Knowledge and Practice toward Menstrual Health and Hygiene among Secondary School Females, Baghdad/ Karkh 2024

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Abstract

Background: The lack of basic knowledge about puberty and menstruation may contribute to the stress and shame associated with menstruation which negatively affect mental health, and unhygienic sanitation products may make girls susceptible to reproductive tract infections.

The Objectives of the Study: To assess the knowledge and practice among female students in secondary school toward menstrual health and hygiene. And to determine factors associated with knowledge and practice.

Subjects and Method: A cross-sectional study with an analytical purpose, that was carried out in Baghdad governorate in AL- Karkh side from the 14th of February 2024 to the 1st of December 2024. Seven hundred and fifty female students were selected by multistage random sampling. The data were collected by a self-reported questionnaire. Data were collected for three consecutive months (February to April)

Results: The mean age of female students was 15.67±1.895 years, there were six grades; with 125 (16.7%) female students from each one. The mean age of menarche was 12.38±1.169 years ranging between 7-16 years, out of them, 427 (56.9%) female students began menstruating at 12 years or less, and 323 (43.1%) began menstruating after 12 years. The mean knowledge score was 7.99±1.858. 254 (33.9%) participants had poor knowledge, and 496 (66.1%) had good knowledge. The mean practice score was 3.68±0.888. There were 281 (37.5%) participants had poor practice and 469 (62.5%) participants had good practice. Good knowledge was significantly associated with participants in high school, those whose mothers and fathers had a college level of education, employed mothers, and among participants whose source of knowledge about menstruation was the mother. Good practice was significantly associated with participants aged >15 years, those whose mothers had a college level of education, employed mothers, participants whose source of knowledge about menstruation was health personnel, and participants who had good knowledge.

Conclusion: A higher proportion of the total students had good knowledge and good practice.

Key words: menstrual health, menstrual hygiene, knowledge and practice.

Introduction

Menstrual Health (MH) is defined as "a state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity, in relation to the menstrual cycle." [1] Menstrual hygiene management (MHM) refers to the management of hygiene associated with the menstrual process. [2]

May 28th is designated as "Global Menstrual Hygiene Day" in order to acknowledge its influence on women's lives, which was introduced by WASH United (Safe Drinking Water, sanitation, and Hygiene) to create awareness and recognize the rights of girls to manage their menstruation hygienically. Although it is a normal biological process and a key sign of reproductive health, yet in various cultures, it is treated as something negative, shameful, or dirty. [3, 4]

Globally, approximately 52% of the female population (26% of the total population) is within reproductive age. It is estimated that 10% of women worldwide are exposed to genital infections including urinary tract infections and bacterial vaginosis, and 75% of women have a history of genital infection due to pregnancy, poor perineal hygiene, and poor menstrual hygiene. [5]

Menstruation (also called a "period") is a normal biological process experienced by millions around the world each month. The external manifestation of a normal menstrual cycle is the presence of regular vaginal bleeding. This occurs as a result of the shedding of the endometrial lining following failure of fertilization of the oocyte or failure of implantation. The cycle depends on changes occurring within the ovaries and fluctuation in ovarian hormone levels, which are themselves controlled by the pituitary and hypothalamus, the hypothalamo–pituitary–ovarian axis (HPO). [6, 7]

Menstrual materials are used to catch menstrual blood. There are two main types: disposable materials (including tampons and disposable sanitary pads) and reusable materials (including reusable pads, cloths, and menstrual cups). Menstrual supplies are other supportive items for menstrual hygiene and health more broadly, such as soap, underwear, and pain relief. [8]

According to a study in Iraq, 36% of secondary school female students had a good level of knowledge regarding menstruation. According to a study in Egypt, more than two-thirds (68%) of participants had a satisfactory level of knowledge related to menstruation. Another study in Egypt showed that 90% of students had acceptable menstrual hygiene. A study in Saudi Arabia revealed that 64% had poor knowledge and 81% had poor menstrual hygiene practices. According to a study in Ethiopia, it was shown that 68.3% had poor knowledge of menstruation and 60.3% of girls had poor menstrual hygiene practices. [9- 13]

The Rationale of the Study

The lack of basic knowledge about puberty and menstruation may contribute to the stress and shame associated with menstruation which can negatively affect mental health, and unhygienic sanitation products may make girls susceptible to reproductive tract infections – all affecting sustainable developmental goals (SDG) health outcomes (Goal 3), (Goal 3: Good Health and Well-being). [2]

The girls may be absent or less attentive in school during menstruation due to a lack of WASH facilities or support from the school community, affecting education (Goal 4), or at work, affecting economic

opportunities (Goal 8). Gender equality (Goal 5) cannot be achieved when taboos and myths prevent menstruating women and girls from full participation in society. [2]

The young adolescent girls tend to be less prepared for MHM and suffer from anxiety, apprehensions, fear, and shame during their menses. Menstrual health impacts half of the global population for up to 40 years of their lives. Yet, MH challenges have been under-researched and under-acknowledged. MH is gaining greater attention and is increasingly recognized as essential to achieving gender equality and sustainable development goals. [14- 17]

The current work was conducted aiming to:

1. Assess the knowledge and practice among female students in secondary school toward menstrual health and hygiene.
2. Determine factors associated with knowledge and practice.

Subjects and Methods:

A cross-sectional study with an analytical purpose was carried out in Baghdad governorate in AL- Karkh side from the 14th of February 2024 to December 202. The target population was represented by female students attending governmental secondary schools in Baghdad/Al-Karkh educational directorate (of first, second, and third Al-Karkh). Students were eligible to participate in the study from first, second, third, fourth, fifth, and sixth grades.

Female students from selected intermediate and high schools in Baghdad/ Karkh (directorate of education of first, second, and third Karkh) was selected by Multistage random sampling.

Stage 1: Selection of Schools

A representative number of intermediate and high schools in the Baghdad/Karkh area was selected by simple random sampling. Twelve schools were selected randomly as follows: Two intermediate and two high schools from each directorate were selected by simple random sampling.

Stage 2: Selection of Classes

Each school contains 3 grades; first, second, and third for intermediate school and fourth, fifth, and sixth for secondary school. Two classes from each grade were chosen by simple random sampling.

Stage 3: Selection of Participants

Within the selected classes, 10 or 11 students were picked up by simple random sampling.

Sample Size was determined by using the standard equation for the calculation of the sample size of cross-sectional studies [18]

$n= p(1-p)(Z\backslash E)^{2}$

The minimally needed sample is expected to be 384 subjects. The sample was further expanded to 750 female students, to obtain more valid results.Girls who haven't had their first period (menarche) and those who were married were excluded from the study.

Class-by-class, questionnaires were distributed, then the items were explained and instructions were given regarding filling out the forms. Thereafter, the students started to answer the questions; meanwhile, any further inquiries were answered by the researcher. After reviewing relevant literature, a structured questionnaires were adapted and modified to the cultural norms of the study area [19- 21].

The Questionnaire included the following data:

Part 1: Socio-Demographic and Family-Related Questions

Part 2: -Menstrual Health Knowledge-Related Questions

Part 3: -Menstrual Hygiene Practice-Related Questions

Scoring

Knowledge: One point was given for each correct answer and zero points for don't know or incorrect answers. Thus, the highest possible score was 13 points (items 1-10, 12, 13) were included in the scoring. The mean score of menstrual knowledge was computed and used as a cutoff point to classify. Good knowledge of menstruation and menstrual hygiene was given to those respondents who scored greater than or equal to the mean, and poor knowledge of menstruation and menstrual hygiene was given to those respondents who scored below the mean score. [19, 21]

For practice: One point was given for each positive practice and zero points for each negative practice. Thus, the highest possible score was 5 points (items 1, 4, 6, 7, and 8) were included in the scoring. Accordingly, the mean score was used to decide the cutoffs of the classification. Good practice of menstrual hygiene was given to those respondents who scored greater than or equal to the mean score and poor practice of menstrual hygiene was given to those respondents who scored below the mean score [19, 21].

Data Management and Statistical Analysis

Microsoft Excel 2010 and IBM SPSS version 26 were used for data entry, management, and analysis. Descriptive analysis was presented in numbers, tables, and graphs. Analytical statistics using the Chi-square test to show the association between knowledge and practice and variables under study. P value of less than 0.05 was considered as statistically significant.

Ethical Considerations

Official approval was obtained from the scientific committee of the Iraqi Board of Medical Specializations, the Department of Family and Community Medicine, and second approval from the directorate of education of (first, second, and third) Al-Karkh. Verbal consent was obtained from the participants, and data were kept confidential and not used only for scientific purposes.

Results:

This study enrolled 750 female students, with a mean age of 15.67±1.895 years ranging between 12-25 years, out of them 334 (44.5%) were 15 years old or below and 416 (55.5%) were older than 15 years. Most of the participants lived with their both parents 658 (87.7%). Mother's and father's educational status was mostly secondary level 288 [(38.4%) and 286 (38.1%)] respectively. Mothers were most commonly housewives 449 (59.9%); while fathers were governmental employees 389 (51.9%) then self-employed 280 (37.3%). (Table 1).

Table (1): Sociodemographic Data of Participants n=750 in Baghdad, 2024.

Variables		No.	%
Age group/ years:	≤15	334	44.5%
	>15	416	55.5%
Age of menarche/ years:	≤12	427	56.9%
	>12	323	43.1%
With whom do you live?	Both parents	658	87.7%
	Mother only	57	7.6%
	Relatives	12	1.6%
	Father Only	23	3.1%
Mother's educational status?	Illiterate	41	5.5%
	Primary	237	31.6%
	Secondary	288	38.4%
	College	135	18.0%
	Postgraduate	49	6.5%
Father's educational Status:	Illiterate	29	3.9%
	Primary	145	19.3%
	Secondary	286	38.1%
	College	200	26.7%
	Postgraduate	90	12.0%
Mother's occupation:	Housewife	449	59.9%
	Employed	255	34.0%
	Self-employed	32	4.3%
	Retired	14	1.9%
Father's occupation:	Unemployed	31	4.1%
	Employed	389	51.9%
	Self-employed	280	37.3%
	Retired	50	6.7%

588 (78.4%) had heard about menstruation before menarche, and their source of knowledge about menstruation was mostly from their mothers 432 (73.5%), then friends 67(11.4%) followed by mass media 50 (8.5%), teacher 17(2.9%), book 13 (2.2%) and health personnel 9(1.5%).

The mean knowledge score was 7.99±1.858. Participants with less than the mean knowledge score had poor knowledge, while Participants with more than the mean knowledge score had good knowledge. As shown in Figure 1, 254 (33.9%) participants had poor knowledge, and 496 (66.1%) had good knowledge.

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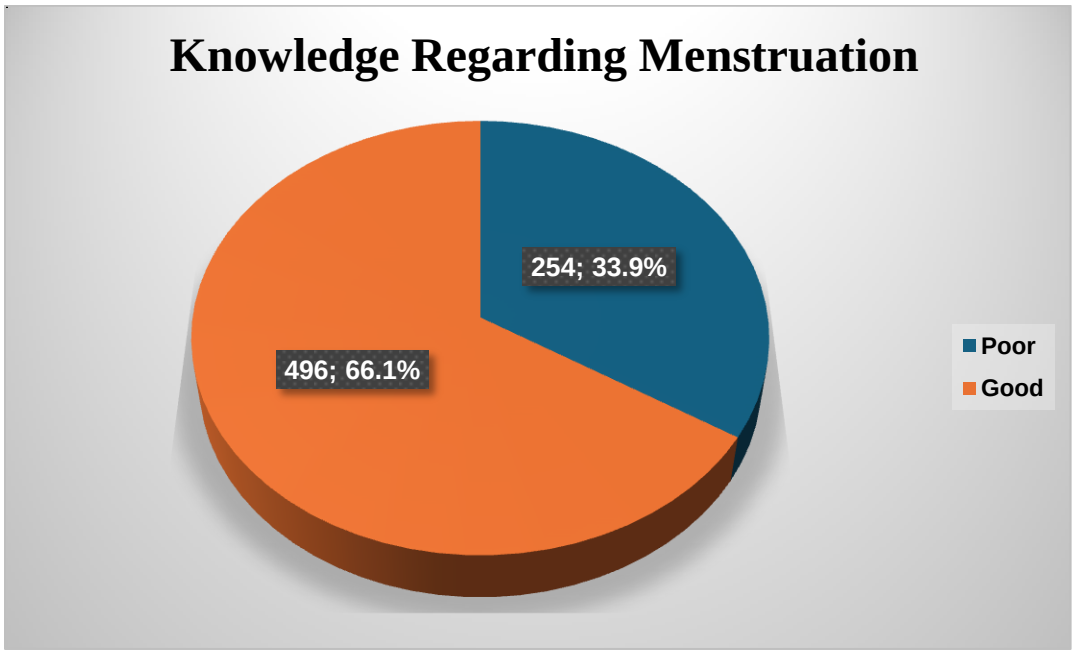

Figure (1): Knowledge of Participants Regarding Menstruation (n=750) in Baghdad,2024

Responses of participants to knowledge questions about menstruation are shown in Table 2. There were 640 (85.3%) participants who knew that menstruation was a physiological process, 549 (73.2%) knew that hormones were the cause of menstruation, 222 (29.6%) knew that the onset of menarche implied the capability of conceiving, 689 (91.9%) knew that the age of menarche was 8-18 years, 596 (79.5%) knew that 2-7 days was the normal menstrual bleeding duration, 483 (64.4%) knew that 20-35 days was the normal duration of the menstrual cycle, 708 (94.4%) knew that menstruation did not continue lifelong, 109 (14.5%) knew that menstruation blood was hygienic, 213 (28.4%) knew that menstruation blood was odorless, The absorbent materials used during menstruation that participants knew were pads 709 (94.5%) and clothes 41 (5.5%). There were 440 (58.7%) participants who knew that taking a bath during menstruation was not harmful.; and girls who were menstruating didn't need to rest and could do heavy activities 158 (21.1%).

Table (2): Responses of Participants to Knowledge Questions about Menstruation (n=750) in Baghdad, 2024.

Variables		No.	%
1. Menstruation is:	Physiological Process*	640	85.3%
	Pathological	23	3.1%
	I don't know	87	11.6%
2. The cause of menstruation is:	Hormones*	549	73.2%
	Is caused by a disease	9	1.2%
	I don't know	192	25.6%
3. The onset of menarche implies :	Capable of conceiving*	222	29.6%
	Ready for marriage	179	23.9%
	I don't know	337	44.9%
	Puberty	12	1.6%
4. The age of menarche is:	8-18 years*	689	91.9%
	<8 or >18 years	61	8.1%
5. The bleeding organ during menstruation is:	Uterus*	599	79.9%
	Urinary bladder	48	6.4%
	I don't know	103	13.7%
6. Normal menstrual bleeding duration is:	<2 Days	15	2.0%
	2-7 Days*	596	79.5%
	>7 Days.	66	8.8%
	I don't know	73	9.7%
7. The normal duration of the menstrual cycle is:	<20 Days	101	13.5%
	20-35 Days*	483	64.4%
	>35 Days	52	6.9%
	I don't know	114	15.2%
8. Menstruation doesn't continue lifelong.	Yes*	42	5.6%
	No	708	94.4%
9. Menstruation blood is:	Hygienic*	109	14.5%
	Unhygienic	641	85.5%
10. Menstruation blood is:	Foul-Smelling	537	71.6%
	Odorless*	213	28.4%
11. The absorbent materials you know that are used during menstruation:	Pads	709	94.5%
	Others (pads and clothes)	41	5.5%
12. It's harmful to take a bath during menstruation.	Yes	310	41.3%
	No*	440	58.7%
13. Girls who are menstruating need to rest and can't do heavy activities.	Yes	592	78.9%
	No*	158	21.1%
14. I heard about menstruation before menarche.	Yes	588	78.4%
	No	162	21.6%

Good knowledge was significantly associated with participants in high school, the mother's and father's educational status was college, and employed mother, P<0.05. While poor knowledge was significantly associated with participants who had unemployed fathers, P<0.001. (Table 3).

Table (3): Association between Sociodemographic Data and Participants' Knowledge about Menstruation (n=750) in Baghdad, 2024.

		Knowledge				
		Poor		Good		
		No.	%	No.	%	
Age group/ years	≤15	123	36.8%	211	63.2%	0.14
	>15	131	31.5%	285	68.5%	
Grade	Middle school	174	46.4%	201	53.6%	0.046
	High school	146	38.9%	229	61.1%	
Age of menarche/ years	<12	140	32.8%	287	67.2%	0.48
	≥12	114	35.3%	209	64.7%	
With whom do you live?	Both parents	218	33.1%	440	66.9%	0.13
	Mother only	18	31.6%	39	68.4%	
	Relatives	7	58.3%	5	41.7%	
	Father Only	11	47.8%	12	52.2%	
Mother's Educational Status	Illiterate	23	56.1%	18	43.9%	0.001
	Primary	80	33.8%	157	66.2%	
	Secondary	99	34.4%	189	65.6%	
	College	31	23.0%	104	77.0%	
	Above	21	42.9%	28	57.1%	
Father's Educational Status	Illiterate	20	69.0%	9	31.0%	0.001
	Primary	55	37.9%	90	62.1%	
	Secondary	92	32.2%	194	67.8%	
	College	59	29.5%	141	70.5%	
	above	28	31.1%	62	68.9%	
Mother's Occupation	Housewife	260	57.9%	189	42.1%	<0.001
	Employed	36	14.1%	219	85.9%	
	Self-employed	15	46.9%	17	53.1%	
	Retired	9	64.3%	5	35.7%	
Father's Occupation	Unemployed	23	74.2%	8	25.8%	<0.001
	Employed	126	32.4%	263	67.6%	
	Self-employed	89	31.8%	191	68.2%	
	Retired	16	32.0%	34	68.0%	

Participants' responses about their practice toward menstruation are shown in Table 4. There were 228 (30.4%) who freely discussed menstruation issues with their parents or friends, of them; 75 (32.9%) discussed menstrual hygiene management, 10 (4.4%) discussed methods on how to use sanitary pads, and 143 (62.7%) discussed both subjects.While most of the participants 522 (69.6%) didn't freely discuss menstruation issues with their parents or friends; this was because of shamefulness 166 (31.8%), not habitual 78 (14.9%), or privacy 278 (53.3%).

There were 721 (96.1%) participants using sanitary pads, 27 (3.6%) using new cloth pieces, and 2 (0.3%) participants using old cloth pieces. Mothers were the most common person who bought the sanitary material for participants 535 (71.3%), then fathers 109 (14.5%).

Most of the participants washed their genitalia during menstruation 735 (98.0%); out of them, 347 (47.2%) washed their genitalia with water and 388 (52.8%) washed their genitalia with water and Soap; also; 407 (55.4%) were washing their genitalia daily.

During their menstrual cycle, 539 individuals (71.9%) changed ≥3 sanitary pads per day, and 676 (90.1%) disposed of their menstrual materials after use through waste bins. Participants who took a bath during menstruation (exceptional from the usual) were 588 (78.4%).

The most common remedial measures used for problems were pills 273 (36.4%), then hot drinks 110 (14.7%). Thirty-six percent (271) of participants had missed school because of menstruation; this is mostly due to pain 193 (62.9%). If menstruation happened in school, 300 (40.0%) participants used extra pads while 230 (30.7%) participants waited to return home.

Disposable materials were used by 692 (96.0%) participants and 29 (4.0%) participants used reusable materials. Out of the total participants that used reusable materials; the reason for not using a disposable sanitary pad was shyness from purchasing it 16 (55.2%), didn't know about them 11 (37.9%), and due to unavailability 2 (6.9%). Also; 18 (62.1%) of them washed the reusable cloth with soap and water and 11 (37.9%) washed it with water. Nineteen (65.5%) of them put/ kept their reusable sanitary pads after washing for drying in shadow, and 10 (34.5%) in sunlight.

Table (4): Responses of Participants (n=750) to Practice Questions about Menstruation in Baghdad, 2024.

Practices		**No.**	**%**
1. I freely discuss menstruation issues with my parents or friends.	Yes*	228	30.4%
	No	522	69.6%
Yes, about (n.228)	About menstrual hygiene management	75	32.9%
	About methods on how to use sanitary pads	10	4.4%
	both	143	62.7%
No, because (n.522)	Because of shamefulness	166	31.8%
	Not habitual	78	14.9%
	Privacy	278	53.3%
2. Sanitary material I use during menstruation	sanitary pads	721	96.1%
	New cloth pieces	27	3.6%
	Old cloth pieces	2	0.3%
3. The person who buys the sanitary material for me	Father	109	14.5%
	Mother	535	71.3%
	Me	86	11.5%
	Brother	7	0.9%
	Sister	13	1.7%
4. I wash my genitalia during menstruation.	Yes*	735	98.0%
	No	15	2.0%
Yes, I use no.735	Water*	347	47.2%
	Water and Soap	388	52.8%
5. Number of times I wash my genitalia during menstruation. (n.735)	Daily*	407	55.4%
	Not daily	328	44.6%
6. The number of sanitary pads I change daily during menstruation.	<3	211	28.1%
	≥3*	539	71.9%
7. The way I dispose of menstrual materials after using them.	Open field	13	1.7%
	Latrine	19	2.5%
	Waste bins*	676	90.1%
	Burn them	31	4.1%
	Wash it	7	0.9%
	Bury it	4	0.5%
8. I take a bath during menstruation (exceptional from the usual).	Yes*	588	78.4%
	No	162	21.6%
9. Remedial measures for problems:	Pills	273	36.4%
	Injection	5	0.7%
	Hot drink	110	14.7%
	Herbal remedy	25	3.3%
	Hot water	44	5.9%
	Nothing	293	39.1%
10. I missed school because of menstruation.	Yes	271	36.1%
	No	479	63.9%
Yes, because. (n.271)	Afraid of odor	5	1.6%
	Being teased	25	8.1%
	Staining clothes	31	10.1%
	Pain	193	62.9%
	Lack of water	3	1.0%
	Lack of a convenient place to wash	1	0.3%
	Unclean/no latrine to change pad	13	4.2%
11. My action If menstruation happens in school is	Used Extra pads	300	40.0%
	Waiting	230	30.7%
	Shop	74	9.9%

	Friend	38	5.1%
	Teacher	108	14.4%
Using a disposable vs reusable material.	Disposable material	692	96.0%
	Reusable material	29	4.0%
12. The reason for not using a disposable sanitary pads (n.29)	Didn't have the knowledge	11	37.9%
	Unavailable	2	6.9%
	Shyness from purchasing them	16	55.2%
13. The materials I use for washing the reusable cloth (n.29)	With soap and water*	18	62.1%
	Water	11	37.9%
14. I put/ keep my reusable sanitary pads after washing for drying. (n.29)	Shadow	19	65.5%
	Sunlight*	10	34.5%

The mean practice score was 3.68±0.888. Participants with less than mean practice score had poor practice, while participants with more than mean practice score had good practice. There were 281 (37.5%) participants had poor practice and 469 (62.5%) participants had good practice, as shown in Figure (2).

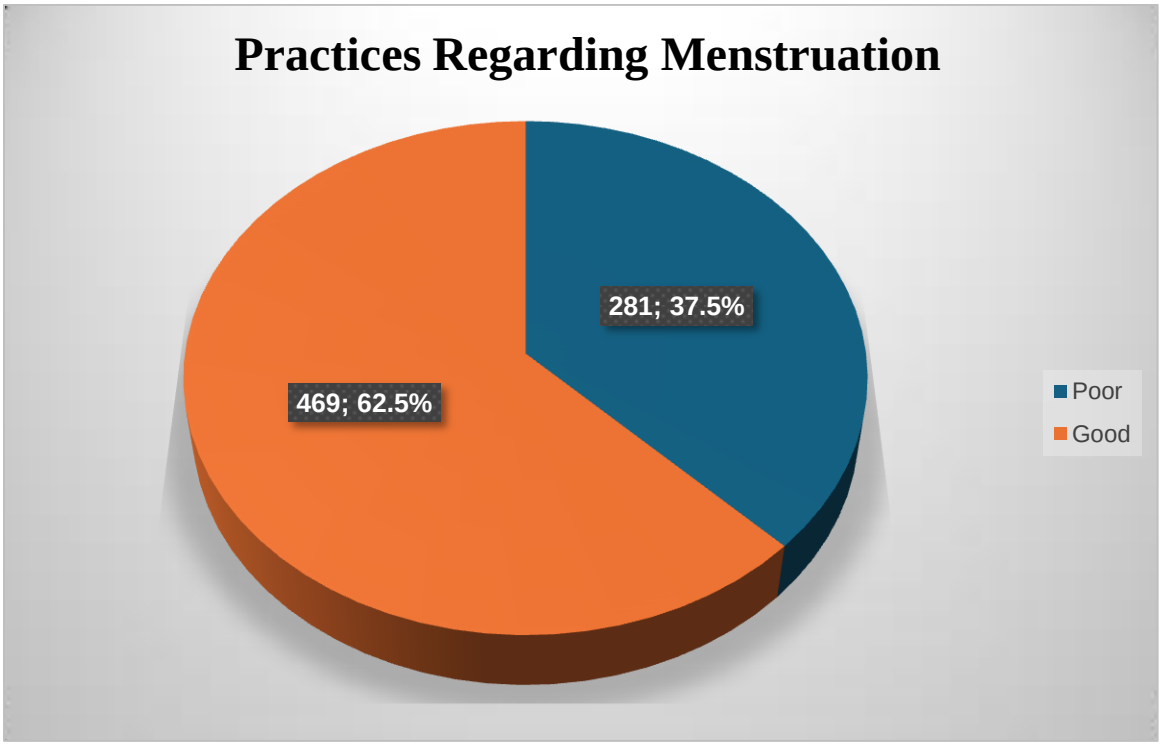

Figure (2): Practice of Participants Regarding Menstruation (n=750) in Baghdad, 2024.

Good practice was significantly observed among participants aged >15 years, mother's educational status was college, and employed mother, P<0.05. Table (5).

Table (5): Association between Sociodemographic Data and Participants' Practice of Menstruation (n=750) in Baghdad, 2024.

		Practice				
		Poor		Good		
		No.	%	No.	%	
Age group/ years	<15	141	42.2%	193	57.8%	0.019
	>15	140	33.7%	276	66.3%	
Grade	Middle school	145	38.7%	230	61.3%	0.54
	High school	136	36.3%	239	63.7%	
Age of menarche/ years	<12	149	34.9%	278	65.1%	0.11
	>12	132	40.9%	191	59.1%	
With whom do you live?	Both parents	242	36.8%	416	63.2%	0.65
	Mother only	24	42.1%	33	57.9%	
	Relatives	6	50.0%	6	50.0%	
	Father Only	9	39.1%	14	60.9%	
Mother's educational status	Illiterate	28	68.3%	13	31.7%	<0.001
	Primary	104	43.9%	133	56.1%	
	Secondary	96	33.3%	192	66.7%	
	College	38	28.1%	97	71.9%	
	Above	15	30.6%	34	69.4%	
Father's education	Illiterate	13	44.8%	16	55.2%	0.60
	Primary	61	42.1%	84	57.9%	
	Secondary	105	36.7%	181	63.3%	
	College	71	35.5%	129	64.5%	
	Above	31	34.4%	59	65.6%	
Mother's occupation	Housewife	186	41.4%	263	58.6%	0.04
	Employed	79	31.0%	176	69.0%	
	Self-employed	11	34.4%	21	65.6%	
	Retired	5	35.7%	9	64.3%	
Father's occupation	Unemployed	14	45.2%	17	54.8%	0.66
	Employed	150	38.6%	239	61.4%	
	Self-employed	99	35.4%	181	64.6%	
	Retired	18	36.0%	32	64.0%	

Discussion

The majority of participants in this study were aware that menstruation was a physiological process, that agreed with studies by Boruah *et al.*, 2022 [22] and Shumie and Mengie 2022 [19], where 91.76% and 77.8% of the sample respectively knew this fact. Less than three-quarters recognized that the cause of menstruation was hormones, and more than three-quarters realized that the uterus was the bleeding organ during menstruation. Those findings followed Gena 2020 [20] who found that 73.1% and 73.4% of participants respectively, knew the cause and the bleeding organ of menstruation.

Less than one-third of females in this study responded that the onset of menarche implied the capability of conceiving, which matched the results of Shah *et al.*, 2023 [23] where 29% of females believed that menstruation was an indicator of fertility. More than three-quarters of the selected females in the current study were familiar with the normal duration of menstrual bleeding, which supported the results by Shumie and Mengie 2022 [19] 69.8% and Al Mutairi and Jahan 2021 [24] 70.5%.

Less than one-half of the participants thought that taking a bath during menstruation was harmful, which was consistent with the findings of Shah *et al.*, 2023 [23] who revealed that about 37.6% of participants said it was best to keep away from washing one's body while one is menstruating.

In this study, more than three-quarters of the students had heard about menstruation before menarche, and their mothers were the main source of knowledge about menstruation. Additional studies confirmed these results, in Northeast Ethiopia, Shumie and Mengie 2022 [19] stated that 69.4% of adolescent girls had learned about the menstrual cycle before menarche primarily from their mothers. According to Kitesa *et al.*, 2016 [25], 72.8% of girls knew about menstruation before it started. The primary reason why mothers serve as the predominant educators about the menstrual cycle is the delicate subject matter of menstruation [23], so girls feel more at ease talking about their periods with their mothers.

Two-thirds of the selected sample had good knowledge, and the rest had poor knowledge. These observations were supported by other studies. The percentages of students with good knowledge were 57.7% in a study in the United Arab Emirates by Ali *et al.*, 2024 [26], 69.7% in a Nigerian study by Nnennaya *et al.*, 2021 [27], 64.9% in an Ethiopian study by Shumie and Mengie 2022 [19], and 72.6% in an Ethiopian study by Hussein *et al.*, 2022 [28].

It was noticed that high school pupils were found to be more likely to have good knowledge compared to middle school students, which was consistent with other studies in Egypt, Ethiopia, the United Arab Emirates, and India [10, 19, 25, 26, 29] that found a positive association between the level of education (grade) of participants and knowledge. Possible explanations for this association include the fact that girls learn more about menstruation and how to manage it hygienically as they get older (for instance, the Iraqi educational curriculum states that students begin learning about menstruation at the end of the third grade of intermediate level).

It was realized that a higher parental level of education was significantly related

to a good level of knowledge. Fehintola *et al.,* 2017 [30] stated that as the parents' degree of education increased, the level of understanding of menstruation and menstrual hygiene increased as well. Kitesa *et al.,* 2016 [25] found that girls with mothers who completed grades 7–12 had a 3.13 times higher likelihood of knowing about menstruation and menstrual hygiene than their counterparts with mothers who did not complete school, in addition to that, girls whose mothers had a diploma degree or above were 5.94 times more likely to be knowledgeable about menstruation and menstrual hygiene than their counterparts. This could be due to the reason that girls from educated families may openly discuss sexual and reproductive health concerns, including menstruation [25].

This study showed that students whose mothers were employed were more likely to have a good level of knowledge. While poor knowledge was significantly observed among participants who had unemployed fathers, the same finding was observed by Al Mutairi and Jahan 2021 [24] who reported that good knowledge was significantly associated with daughters of working mothers. This might be due to the reason that employed persons are more likely to have some degree of education compared to unemployed people.

It was demonstrated that participants who learned about menstruation from their mothers showed significantly higher levels of knowledge, which was in accordance with Ali *et al.,* 2024 [26] who observed that those who got information on menstruation from their mothers knew more about menses overall.

More than two-thirds of the recruited sample avoided speaking to their parents or friends about their menstrual troubles; Gebre *et al.,* 2023 [31] demonstrated the same observations and stated that 66.8% of participants did not freely talk to their parents and friends about menstrual problems. Almost all the participants washed their genitalia during menstruation and more than one-half of them washed their genitalia daily, and that agreed with two other studies where the rates of those who washed their genitalia during menstruation were as follows: Salama *et al.,* 2020 [11] 94.6% and Gena 2020 [20] 96.1%.

Less than three-quarters of females in this study changed at least three sanitary pads every day during their menstrual cycle, and the majority disposed of their menstrual products in waste containers after using them. This was in line with the findings of Ali *et al.,* 2024 [26], where 74.3% of participants changed their sanitary pads three times or more, and 97.4% of them disposed of menstrual materials properly.

More than three-quarters of the selected sample took a bath during menstruation, which agreed with Salama *et al.,* 2020 [11] who stated that 73.3% bathed during their period, on the other hand, it was contrary to Shah *et al.,* 2023 [32] where only 41% took a bath during menstruation. This may be justified by different cultures and beliefs among different regions of the world.

Over one-third of participants reported missing school due to menstruation and less than two-thirds stated that it was due to pain. Similar findings were revealed by Al Mutairi and Jahan 2021 [24] where 34.5% were missing school, 68.4% of them because of pain.

Almost all participants used disposable sanitary pads, and that was similar to Salama *et al.,* 2020 [11] where 98.6% used disposable sanitary pads. Out of the total participants that used reusable

materials; less than two-thirds of them washed the reusable cloth with soap and water. Around one-third of them put/ kept their reusable sanitary pads after washing for drying in sunlight. Gebre *et al.,* 2023 [31] revealed that 60.1% washed reusable sanitary pads with soap and water, and Gena 2020 [20] noted that 25% dried reusable sanitary pads in the sunlight, both of which were similar to this study.

In the present study, it was observed that less than two-thirds of the students had good practice and the remaining had poor practice toward menstruation. The results aligned with other studies, Ali *et al*., 2024 [26] in the United Arab Emirates demonstrated that 54.7% of the sample adopted good hygiene habits toward menstruation. Shumie and Mengie 2022 [19], noticed that 62.4% of girls in Northeast Ethiopia managed their menstruation hygienically. Hussein *et al.,* 2022 [28] reported that 68% of the participants had good menstrual hygiene practices.

The participants aged >15 years showed significantly good practice, which was in agreement with other studies, according to Belayneh and Mekuriaw 2019 [13], teenage schoolgirls under the age of 15 years had a 1.71-fold higher probability of practicing poor menstrual hygiene than girls who were at least 15 years old. Yogesh *et al.,* 2023 [32] stated that girls aged 16-19 years were more likely to have good menstrual hygiene practices than girls aged 10–15 years. This could be explained by the possibility that older girls have better opportunities than younger girls to share more information, learn enough about menstrual hygiene, and prepare themselves to practice safe hygiene throughout their menstrual period [13].

Good practice was dominant among students whose mothers' educational level was college, as well as with employed mothers. These observations were in line with studies in Iran [12], Ethiopia [33], Addis Ababa [34], India [35], Ghana [36], and Nigeria [37]. According to the Iranian study by Siabani *et al.,* 2018 [12], menstrual practice was significantly related to the mother's education. In Ethiopia, Daniel et al, [33] reported that teenage girls whose mothers were college graduates or higher were more likely to manage their menstrual hygiene than females whose mothers were uneducated. This may be because literate women are better able to educate their daughters about managing menstrual hygiene, and they also tend to have more mother-daughter communication around menstruation than illiterate moms. A systematic review and meta-analysis by Anbesu and Asgedom 2023 [38] showed that adolescent girls from educated mothers were 2.33 times more likely to practice menstrual hygiene than their counterparts (OR = 2.33, 95% CI 1.32, 4.12). This may be because mothers are the primary educators of adolescents regarding menstrual hygiene, especially in light of the challenges posed by societal taboos and shame. Furthermore, teenage girls in impoverished nations frequently grow up with little knowledge of menstruation and little involvement from males to help their wives and daughters manage period hygiene [38].

Conclusions

1- A high proportion of the total students had good knowledge and good practice.

2-Good knowledge was dominant among participants in high school, the parents' educational status was college, employed mother, and whose source of knowledge about menstruation was the mother.

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