Impact of a School-Based Educational Program on Knowledge and Self-Care Practices Related to menstruation among female students in Al-Kut City/ Iraq

Noor bader kutar [1*], Jenan Akbar Shakoor [2]
[1] MSc Student, Department of Community Health Nursing, College of Nursing, University of Kirkuk, Kirkuk, Iraq
[2] Assistant Professor (PhD), Department of Community Health Nursing, College of Nursing, University of Kirkuk, Kirkuk, Iraq

* Corresponding Author: **Noor bader kutar**

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Abstract
Objective: To identify the impact of an Educational Program on Knowledge and self-care Practices Related to Menstruation among adolescent girls in Al-Kut City/Iraq
Methods: A quasi-experimental pre-test–post-test control group design was conducted in governmental female secondary schools in Al-Kut city, Iraq, from November 2025 to April 2026. A purposive sample of 200 female students (4th and 5th) secondary grade assigned in to an intervention group (n=100) and a control group (n=100). The sample size was determined using G* power software (version 3.1.9.7). Data were collected using a structured questionnaire consisting of four parts; sociodemographic characteristics for students and sociodemographic characteristics for parents', Knowledge regarding menstruation and Self-Care Practices During Menstruation. The data were analysed using (SPSS), version 26.0, with P value < 0.05 considered statistically significant.
Results: The study group showed significant improvement in knowledge levels in the post test, shifting from "Average"/ "Incorrect" responses to a good knowledge regarding to menstruation, symptoms of puberty, usual length of bleeding during menstrual period, and functions and illness related to menstrual cycle. In particular, the control group demonstrated a slight increase in knowledge on menarche and menstrual cycle; however less significant than the intervention group. In general, the intervention group had more knowledge than control group after engagement in an educational program. The findings showed The study group had significant high self-care practices scores at post-test in most of the items, and many of them were in "Good" category. The mean score rose from 21.05(±2.962) during the pre-test to 24.76 (±2.663) during the post-test after engagement in an educational program. In contrast, the students in the control group show no clear change in mean score during the pre-test (20.88±2.861) and post-test (20.68±2.860), 58% of students demonstrate average self-care practices during pre-test and post-test.
Conclusion: the education program significantly enhances knowledge and self-care practices among Female adolescents school students' compared to the control group.
Recommendations: Conducting regular school based educational sessions on menstruation and self-care practices, as well as integration menstrual health education into the secondary school curriculum.

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Introduction

Adolescence is a period characterized by significant physical and psychological challenges for young females. The onset of menstruation signifies a crucial transition from childhood to adulthood, triggering numerous physiological changes and emotional responses that significantly impact adolescents' experiences and overall well-being [1]. The World Health Organization (WHO) defines self-care as a broad concept that includes both general and personal hygiene. Nutritional and lifestyle factors, including physical activity, self-management, and compliance with therapeutic regimens for pre-existing

conditions [2]. Menstrual hygiene management (MHM) is a critical component of the health and welfare of adolescent girls, particularly in developing nations where cultural stigmas surrounding menstruation and restricted access to resources and information pose significant obstacles. [3]. The World Health Organization indicates that global menstrual health and hygiene requirements are neglected due to restricted access to information, education, products, and services, alongside insufficient facilities and disparities. [4] Iraq confronts unique challenges in the area of adolescent health, especially managing menstrual hygiene, as a result of decades of conflict, economic sanctions, and political instability. Lack of knowledge, stigma, and restricted access to youth-friendly healthcare treatments are some examples of these obstacles. [5].

Although previous research has highlighted the importance of educational programs in enhancing students' understanding of reproductive health through lectures, school health providers, the media, and specialised curricula, little research has been done in Iraq to assess the programs' actual efficacy. The majority of research to date has primarily measured students' knowledge levels without putting formal interventions into place or analyzing how they affect their self-care habits. This is a glaring need for studies evaluating how school-based learning initiatives might improve teenage girls' reproductive health-related knowledge and practical self-care practices. [6] The detrimental effects that could arise from adolescents not receiving the proper information further highlight the importance of reproductive health education. Menstrual discomfort or humiliation is a prevalent problem that can lead to female pupils missing school or feeling alone. [7]

This study is unparalleled in Iraq, as previous research has exclusively concentrated on adolescents' knowledge and attitudes regarding reproductive health, failing to evaluate the effects of a structured health education program. Reproductive health is a crucial health issue that directly impacts the welfare of individuals and communities, particularly adolescents. Surveys reveal that most female secondary school students in Iraq possess insufficient knowledge about reproductive health, consequently subjecting them to numerous social and health risks. A survey in the Basra Governorate indicated that 287 students aged 14 to 23 lack sufficient knowledge of reproductive health, highlighting the urgent need for health education programs to improve this awareness. [6] therefore, the current study aimed to evaluate the Impact of an educational program on knowledge and Self-Care Practices Related to menstruation among secondary school female students in Al-Kut city.

Materials and Methods

Study Design and Setting

A quasi-experimental study design was employed using a pre-test and post-test approach for both the study and control groups. An educational program regarding knowledge and self-care practices related to menstruation was implemented only for the study (intervention) group. The study was conducted in governmental female secondary schools in Kut, Iraq, from November 2025 to April 2026. Kut is the capital city of Wasit Governorate, located in eastern Iraq, approximately 180 kilometres southeast of Baghdad [8]. The study was conducted in four governmental female secondary schools. The schools were randomly selected and divided into study and control groups. Since schools in Wasit City are categorized into two educational sectors, two secondary schools were selected for the study group and two for the control group.

Participants and Sampling

The study employed non-probability purposive sampling to select four governmental female secondary schools in Al-Kut city. A total of 200 female students from these schools were equally divided into two groups: the intervention group (n = 100) and the control group (n = 100). The sample size was calculated utilizing G*Power software (version 3.1.9.7). The minimum requisite sample size was 176 participants, with 88 allocated to each group. The sample size was augmented to 200 participants to bolster statistical power and mitigate potential attrition, with equal distribution between the intervention and control groups. The data was gathered through the distribution of questionnaire forms to participants for the self-filling technique grouping. The study sample comprised 50 participants from Al Kut, 50 participants from Al Noor, 50 participants from Al Amal, and 50 participants from Khawla bint al-Azwar, all from Al Kut city. Exclusion criteria included: married students and who are not willing to participate and not available during the data collection.

Study Instrument

Data Collection was conducted using the self-report technique consists of three main parts. Part one: that represent the Socio-demographic characteristics of the students which included: (Age, grade, Residency, the students live with, number of family members, source of information. Part two: that represent the knowledge Related to Menstruation [6] items: Menarche refers to? Signs of puberty in girls include? The normal duration of menstrual bleeding is? The menstrual cycle functions to? Menstrual disorders refer to? Dysmenorrhea is defined as? and Part Three represents the Self-Care Practices During Menstruation. This part contains [9] items assessing self-care practices during menstruation. Responses were measured using a three-point Likert scale: Always (3), Sometimes (2), and Never (1).

Education program

Prior to the implementation of the educational program, a pre-test was administered to assess the students' baseline knowledge and self-care practices related to menstruation. In addition, written consent was obtained from the parents of the participating female students. The educational program was implemented exclusively for the study group through direct face-to-face sessions conducted within the school setting. Each school received the intervention separately over a one-week period. The instructional materials included a lecture booklet, illustrative posters, and classroom board presentations. The intervention consisted of five structured educational sessions delivered over five consecutive days. Each session lasted approximately one hour and was conducted daily from Sunday to Thursday, from 9:00 a.m. to 10:00 a.m. The educational content covered signs of puberty, onset of menstruation, menstrual disorders, and personal hygiene practices during menstruation. One week after completion of the program, a post-test was administered to evaluate the effectiveness of the educational intervention.

Pilot Testing and Reliability

pilot study was conducted on [10] Female student from One of female secondary school females in wasit city, (they excluded from the original sample of the study). The reliability analysis of the study instruments based on Cronbach's alpha values for a pilot sample of (N = 10). The results show that both scales; knowledge (α = 0.706) and self-care behaviours (α = 0.732) demonstrate good internal consistency, indicating that their items reliably measure their intended constructs. Reliability Analysis of the Instruments (Test- retest) based on Pearson correlation coefficient values show that both scales; knowledge (α = 0.739) and self-care behaviours (α = 0.717) demonstrate good test-retest consistency, indicating that their items reliably measure their intended constructs.

Data Collection and Analysis

Data were collected by using a structured self-administered questionnaire, analyzed and interpreted through use of the application of Statistical Package for Social Sciences (SPSS), version 26.0. Descriptive Statistical Tests (Frequency, Percentage (%), Mean (M), and Standard Deviation). summarised sample characteristics. Inferential Statistical Tests (Cronbach Alpha (α), Kolmogorov Smirnov Test, Levene's test, The Mann-Whitney U test, Wilcoxon Signed Ranks, Spearman's rank correlation coefficient, the effect size (r), It used to determine the effect size of effectiveness of educational program on knowledge and self-care practices. A p-value ≤ 0.05 was considered statistically significant.

Results

Of the 200 Female students enrolled in the study in both groups, the average age refers to 16±1.9 years in the study group and 16±0.9 years in the control group, the higher proportion within age group of 14-16 years in both groups (study= 60% and control= 67%). The variance test indicates no significant difference (Λ= 1.052, P= .306) between groups. The academic grade shows no significant difference (Λ= 0.000, P= 1.000) between groups as equal proportion has reported in each group. The current living status indicates that students living with their parents as reported in the study group (83%) and control group (94%). The variance test indicates no significant difference (Λ= 3.896, P= .055) between groups. The number of family member refers to 4-6 in the study group (64%) and 7 – 9 in the control group (60%). The variance test indicates high significant difference (Λ= 8.655, P= .004) between groups based on number of family members. The higher proportion regarding sources of information refers to "internet and social media" in both groups; study (46%) and control (26%). The variance test indicates a significant difference (Λ= .420, P= .518) between groups based on source of information. (Table 1)

The study group showed improvements of understanding to a good level according to most of the post-tests results. For example, knowledge about menstruation, symptoms of puberty, usual length of bleeding during menstrual period, and functions and illness related to menstrual cycle had significant changes in post-test scores from "Average"/ or "Incorrect" belonged category at pre-test to "Good". Those in the control group had comparatively more modest changes, with mean ratings on most items continuing to be in the "Average" or "Good" ranges at post-test. In particular, the control group demonstrated a slight increase in knowledge on menarche and menstrual cycle; however less significant than the intervention group. In general, the intervention group had more knowledge than control group after engagement in an educational program. Table (2)

The study group had significant high self-care practices scores at post-test in most of the items, and many of them were in "Good" category. such as "wash your external genital area every day", "change pads frequently" and "use reliable source in getting information about RH (reproductive health)" while discussing issue about menstruation with family member, saw notable improvements in the study group, with post-test scores increasing to the "Good" level. Control group, on the other hand, exhibited more limited variations, with the majority of practices keeping "average", minor changes were seen, mainly with respect to taking a shower during menstruation and abstaining from using vaginal douches or scented products but they were not as dramatic as in the study group. Generally, the participants had higher Knowledge and self-care practices in comparison with control group after engagement in an educational program. Table (3)

the improvement in self-care practices in the study group as reported by mean score of that rose from 21.05 to 24.76 indicating the effectiveness of educational program. Conversely, no clear change has shown in mean score of self-care practices among female students in the control group. Figure (1)

the finding in the study group indicates that there is high significant difference in knowledge score with regard to post-test (Z= -8.609, P= .001) with large effect size (.860). For self-care practices, there is also high significant difference with regard to post-test (Z= -8.494, P= .001) with large effect size (.849). These findings indicate a high effectiveness of educational program in improving students' knowledge and self-care practices.

In contrast, the findings in control group show no significant differences in knowledge and self-care practices with regard to post-test. The p-value less than 0.05 and the effect size were small for knowledge (.065) and self-care practices (.087). Table (4)

The findings in the study group show significant relationship among l knowledge score and students' academic grade (P= .030) and number of family members (P=.009) suggesting that students in the fourth academic grade and low family member demonstrating higher level of knowledge.

The findings in the control group show no significant relationship between knowledge score and sociodemographic variables of female students. Table (5)

there is no significant relationship between self-care practices and sociodemographic variables of female students either in study group or control group. Table (6)

Table 1: Description of Socio-demographic of Female Students in Study and Control Group(N=100)

No.	Characteristics		Study group		Control group		Variance test
			F	%	f	%	
1	Age (year)	14 – 16	60	60	67	67	Λ= 1.052 P= .306 Sig= N.S
		17 – 19	40	40	33	33	
		Total	*100*	*100*	*100*	*100*	
		M±SD	*16±1.9*		*16±0.9*		
2	Academic grade	Fourth	50	50	50	50	Λ= .000 P= 1.000 Sig= N.S
		Fifth	50	50	50	50	
		Total	*100*	*100*	*100*	*100*	
3	Current Living with	Both parent	83	83	94	94	Λ= 3.896 P= .055 Sig= N.S
		Mother only	15	15	4	4	
		Father only	2	2	2	2	
		Total	*100*	*100*	*100*	*100*	
4	Number of family members	≥ 3	2	2	5	5	Λ= 8.655 P= 004 Sig= H.S
		4 – 6	64	64	35	35	
		7 – 9	34	34	60	60	
		Total	*100*	*100*	*100*	*100*	
5	Sources of information about reproductive health	None	37	37	54	54	Λ= .420 P= .518 Sig= S
		Internet / S.M	46	46	26	26	
		Parents/sib.	10	10	9	9	
		School	6	6	9	9	
		H.C. Provider	1	1	2	2	
		Total	*100*	*100*	*100*	*100*	

No: Number, f: Frequency, %: Percentage, Λ= Levene's Test, P: Probability value, Sig: Significance, N.S: Not significant, S: Significant

Table 2: Mean Scores Assessments of Items of Knowledge about "Menstruation" among Female Students in Study and Control Groups

Groups Items Score			Study (N=100)						Control (N=100)					
			Pre-test			Post-test			Pre-test			Post-test		
			f(%)	Mean	Assess	f(%)	Mean	Assess	f(%)	Mean	Assess	f(%)	Mean	Assess
1	Menarche refers to first menstrual period, usually occurring between 10–16 years of age	Incorrect	18(18)	.82	Good	1(1)	.99	Good	27(27)	.73	Good	27(27)	.73	Good
		Correct	82(82)			99(99)			73(73)			73(73)		
2	Signs of puberty in girls include Breast development, Growth of pubic and axillary hair, and Rapid increase in height	Incorrect	33(33)	.67	Average	0(0)	1.00	Good	43(43)	.57	Average	41(41)	.59	Average
		Correct	67(67)			100(100)			57(57)			59(59)		
3	The normal duration of menstrual bleeding is 3 – 7 days	Incorrect	5(5)	.95	Good	0(0)	1.00	Good	16(16)	.84	Good	41(41)	.85	Good
		Correct	95(95)			100(100)			84(84)			15(15)		
4	The menstrual cycle functions to Renewal of the uterine lining in preparation for implantation of a fertilized ovum	Incorrect	16(16)	.84	Good	0(0)	1.00	Good	26(26)	.74	Good	25(25)	.75	Good
		Correct	84(84)			100(100)			74(74)			75(75)		
5	Menstrual disorders refer to Abnormal changes in the timing, amount, or duration of menstruation	Incorrect	32(32)	.68	Good	1(1)	.99	Good	44(44)	.56	Average	44(44)	.56	Average
		Correct	58(68)			99(99)			56(56)			56(56)		
6	Dysmenorrhea is defined as Pain or cramps in the lower abdomen or lower back before or during menstruation	Incorrect	35(35)	.65	Average	4(4)	.96	Good	42(42)	.58	Average	40(40)	.60	Average
		Correct	65(65)			96(96)			58(58)			60(60)		
Total				*.76*	*Good*		*.99*	*Good*		*.67*	*Average*		*.67*	*Average*

No: Number, %: Percentage, M: Mean, Poor= 0.00 – 0.33, Average= 0.34 – 0.67, Good= 0.68 – 1.00

Table 3: Mean Scores Assessments of Items of Self-care Practices during Menstruation among Female Students in Study and Control Groups

Groups Items Score			Study (N=100)						Control (N=100)					
			Pre-test			Post-test			Pre-test			Post-test		
			f(%)	Mean	Assess	f(%)	Mean	Assess	f(%)	Mean	Assess	f(%)	Mean	Assess
1	I clean my external genital area daily	Never	2(2)	2.86	Good	1(1)	2.98	Good	1(1)	2.87	Good	2(2)	2.86	Good
		Sometime	10(10)			0(0)			11(11)			10(10)		
		Always	88(88)			(99(99)			88(88)			88(88)		
2	I change sanitary pads or tampons every 4–6 hours	Never	3(3)	2.83	Good	1(1)	2.99	Good	2(2)	2.86	Good	1(1)	2.76	Good
		Sometime	11(11)			0(0)			10(10)			22(22)		
		Always	86(86)			(99(99)			88(88)			77(77)		
3	I visit a health center or seek medical advice when experiencing abnormal pain or discharge	Never	26(26)	2.04	Average	2(2)	2.67	Good	38(38)	1.91	Average	38(38)	1.90	Average
		Sometime	44(44)			29(29)			33(33)			34(34)		
		Always	30(30)			69(69)			29(29)			28(28)		
4	I use reliable sources to obtain reproductive health information (e.g., nurse, book, trusted medical website).	Never	25(25)	2.05	Average	1(1)	2.75	Good	34(34)	2.00	Average	34(34)	2.00	Average
		Sometime	45(45)			23(23)			32(32)			32(32)		
		Always	30(30)			76(76)			34(34)			34(34)		
5	I avoid using vaginal douches or scented products for the genital area	Never	23(23)	2.28	Average	0(0)	2.83	Good	23(23)	2.28	Average	26(26)	2.26	Average
		Sometime	26(26)			17(17)			26(26)			22(22)		
		Always	51(51)			83(83)			51(51)			52(52)		
6	I discuss menstrual-related problems with my mother or sister	Never	18(18)	2.39	Good	7(7)	2.59	Good	5(5)	2.48	Good	15(15)	2.45	Good
		Sometime	25(25)			27(27)			42(42)			25(25)		
		Always	57(57)			66(66)			53(53)			60(60)		
7	I follow a healthy diet and sleep routine to improve my general and reproductive health	Never	22(22)	2.20	Average	5(5)	2.48	Good	26(26)	2.13	Average	26(26)	2.13	Average
		Sometime	36(36)			42(42)			20(20)			20(20)		
		Always	42(42)			53(53)			54(54)			54(54)		
8	I attend reproductive health lectures or workshops when available at school	Never	32(32)	1.96	Average	0(0)	2.86	Good	38(38)	1.93	Average	38(38)	1.92	Average
		Sometime	40(40)			14(14)			31(31)			32(32)		
		Always	28(28)			86(86)			31(31)			30(30)		
9	I take showers during my menstrual period	Never	8(8)	2.44	Good	1(1)	2.76	Good	13(13)	2.42	Good	13(13)	2.40	Good
		Sometime	40(40)			22(22)			32(32)			34(34)		
		Always	52(52)			77(77)			55(55)			53(53)		

No: Number, %: Percentage, M: Mean, Poor= 1.00 – 1.66, Average= 1.67 – 2.33, Good= 2.34 – 3.00

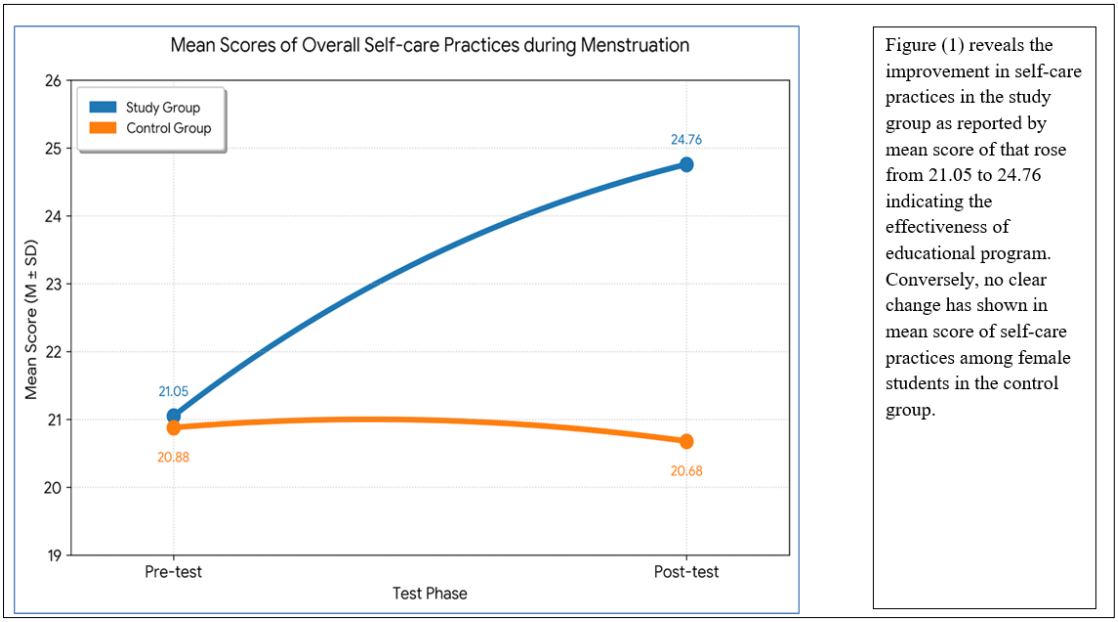

Fig 1: Overall Level of Self-care Practices during Menstruation

Table 4: Significant Difference in Variables' Scores (Knowledge about menstruation) for Female Students in the Study and Control Groups (Pre and Post- Educational Program)

Variables	Group Program	Study (N=100)						Control (N=100)					
		N	Mean Rank	Z-score	p-value	Sig.	Effect size (*r*)	N	Mean Rank	Z-score	p-value	Sig.	Effect size (*r*)
Knowledge	Pre-test	100	13.14	-8.609	.001	H.S	.860	100	12.35	-.654	.100	N.S	.065
	Post test	100	19.66					100	12.68				
Practices	Pre-test	100	21.05	-8.494	.001	H.S	.849	100	20.88	-.879	.070	N.S	.087
	Post test	100	24.91					100	20.68				

N: Number, p: Probability, Sig.: Significance, N.S: Not Significant

Table 5: Relationship between Overall Knowledge Score and Sociodemographic Variables of Female Students in the Study and Control Groups (Post-test)

Variables		Overall Knowledge					
		Study group (N=100)			Control group (N=100)		
		Mean	*R*	*Sig*	Mean	*R*	*Sig*
Age (year)	14 – 16	19.70	.164	.103	12.58	.068	.502
	17 – 19	19.60			12.88		
Academic grade	Fourth	19.72	.217	.030*	12.12	.077	.446
	Fifth	19.60			13.24		
Current Living with	Both parent	19.65	.060	.555	12.56	.174	.083
	Mother only	19.87			14.00		
	Father only	18.50			15.50		
Number of family members	≥ 3	20.00	-.261	.009*	13.40	.035	.730
	4 – 6	19.81			12.37		
	7 – 9	19.35			12.80		
Sources of information about reproductive health	None	19.54	.181	.071	12.48	.094	.353
	Internet / S.M	19.67			13.35		
	Parents/sib.	19.80			10.33		
	School	20.00			14.11		
	H.C. Provider	20.00			13.50		

r: Spearman Correlation coefficient, Sig: Significance, *Significant at p-value= 0.05, **Significant

Table 6: Relationship between Overall Self-care Practices Score and Sociodemographic Variables of Female Students in the Study and Control Groups (Post-test)

Variables		Overall Self-care Practices					
		Study group (N=100)			Control group (N=100)		
		Mean	*R*	*Sig*	Mean	*r*	*Sig*
Age (year)	14 – 16	25.15	.174	.083	20.97	.104	.305
	17 – 19	24.55			20.09		
Academic grade	Fourth	25.22	.189	.060	20.90	.093	.355
	Fifth	24.60			20.46		
Current Living with	Both parent	24.96	.077	.446	20.70	.031	.756
	Mother only	24.60			21.25		
	Father only	25.00			18.50		
Number of family members	≥ 3	26.50	.038	.704	19.80	.087	.391
	4 – 6	24.94			21.09		
	7 – 9	24.76			20.52		
Sources of information about reproductive health	None	24.57	.187	.062	20.43	.156	.120
	Internet / S.M	25.02			20.27		
	Parents/sib.	25.20			22.00		
	School	25.67			21.44		
	H.C. Provider	25.00			23.50		

r: Spearman Correlation coefficient, Sig: Significance, *Significant at p-value= 0.05, **Significant at p-value= 0.01

Discussions

The present study showed that (N=200) of female students enrolled in the study the finding reveals that average age is 16± 1.5 years, 63.5% of students fell within age group of 14 – 16 years while 36.5% within age group of 17 – 19 years. Regarding residency, all participant students (100%) were residing in urban and none of them was reside in the rural. 36% got their information from internet and social media, this result validates past research conducted in Iraq (9). who found that 62.5% of participants said that their primary source of information is internet browsing, and 92% of participants live in urban areas The study sample exhibited substantial enhancement in knowledge across most items from the pre-test to the post-test phase, with numerous students attaining a "Good" level following the educational program. Significant improvements were observed in understanding menstruation, puberty symptoms, typical menstrual bleeding duration, and menstrual cycle functions and disorders showed marked improvements in post-test scores, progressing from the "Average" or "Incorrect" category in the pre-test to "Good." These findings align with the research conducted in Egypt (10). which assessed the impact of a health education program on knowledge and self-care practices regarding menarche among preparatory school girls in Alexandria Governorate. The findings of this study indicated that both the study and control groups possessed a limited understanding of menarche, with no statistically significant difference observed between the two groups. Following the educational program, the intervention group demonstrate significant higher knowledge levels compared to the control group. Also consistent with a quasi-experimental study conducted in Türkiye [11]. which indicated that menstrual education programs significantly enhanced girls' understanding of menstruation and menstrual hygiene.

The results of the current study indicate a significant enhancement in self-care practices among participants in the study group at post-test, with the majority of items attaining the "good" category. Significant improvements were noted in daily genital hygiene, consistent changing of sanitary pads, and dependence on reputable sources for reproductive health information. Furthermore, communication with family members concerning menstruation has significantly improved, reflecting a favourable change in both behaviour and transparency. These results demonstrate the efficacy of

the educational intervention in improving health-related behaviours among adolescent girls.

The findings align with study among adolescent schoolgirls in India [12], who documented substantial post-intervention enhancements in menstrual hygiene practices, encompassing heightened utilization of sanitary pads, improved hygiene behaviours, and increased dependence on knowledgeable sources such as parents and teachers. Also consist with A cross-sectional descriptive study in Iraq. (3) identified significant deficiencies in menstrual knowledge and attitudes among adolescent girls, highlighting the need for educational interventions to rectify these gaps and reinforcing the improvements noted in the current study.

the finding in the study group indicates that there is high significant difference in knowledge score with regard to post-test (Z= -8.609, P= .001) with large effect size (.860). For self-care practices, there is also high significant difference with regard to post-test (Z= -8.494, P= .001) with large effect size (.849). These findings indicate a high effectiveness of educational program in improving students' knowledge and self-care practices. This result consistent with study conducted in Egypt (10). the study showed the menarche education program has significantly impact on improvement of preparatory school student's knowledge and their self-care practices.

The findings in the study group show significant relationship among knowledge score and students' academic grade (P= .030) and number of family members (P=.009) suggesting that students in the fourth academic grade and low family member demonstrating higher level of knowledge. The findings in the control group show no significant relationship between knowledge score and sociodemographic variables of female students. This result inconsistent with the study conducted in Sulaymaniyah City/Iraq [13]. to assess knowledge, attitude, and practices (KAP) regarding MHM among adolescent schoolgirls across different grades. that show Knowledge increased with grade level, from7th grade (Mean = 8.19 ± 1.97) to 12th grade (Mean = 10.15± 1.44) (P = 0.000).

No significant correlation was identified between overall self-care practices and sociodemographic characteristics for students in both the study and control groups. This finding contrasts with educational intervention study among adolescent girls. [14], who indicated a significant correlation between age and knowledge, attitudes, and practices related to menstrual hygiene. This variation may result from differences in sample characteristics or contextual factors.

Conclusion

The findings of the current study allow for the conclusion. The educational intervention effectively enhanced Knowledge and Self-Care Practices Related to Menstruation among adolescent girls in the study group, as post-test results indicated significant improvements in knowledge regarding menstruation. The study group showed a marked improvement from average or incorrect levels at pre-test to a good level at post-test across most knowledge domains, including menstruation, puberty symptoms, menstrual cycle duration, and related functions and disorders, essential hygiene behaviours, utilization of credible information sources, and communication concerning menstruation. In contrast, the control group exhibited no enhancement.

Declarations

Ethics Approval and Consent to Participate

Ethical approval for the study was obtained from the Scientific Committee (Research Ethics Committee) of the College of Nursing, University of Kirkuk (Issue No. 1, 2025). Authorization to conduct the research was also granted by the Directorate of Education in Wasit Governorate (Issue No. 68081, 2025). Written consent was obtained from the parents of the female students participating in the educational program; the voluntary nature of participation and assurances of confidentiality and anonymity were explained.

Availability of Data and Materials

The datasets produced and examined in this study are accessible from the corresponding author upon reasonable request.

Competing Interests

The authors assert that they possess no conflicting interests.

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Authors' Contributions

Both authors participated in the study's conceptualization, design, data collection, analysis, and interpretation. They also engaged in composing and rigorously revising the manuscript. All authors reviewed and endorsed the final version of the manuscript.

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