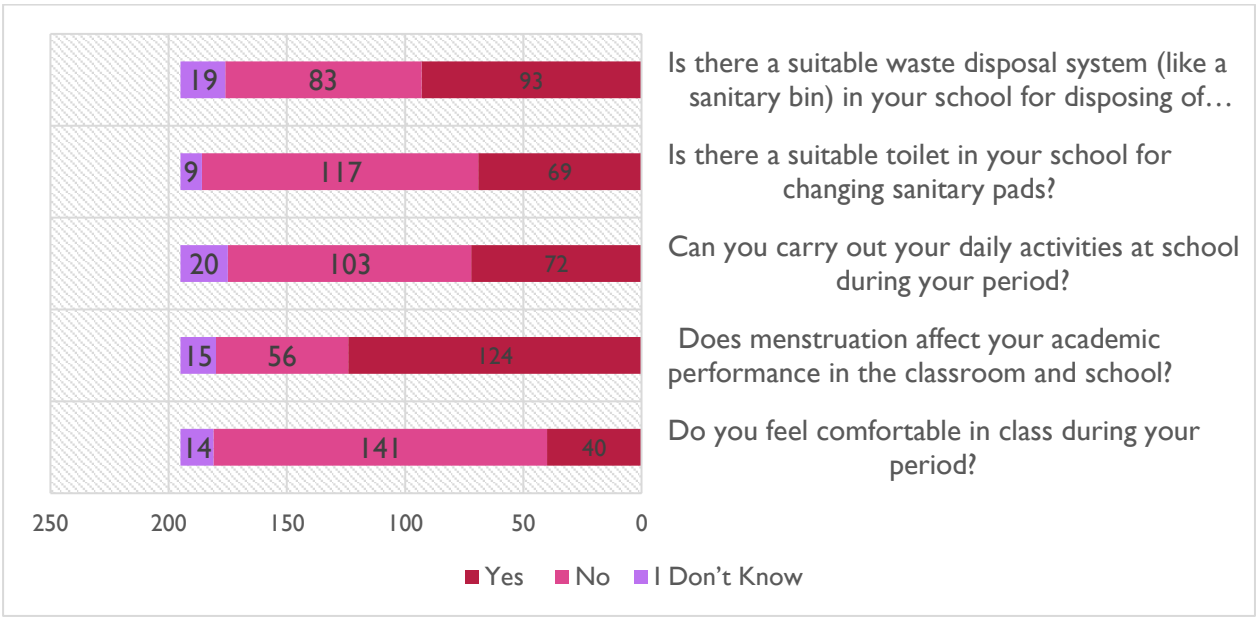

Figure 1. Factors affecting students' activity limitations among school-aged adolescents in Sulaimani City.

The relationship between demographic variables and the hygienic practice of changing menstrual pads every four hours is demonstrated in Table 5. A significant inverse relationship was found between age and the practice of changing pads every four hours (r=-0.586, P≤0.001). The educational level of the mother, the mother's occupation, and economic status were statistically significant factors influencing this hygienic practice (P≤0.001). Girls whose mothers had higher education levels, were government employees, and had better economic status were more diligent in changing sanitary pads regularly.

Table 5. Sociodemographic variables and menstrual pads be changed every 4 hours

Variable		Should menstrual pads be changed every 4 hours?			P-value*
		Yes	No	I Don't Know	
Age		(r=-0.586), (P≤0.001)			
Mother's Level of Education	Literate	18 (13.8%)	10 (16.7%)	2 (40%)	0.006
	Primary School	14 (10.8%)	10 (16.7%)	3 (60%)	
	Secondary School Graduate	21 (16.2%)	16 (26.7%)	0	
	Institute Graduate	34 (26.2%)	15 (25%)	0	
	College/University Graduate	43 (33.1%)	6 (15%)	0	
Mother's Occupation	Government Employee	85 (65.4%)	15 (25%)	0	0.001
	Self-employed	16 (12.3%)	21 (35%)	0	
	Housewife	29 (22.3%)	24 (40%)	5 (100%)	
Economic Status	Sufficient	69 (53.1%)	14 (23.3%)	0	0.001
	Barely Sufficient	57 (43.8%)	44 (73.3%)	5 (100%)	
	Insufficient	4 (3.1%)	2 (3.3%0	0	

*P-value calculated based on Spearman correlation and Chi-Square

Table 6 illustrates the relationship between demographic variables and the practice of washing hands before and after changing menstrual pads. A significant inverse relationship was found between age and this practice (r=-0.280, P≤0.001).

Table 6. Sociodemographic variables and hand washing important before and after changing menstrual pads.

Variable		Is hand washing important before and after changing menstrual pads?			P-value*
		Yes	No	I Don't Know	
Age		(r=-0.280), (P≤0.001)			
Mother's Level of Education	Literate	24 (13.6%)	4 (33.3%)	2 (28.6%)	0.034
	Primary School	24 (13.6%)	3 (25%)	0	
	Secondary School Graduate	36 (25.5%)	1 (8.3%)	0	
	Institute Graduate	45 (25.6%)	0	4 (57.1%)	
	College/University Graduate	47 (26.7%)	4 (33.3%)	1 (14.3%)	
Mother's Occupation	Government Employee	92 (52.3%)	3 (25%)	5 (71.4%)	0.1

	Self-employed	32 (18.2%)	3 (25%)	2 (28.6%)	
	Housewife	52 (25.9%)	6 (50%)	0	
Economic Status	Sufficient	74 (42%)	6 (50%)	3 (42.9%)	0.963
	Barely Sufficient	96 (54.5%)	6 (50%)	4 (57.1%)	
	Insufficient	6 (3.4%)	0	0	

*P-value calculated based on Spearman correlation and Chi-Square

The relationship between demographic variables and the use of old clothes during menstruation is shown in Table 7. A significant inverse relationship was found between age and the use of old clothes during menstruation (r=-0.213, P≤0.003). The educational level of the mother and economic status were statistically significant factors, with girls whose mothers had higher education levels and better economic status less likely to use old clothes during menstruation (P≤0.05).

Table 7. Sociodemographic variables and use old wipes during your period.

Variable		Do you use old wipes during your period?			P-value*
		Yes	No	I Don't Know	
Age		(r=-0.213), (P≤0.003)			
Mother's Level of Education	Literate	8 (22.2%)	19 (12.7%)	3 (33.3%)	0.011
	Primary School	3 (8.3%)	24 (16%)	0	
	Secondary School Graduate	10 (27.8%)	27 (18%)	0	
	Institute Graduate	9 (25%)	36 (24%)	4 (44.4%)	
	College/University Graduate	6 (16.7%)	44 (29.3%)	2 (22.2%)	
Mother's Occupation	Government Employee	23 (63.9%)	74 (43.9%)	3 (33.3%)	0.221
	Self-employed	3 (8.3%)	31 (20.7%)	3 (33.3%)	
	Housewife	10 (27.8%)	45 (20%)	3 (33.3%)	
Economic Status	Sufficient	7 (19.4%)	73 (48.7%)	(33.3%)	0.014
	Barely Sufficient	28 (77.85)	72 (48%)	6 (66.7%)	
	Insufficient	1 (2.8%)	5 (3.3%)	0	

*P-value calculated based on Spearman correlation and Chi-Square

Table 8 presents the relationship between demographic variables and daily bathing during menstruation. The mother's occupation and economic status were statistically significant factors (P≤0.05). Girls whose mothers were government employees or had better economic status were less likely to prefer daily bathing during menstruation.

Table 8. Sociodemographic variables and use old wipes during your period.

Variable		Do you prefer taking daily baths during menstruation?			P-value*
		Yes	No	I Don't Know	
Age		(r=0.086), (P≤0.234)			
Mother's Level of Education	Literate	9 (14.3%)	19 (16.7%)	2 (11.1%)	0.841
	Primary School	8 (12.7%)	15 (13.2%)	4 (22.2%)	

	Secondary School Graduate	9 (14.3%)	25 (21.9%)	3 (16.7%)	
	Institute Graduate	16 (25.4%)	28 (24.6%)	5 (27.8%)	
	College/University Graduate	21 (33.3%)	27 (23.7%)	4 (22.2%	
Mother's Occupation	Government Employee	23 (36.5%)	64 (56.1%)	13 (72.2%)	0.007
	Self-employed	11 (17.5%)	23 (20.2%)	3 (16.7%)	
	Housewife	29 (46%)	27 (23.7%)	2 (11.1%)	
	Sufficient	35 (56.6%)	44 (38.6%)	4 (22.2%)	
Economic Status	Barely Sufficient	25 (39.7%)	67 (58.8%)	14 (77.8%)	0.028
	Insufficient	3 (4.8%)	3 (2.6%)	0	

*P-value calculated based on Spearman correlation and Chi-Square

The relationship between demographic variables and the disposal of used sanitary products (pads or cloths) in outdoor bins to prevent disease spread is depicted in Table 9. A significant inverse relationship was found between age and this practice (r=-0.267, P≤0.001). The mother's occupation and economic status were statistically significant factors, with girls whose mothers were government employees or had better economic status more likely to prefer disposing of used sanitary products promptly in outdoor bins to prevent disease spread (P≤0.05).

Table 9. Sociodemographic variables and used sanitary products (pads or bloody rags) be wrapped quickly and disposed of in an outdoor dustbin to prevent the spread of disease.

Variable		Should used sanitary products (pads or bloody rags) be wrapped quickly and disposed of in an outdoor dustbin to prevent the spread of disease?			P-value*
		Yes	No	I Don't Know	
Age		(r=-0.267), (P≤0.001)			
	Literate	16 (13.3%)	8 (22.9%)	6 (15%)	
	Primary School	16 (13.3%)	6 (17.1%)	5 (12.5%)	
Mother's Level of Education	Secondary School Graduate	21 (17.5%)	8 (22.9%)	8 (20%)	0.709
	Institute Graduate	32 (26.7%)	8 (22.9%)	9 (22.9%)	
	College/University Graduate	35 (29.2%)	5 (14.3%)	12 (30%)	
	Government Employee	65 (54.2%)	19 (54.3%)	16 (40%)	
Mother's Occupation	Self-employed	14 (11.7%)	11 (31.4%)	12 (30%)	0.007
	Housewife	41 (34.2%)	5 (14.3%)	12 (30%)	
	Sufficient	60 (50%)	9 (25.7%)	14 (35%)	
Economic Status	Barely Sufficient	58 (48.3%)	26 (74.3%)	22 (55%)	0.006
	Insufficient	2 (1.7%)	0	4 (10%)	

*P-value calculated based on Spearman correlation and Chi-Square

Table 10 illustrates the relationship between demographic variables and the practice of washing the genital area with soap and water during menstruation. A significant inverse relationship was observed between age and this practice (r=-0.218,

P≤0.001). Economic status was a statistically significant factor, with girls from better economic backgrounds more likely to wash their genital area with soap and water during menstruation (P≤0.001).

Table 10. Sociodemographic variables and used sanitary products (pads or bloody rags) be wrapped quickly and disposed of in an outdoor dustbin to prevent the spread of disease.

Variable		Should genitalia be washed with soap and water during menstruation?			P-value*
		Yes	No	I Don't Know	
Age		(r=-0.218), (P≤0.001)			
Mother's Level of Education	Literate	18 (18.4%)	6 (9.5%)	6 (17.6%)	0.285
	Primary School	11 (11.2%)	12 (19%)	4 (11.8%)	
	Secondary School Graduate	16 (16.3%)	16 (25.4%)	5 (14.7%)	
	Institute Graduate	29 (29.6%)	10 (15.9%)	10 (29.4%)	
	College/University Graduate	24 (24.5%)	19 (30.2%)	9 (26.5%)	
Mother's Occupation	Government Employee	56 (57.1%)	30 (46.7%)	14 (41.2%)	0.073
	Self-employed	12 (12.2%)	18 (28.6%)	7 (20.6%)	
	Housewife	30 (30.6%)	15 (23.8%)	13 (38.2%)	
Economic Status	Sufficient	53 (54.1%)	15 (23.8%)	15 (44.1%)	0.001
	Barely Sufficient	41 (41.8%)	46 (73%)	19 (55.95)	
	Insufficient	4 (4.1%)	2 (3.2%)	0	

*P-value calculated based on Spearman correlation and Chi-Square

4. DISCUSSION

This study examines the knowledge and practices of school-aged adolescents regarding MH, their sources of information about menstruation, the limitations imposed by menstruation in educational settings, and the factors influencing their knowledge and practices related to menstruation. The findings indicate that girls' understanding of menstruation, its causes, MH, menstrual blood flow, therapeutic interventions, exercise, and nutrition was generally inadequate, with only about 50% of the girls possessing sufficient knowledge about menstruation. The primary source of information for most girls was their mothers. Most adolescents had not attended educational classes about menstruation prior to its onset. The adolescents demonstrated satisfactory practices regarding MH, including the use of sanitary pads, hygienic practices before and after disposing of pads, and handwashing. However, menstruation and its processes negatively impacted the comfort of most adolescents in attending school and participating in educational activities. A significant challenge for adolescents was the absence of an adequate sanitary system for MH practices.

Adolescence and puberty are critical stages in girls' development, and a lack of awareness about the mechanisms of puberty and menstruation can lead to various physical, psychological, and behavioral issues [7, 8]. The mean age of girls in the present study was 13 years. In the study by Mosavi et al. (2018) examining demographic factors affecting menstrual health awareness and practices among high school girls in Hamadan, the mean age of participants was similar to that in the present study [9]. In contrast, Qaralleh et al. (2024) found that the mean age of adolescent girls in their study on menstrual knowledge and self-care behaviors was higher than in the present study, likely due to differing target populations and sampling methods [10].

Most girls had experienced menarche by age 13. In the study by Ali et al. (2024) (11) on factors influencing the age of menarche in Sharjah, UAE, the age of menarche was lower than in the present study [11]. Similarly, a study in Iran reported a lower age of menarche [12]. Environmental factors, social status, body mass index, genetic and racial factors, improved socioeconomic status, enhanced healthcare, and nutritional conditions in recent years significantly contribute to the declining age of menarche [13, 14].

The predominant reactions to menarche among adolescent girls were feelings of embarrassment and fear, consistent with reactions observed in other studies [15, 16]. These reactions are often due to insufficient preparation for this significant pubertal event, stemming from inadequate and incorrect information about menstruation. The study revealed that the primary source of information for girls about menstruation was their family members, particularly their mothers and sisters, highlighting the significant role mothers play in transferring knowledge. It underscores the need for educational programs to correct misconceptions among mothers. These findings align with the review by Uzoechi et al. (2023), which identified mothers as the primary source of menstrual information in many studies [17]. Similarly, Boruah et al. (2022) found that mothers were the main source of information about menstruation for girls [1].

The current study showed that adolescents' awareness of MH aspects was generally inadequate, with only about 50% of girls having sufficient knowledge. The lack of information about menstruation and its causes, the absence of educational classes before its onset, and insufficient knowledge about medical, exercise, and nutritional interventions during menstruation were evident. The study by Balat et al. (2019) on MH knowledge and practices among schoolgirls showed similar results, with inadequate knowledge about menstruation [18]. A study in Jordan also found that the awareness and practices regarding MH among adolescent schoolgirls were unsatisfactory, aligning with the findings of the present study [19].

The performance and behaviors of adolescents regarding MH revealed that the sanitary practices among girls were at a satisfactory level. This included the use of sanitary pads, hygienic practices before and after disposal of pads, and handwashing. In agreement with the present study, the research by Rathoria et al. (2024) investigated the influence of demographic variables on MH awareness, attitudes, and practices in adolescent girls. The study found that the girls' hygienic behaviors were similar to the findings of the current study, although the awareness level in the mentioned study was higher than in the current study [20]. In a study conducted in Iraq, the awareness and practices of adolescent girls regarding the menstrual cycle and its associated actions and restrictions were found to be inadequate, whereas the knowledge and practices in the present study were better [21].

In the study by Yadav et al. (2024), it was demonstrated that adolescent girls had high awareness and self-efficacy in managing MH. However, their behaviors were less satisfactory due to cultural factors, perceived risks, and inadequate infrastructure [22]. The study by Oshineye et al. (2023) also found that the knowledge and practices regarding MH among adolescent girls were satisfactory [23]. Similarly, Gebre et al. (2023) examined MH knowledge, practices, and related factors among girls, showing that half of the girls had adequate knowledge and hygienic behaviors, aligning with the findings of the present study [24].

Menstruation and its processes negatively impacted the comfortable school attendance and educational activities of most adolescents. The lack of proper sanitary systems for MHM posed a significant challenge for adolescents. Other studies have also shown that menstruation presents substantial challenges to girls' comfortable school attendance, adversely affecting their educational activities. Therefore, establishing accessible and suitable infrastructure and comprehensive education is essential [25, 26].

Factors such as age, the mother's education level, maternal employment status, and household economic status significantly influenced MH practices. A study in India also demonstrated that the age of the girls and their mother's education level could significantly impact the girls' knowledge and practices in MH, leading to improved use of sanitary materials and adherence to hygiene practices [27]. Similarly, Jarrahi et al. (2021) showed that the age of the girls and their mother's education level had a direct and significant impact on the knowledge and practices of adolescent girls regarding MH [12].

5. CONCLUSIONS

The knowledge of girls regarding various aspects of menstruation was moderate, with only about 50% having adequate knowledge. The primary source of information for most girls was their mothers. The adolescents' practices and behaviors concerning MH, such as the use of sanitary pads, and hygienic actions before and after pad disposal, were satisfactory. However, menstruation and its processes adversely affected comfortable school attendance and educational activities for most adolescents. Proper MHM can prevent infections, reduce reproductive health issues, increase confidence and self-esteem, and improve access to education.

Recommendations

It is recommended that more education and information about the natural changes of the menstrual cycle, hygiene, and activities during menstruation be incorporated into school curricula and textbooks to enhance awareness and improve attitudes and practices among adolescent girls. Additionally, this phenomenon should not be considered a confidential and taboo subject.

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