Effect of Health Educational Program on Knowledge and Self-care Practices about Menarche among Preparatory School Girls in Alexandria Governorate

Shaymaa Saeed Mohamed Badawe[1], Rasha Mohamed Abo Hadida[2], Neama Saad Mahmoud [3], Mohamed Saied Harfoush[4, 5]

[1]Lecturer, Community Health Nursing, Faculty of Nursing, Alexandria University, Egypt
[2]Lecturer, Pediatric Nursing, Faculty of Nursing, Alexandria University, Egypt.
[3]Lecturer, Obstetrics& Gynecologic Nursing, Faculty of Nursing, Alexandria University, Egypt
[4]Lecturer, Community Health Nursing, Faculty of Nursing, Damanhour University, Egypt
[5]Assistant Professor, Nursing Department, College of Applied Medical Sciences, Buraydah Private Colleges, Buraydah-51418, Saudi Arabia.

Corresponding Author: Mohamed Saied Harfoush
Email: mohamed.said@nur.dmu.edu.eg

Abstract:

Background: Menarche and menstruation are taboo topics that many groups, especially adolescent girls, find unsettling. The health educational program was created to help female adolescents get ready for menarche. **The study aims were to** identify the effect of health educational program on knowledge and self-care practices about menarche among preparatory school girls in Alexandria Governorate. **Subjects and Methods: Design:** A quasi-experimental study design was used. **Setting:** A multistage random sampling technique was used. **Sample:** Students in the selected classes (around 50 preparatory girls from each school) were divided in the sample of 100 female students (study group) and 100 female students (control group). **Tools of data collection:** Three tools were used for data collection. **Tool (I):** Preparatory school girl's basic data structured interview schedule. **Tool II:** Preparatory school girls' puberty related knowledge structured interview schedule. **Tool III:** Preparatory schoolgirl's self-care practices regarding puberty and menarche structured schedule. **Result:** Significant correlations were found between the general self-care practices of students and their knowledge about menses (P=0.001). Significant relationships were found between the number of siblings, the mother's age, the mother's education level, and the student's knowledge (P=0.001). **Conclusion:** According to the findings of the current study, it can be concluded that menarche education program has significantly impact on improvement of preparatory school student's knowledge and their self-care practices. **Recommendation:** The application of programs should help to the development of in-service training programs for healthcare providers who take care of adolescent girls about issues related to menstruation and reproductive health.

Keywords: Menarche, Knowledge and Self-Care Practices, Female Preparatory School.

Introduction

Women's reproductive health, including adolescent females, is one of the focuses of Sustainable Development Goals (SDGs) and it is one of the goals of WHO to improve equality in health, reduce health risks, and promote healthy lifestyles and setting **(Setyowati et al., 2019)**.

The World Health Organization (WHO) mentions that self-care is a broad term that includes general and personal hygiene, nutrition, lifestyle factors such as exercises, self-medication, and following treatment plans for current illnesses **(World Health Organization: WHO, 2022)**. During the stage of adolescence, individuals typically fall within the age range of 10 to 19 years. Presently, there are 1.3 billion adolescents globally, constituting 16 percent of the total world population. Among these adolescents, over 600 million are girls aged between 10 to 19 years, with more than 500 million residing in low and middle-income nations **(World Health Organization: WHO, 2019).**

In Egypt, the adolescent population aged 10-19 is estimated to be around 17 million, making up roughly 19% of the overall population. Additionally, girls under the age of 20 in Egypt amount to approximately 19 million, accounting for one-fifth of the country's total population **(UNFPA, 2022).**

Puberty is an endocrine process that involves the physical, emotional, and sexual transition from childhood to adulthood. It happens gradually, under the direction of the hypothalamic-pituitary, in a sequence of distinct events and milestones. Menstruation, also known as the period, is a woman's regular monthly cycle of vaginal bleeding. A woman's body gets ready for pregnancy every month. In the event of no pregnancy, the lining of the uterus, or womb, sheds. Part of the blood from the menstrual cycle is made up of uterine tissue and blood. It exits the body through the vaginal canal. **(Beckmann, 2019).**

The normal menstruation has many characteristics; the age of onset of menstruation ranges between 10 - 16 years, average 13 years, in studies, worldwide the mean age of menarche was 12.1 years and in Egypt the mean age of menarche was 12.3 years, the regular duration of menstruation lasts for a few days usually 3 to 5 days, but anywhere from 2 to 7 days is considered normal, the average blood loss during menstruation is 35 milliliters with 10-80 mL considered normal, the normal menstrual flow follows a "crescendo-decrescendo" pattern; that is, it starts at a moderate level, increases somewhat and then slowly decreases **(Eric, 2018).**

The first menstrual period (menarche), physical, cognitive, and social changes can impact body image and self-esteem and earlier age at menarche has been associated with a higher risk of depression in late adolescence. On the other end of the reproductive spectrum, some people experience mood swings and depression symptoms during the menopausal transition due to hormonal changes, physical symptoms, and psychological factors. During these phases, menstrual symptoms are frequently more bothersome as well; for instance, cycles may become more irregular and people may bleed more heavily.

In view of this, it becomes important for parents, teachers, and health care practitioners especially nurses to be adequately involved in the promotion of adolescent menstrual hygiene and self-

care. Nurses care for adolescents in a variety of settings, including communities, schools, and public health and acute care clinics, which affords them many opportunities to enhance adolescents' sexual and reproductive health **(Adika et al., 2013).**

In all seven nursing practice sites, school health nurses make ensuring that teenagers have access to sexual and reproductive health care, including treatment and preventive counseling. With their special set of abilities, school health nurses can influence adolescent sexual and reproductive outcomes in a favorable way. School health nurses possess the ability and chance to educate teenagers and their parents about sexual and reproductive health. **(Romero et al., 2015).** Protecting adolescents' confidentiality is crucial to ensuring their access to health care and is also an essential component of that care. School health nurses can and should offer appropriate sexual and reproductive health screening and counseling to adolescents and their parents as part of annual examinations. School health nurses can advise parents on the importance of confidential access to sexual and reproductive health counseling **(Brittain et al., 2015; Romero et al., 2015).**

Although adolescents are usually too embarrassed to initiate conversations with providers about sexual and reproductive health and risky sexual behavior, well-prepared nurses may be able to ease adolescents' embarrassment and facilitate communication. Parent–child interaction and parental monitoring have been shown to improve sexual and reproductive health outcomes **(Brittain et al., 2015; Dittus et al., 2015).**

School health nurses play a crucial role in providing adolescents with comprehensive sexual and reproductive healthcare services, encompassing preventive counseling and treatment, across all nursing practice sites. Leveraging their distinctive blend of expertise and skills, school health nurses can significantly influence positive outcomes in terms of adolescent sexual and reproductive health. Moreover, they possess the capability and platform to effectively interact and educate both adolescents and their parents about sexual and reproductive health matters **(Ramalepa, 2023).**

This study was conducted to determine the effect of health educational program on knowledge and self-care practices about menarche among preparatory schoolgirls in Alexandria Governorate, Egypt.

Significance of the study:

Majority of adolescent girls usually have lack of scientific knowledge and hygienic practice during menstruation and puberty, also adolescent girls often are reluctant to discuss this embracing topic with their care-providers and often hesitate to seek help regarding the menstrual problem from external sources. So, girls should be educated about "menstruation and healthy menstrual practices" through expanded program of health education. Data on their level of knowledge and practices are beneficial for planning program for improving their awareness level.

Aim of the study:

The present study aimed to identify the effect of health educational program on knowledge and self-care practices about menarche among preparatory school girls in Alexandria Governorate.

Research hypotheses:

H1: Preparatory School girls who attend health educational program about menarche exhibit higher knowledge score about menarche than who don't.

H2: Preparatory School girls who attend health educational program about menarche exhibit satisfactory performance of self-care practices about menarche than who don't.

Operational definitions:

Menarche: It is referred to as the first occurrence of menstruation in females aged 11-16 yrs.

Health educational program: In this study, the health educational program refers to an educational intervention program that was developed in a simple Arabic language.

Subjects and Method

Research design:

A quasi-experimental study design was used to conduct this study.

Settings:

Multistage random sampling technique was used accordingly the following steps was conducted.

1. Alexandria Governorate was divided into eight educational zones affiliated to the Ministry of Education.
2. Two out of the eight zones were selected as they had simple random preparatory school's students namely (El-Montazah and East zones) table (I).

Table (I): Number of governmental female preparatory schools in each educational zone in Alexandria.

Educational Zones	Preparatory female school
1. East	22
2. El Montazah	19
3. Middle	12
4. El- Gomrok	6
5. West	11
6. El-Agamy	13
7. El-America	9
8. Brog El-Arab	2
Total	**94**

Table (1): The Number of female preparatory schools in Alexandria according to Ministry of Education Guideline, 2019. Available at: https://search.emis.gov.eg/ دليل المدارس المصرية

3. Two female governmental preparatory schools were selected randomly from each of the above selected zones (one school for the study group and the other for the control group from each zone).
4. One class (first grade) from each of the selected schools was randomly chosen, (2 classes was for the study group and 2 classes for the control group) using simple random sampling method.

Subjects:

All students in the selected classes (around 50 preparatory girls from each school) were included in the sample. giving a total number of 200 female students divided into two groups 100 female students as control group and 100 as a study group.

Tools: In order to fulfill the objectives of this study, three tools were developed and used by the researcher based on the review of related literature for the purpose of data collection.

Tool (I): Preparatory school girl's basic data structured interview schedule includes two parts:

Part (1): Socio-demographic characteristics of parents such as; age, occupation, level of education, religion, current residence, number of family members, marital status, crowding index and income ... etc.

Part (2): Socio-demographic characteristics of the female students such as; sex, age, religion, birth order, number of siblings, grade level at school, scholastic achievement.

Tool II: Preparatory school girls' puberty related knowledge

structured interview schedule. It included two parts:

Part (1): Knowledge of preparatory school girls regarding puberty: It included the anatomical and physiological characteristics of the reproductive system for females (parts and function of the reproductive system) etc.., physical changes (Breast development, appearance of hair in auxiliary and pubic, age of the menstruation, a manifestation of menstruation, personal hygiene during menstruation.

Part (2): Sources of preparatory school girl's information about menarche: It included students' knowledge about menarche and menstrual hygiene as the definition of menarche, age of menarche, signs and symptoms associated with menstruation.

The score was summed by awarding one point for each correctly answered question and zero for incorrect answer or do not know. The total was transferred into percentage. The knowledge level was categorized according to experts' opinion into poor (less than 50%), fair (50% to less than 75%) and good knowledge (75% and more).

Tool III: Preparatory schoolgirl's self-care practices regarding puberty and menarche structured schedule: It included the following items: Hygienic practices, methods of cleaning, behaviors, and restrictions during menstruation, practicing of exercise, waste disposal of the pad, methods of drying, number of pads per day, wash clothes of menses**.**

The score was summed by awarding one point for each Satisfactory performance and zero Inadequate performance or do not know. The total was transferred into percentage. The practice level was categorized according to experts' opinion into inadequate performance (less than 50%), adequate performance (50% to less than 75%) and satisfactory performance (75% and more).

Method

The study was accomplished according to the following steps:

1. Approval was obtained from the Research Ethics Committee, Faculty of Nursing, and Alexandria University.
2. An official letter from the Faculty of Nursing/ Alexandria University was directed to the Education directorates in Alexandria to seek permission to carry out the study in the different selected settings after explaining the purpose of the study.
3. An approval of the director of each school included in the study to inform them about the Education directorates' approval and seek their cooperation. The director of each school was informed about the date and time of data collection.
4. The nature of the study and aim was fully explained to the study participants. The selected class to participate in the study were preceded the questionnaire included a written description of the purpose and nature of the study.
5. **Development and preparation of the study tools:**
   - Tools 1 and II were developed by researchers based on an extensive review of recent, current, and relevant literature.
   - Tools I and II were tested using content validity (CVI) by exposing it to a group of experts 'comments (jury) 5 experts in the field of obstetrics & gynecologic nursing and community health nursing department (**Tool I:94.0%, Tool II :88.0%**).
   - Internal consistency reliability (coefficient alpha) was applied to test

reliability of tools (I and II), it was 0.81.

6. After the development of tools, a pilot study was carried out on a sample of (20) preparatory school girls (10% of the total sample size) from Fawzy Moaz Preparatory school girls in Middle educational zone, who was not be included in the study sample to ascertain the clarity and applicability and wording of the tools, according to their response the tools were modified.
7. The purpose of the pilot study was to ensure the clarity of items and their comprehension, applicability, and relevance of the tools, in addition to identify obstacles and problems that may be occurring during data collection. Also, to test wording of questions and estimate the time that required to complete the instruments.
8. Data obtained from the pilot study were analyzed and according to the results the tools was evident that the statements of the instruments were clear and relevant, and no changes or modifications were done.
9. The program was developed through the following phases:

Assessment phase:

After the Menarche educational program was developed the training program carried out to the four classes study. It consisted of **3 phases**:

Preparation phase:

Pre-test were conducted by using tool I and tool II to assess the students' menarche knowledge and practice for all the study and control groups.

1. Stating clear general objective to study group "At the end of the menarche educational program the preparatory girls school student's knowledge and practice regarding to menarche and reproductive health will be improved."
2. The educational program was developed based on the current literature and the results of the preparatory phase (pre-test). The program steps and methodology were planned to students. The educational program aimed to enhance the knowledge and practice of preparatory school girl students.
3. Any specific instructions and comments from expert's revision were documented and considered in the formulation of the final educational program and feedback from their revision was used after modified it.
4. Preparation of media used in the educational program as printed materials were developed by the researchers in order to enhancing the student's memorization about the meaning of menarche, identify internal and external reproductive organs.
5. Selected suitable videos regarding changes of the reproductive system, manifestation of menstruation, personal hygiene during menstruation and Power point was developed by the researcher to facilitate the concepts clarifications.
6. Preparation of the schools' environment for conducting the educational program as: pelvic model with internal and external reproductive organs.

Implementation phase:

The program was implemented to study group in the form of five sessions; one session per week it included the following:

I. Theoretical part: It was carried out in three lectures combined with a whiteboard presentation:

- **Session 1(30 minutes):** The researcher was discussing the anatomical and physiological characteristics of the female reproductive system (parts and function of reproductive system).

- **Session 2 (30 minutes):** The researcher was discussing the physical changes (Breast development, appearance of hair in auxiliary and pubic and change in voice), and changes of the reproductive system, age of menstruation, manifestation of menstruation.
- **Session3 (30 minute):** The researcher was discussing the personal hygiene during menstruation.

II. Self-care practice skills: It was carried out in two sessions on model as:

- **Session 1 (30 minutes):** The researcher was demonstrating the self - care practice skills on the model.
- **Session 2 (30 minutes):** The students were re-demonstrating the self-care practice skills on the model.
- Other activities as videos cut & lick, simulation, and coloring activities were take about 15 minutes.
- The researcher was using different teaching methods as demonstration and discussion, drawing and coloring activities.
- Learning aids as handouts and pictures were distributed for both groups after the end of the program.
- Revision before each session and give reward to correct answer, at end of the session repeat the main point and ask questions.

Evaluation phase:

The researcher was assessing for the study group in preparatory school girl's puberty related knowledge and self-care practices regarding menarche for post-test by using tools I&II. This was done immediately after the end of sessions to determine the effect of the health educational program on knowledge and self-care practices about menarche among preparatory school girls in Alexandria Governorate.

Post-test was done for the control group about five weeks after the pretest (at the same week with the study group)

7- After data collection, it was coded and transferred into a specially designed format to be suitable for computer feeding. Following data entry, checking and verification process were carried out to avoid any error during data entry. Statistical analysis was performed using Statistical package for Social Sciences (SPSS version 23) and tabulated. The level of significance selected for this study was p equal to or less than 0.05.

The following statistical measures were used:

A. Descriptive statistics:

1) Count and percentage: used for describing and summarizing the quantitative data.

B. Analytical statistics:

The following statistical measures were used:

- Comparisons between groups for categorical variables were assessed using Chi-square test (Monte Carlo) were used to describe the characteristics of the study sample and main variables.
- Student t-test was used to compare two groups for normally distributed quantitative variables. Pearson coefficient was used to correlate between normally distributed quantitative variables. Regression to detect the most independent/ affecting knowledge and practice. Structure Equation Modeling was assessed using AMOS 23 0 software to detect the direct and Indirect Effect of different variables on knowledge and practice.

Ethical Considerations:

- Prior to data collection; research consent form was given to the director of each school in order to assume

protection of human rights of the study subjects.
- Written informed consent was obtained from the study subjects after explanation of the aim of the study.

Privacy and confidentiality:
- Confidentiality and anonymity of participants' response was guaranteed by statement in the cover page.
- A code number was used instead of names.
- Participants' privacy was assured.
- Students were informed that their participation in the study is voluntary, and they can withdraw from the study at any time if they wish.

Result

Table (1) shows the distribution of the studied subjects according to their demographic data. It was found that all students in the study and control groups lived in urban areas (100% for each). About half of the students in the control group (49.0%) were 15 years old, compared to 55.0% of the students in the study group, with a mean ± SD of 14.75 0.67 and 14.91 0.66, respectively. Concerning the student's height, it was observed that the mean ± SD of the student's height in the control group was 144.68.56 compared to 144.98.60 in the student in the study group, while the mean ± SD of the student in the control group was 69.4418.62 compared to 70.0518.0 in the student in the study group. It was also found that an equal percent of students in both groups had two siblings (45.0% for each), with a ± SD of 2.250.78 and 2.210.88, respectively. It was also clarified from the same table that less than half of students in the control group were in the second birth order compared to 37.0% of students in the study group, with a mean of 2.79 1.14 and 2.70 1.17, respectively, in the control and study groups.

Table (1) also portrays that more than half of mothers in both groups (57.0% and 55.0%, respectively) were 35 to less than 45 years old, with a mean SD of 48.78 9.04 and 48.93 8.76, respectively. One-half of the mothers in the control group had attended secondary school (50.0%), compared to 44.0% of the mothers in the study group. 48.0% of mothers in the control group were housewives, compared to more than half of mothers in the study group (53.0%). Regarding father's education, it was found that two-thirds of fathers in the control group had preparatory education, compared to 72.0% of fathers in the study group. Nearly half of fathers' jobs in both groups were trades or business (40.0% and 45.0%, respectively), and the majority of fathers in both groups reported insufficient monthly income (85.0% and 80.0%, respectively).

Table (2) portrays the distribution of the studied sample according to menstrual data. It was found that all students in the control and study groups had their first menstrual period (100.0% for each). Fifty percent of the students in the control group answered that the menstrual cycle was explained before it occurred, compared to 43.0% of the students in the study group. More than half of the students in both groups identified the internet as the source of their knowledge (53.0% and 55.0%, respectively). It was also revealed that more than half of the students in both groups reported moderate amount of menstrual blood (57.0% and 59.0%, respectively). More than two-thirds of students in the control group reported a regular menstrual cycle (68.0%) compared to 65.0% of students in the study group, and more than one-half of the students in

both groups reported the number of days of their menstrual bleeding were 3–5 days (54.0% and 59.0%, respectively).

Table (3) shows the knowledge of students about menstruation in the control group pre and post program. It was found that an equal percentage of students in the control group (60.0%) correctly answered the definition of the menstrual cycle pre- and post-program. 51.0% of students answered the causes of menstruation correctly pre-program, and this percentage increased to 58.0% post-program. It was also found that more than two-thirds of students (71.0%) correctly answered the appropriate age for the occurrence of the first menstrual period for girls' pre-program, and this percentage decreased to less than half of them (48.0%) post-program. 71.0% of students correctly answered about the normal period of menstrual bleeding, and this percentage decreased to 35.0% post-program. Nearly two-thirds of students (62.0%) correctly answered the period between one cycle and the next pre-program, compared to one-third of them post-program (33.0%). It was also observed that more than two-thirds of students (67.0%) correctly answered about the natural age of menopause pre-program, compared to less than half of them (45.0%) post-program.

The same table found that less than half of students in the control group (48.0%) correctly answered the stages of the menstrual cycle (48.0%) pre-programs, and this percentage increased to 56.0% post-program. Equal percent of students (60.0%) correctly answered the definition of menstrual cycle preprogram and post-program. About one-half of students (49.0%) correctly answered the follicular phase pre-program, compared to more than half of them (52.0%) post-program. It was also shown that half of students (50.0%) correctly answered the ovulation phase pre-program, compared to 48.0% of them post-program. More than one-half of students (58.0%) correctly answered in the luteal phase pre-program, and this percentage increased slightly post-program (60.0%). A similar percentage of students (63.0%) correctly mentioned the structure of the female reproductive system pre- and post-program.

Furthermore, it was revealed that more than half of students (51.0%) correctly answered the symptoms of premenstrual syndrome preprogram compared to 46.0% of them post program. Nearly two-thirds of students (62.0%) correctly answered about menstrual bleeding preprogram and this percentage decreased to 59.0% post program. It was also clarified that 44.0% of students correctly answered about the occurrence of menstruation as a result of ovulation preprogram compared to 49.0% of them post program. Two-thirds of students (66.0%) correctly answered the common disorders of the menstrual cycle pre-program compared to 65.0% of them post- program. More than one-third of students correctly answered about dysmenorrhea pre and post program (39.0% and 36.0%, respectively). 57.0% of students reported taking analgesic during their menstrual period preprogram compared to 52.0% of them post-program. Less than half of students (44.0% and 46.0%, respectively) correctly answered the causes of irregular menstruation pre-program and post-program, and more than half of them answered correctly about when they should visit the physician preprogram and post-program (56.0% and 59.0%, respectively).

Table (4) portrays the general self-care practices in the control group pre- and

post-program. It was found that almost all the students (97.0% and 98.0%, respectively) correctly answered the general instructions during the menstruation preprogram and post - program. More than three-quarters of students (78.0% and 77.0%, respectively) correctly answered what type of sanitary pads is recommended to be used during the menstrual cycle pre- and post- program. It was also clarified that less than one quarter of students correctly answered (24.0%) about using cloth pads preprogram compared to 26.0% of them post-program. Less than one quarter (17.0% and 20.0%, respectively) correctly answered about the time of taking a shower during their menstrual period preprogram and post-program.

The same table found that nearly two-thirds of students (65.0%) correctly answered about cleansing themselves from the menstrual cycle preprogram, compared to 61.0% of them post- program. More than one-third of students correctly answered the frequencies of washing external genitalia preprogram and post-program (34.0% and 36.0%, respectively). It was also noted that one- quarter of students correctly answered the direction of the external rinsing of the external genitalia (25.0%) preprogram compared to 23.0% of them post program. Only 1.0% of students correctly answered the question about the frequency of changing sanitary pads during their menstrual cycle preprogram and post- program. While the majority of students correctly answered the correct way to dispose of a single-use sanitary pad (80.0%) preprogram compared to 77.0% of them post program (77.0%).90.0% of students correctly answered. How to prevent infections preprogram compared to 88.0 % percent of them post -program.

Table (5) displays the knowledge of students about menstruation in the study group pre- and post-program. It was found that more than half of the students in the study group correctly answered the definition of the menstrual cycle, and its causes preprogram (54.0% and 51.0%, respectively), compared to the majority of them post-program (81.0% and 93.0%, respectively). It was also found that nearly two-thirds of students (63.0%) correctly answered the appropriate age for the occurrence of the first menstrual period for girls preprogram, and this percentage increased to more than three-quarters of them (78.0%) post-program. Two-thirds of students (66.0%) correctly answered about the normal period of menstrual bleeding, and this percentage increased to 70.0% of them post program. More than half of students correctly answered the period between menstrual cycles and the natural age of menopause preprogram (59.0% and 65.0%, respectively), compared to the majority of them post-program (85.0% and 86.0%, respectively).

The same table found that less than half of the students in the study group (49.0%) correctly answered the stages of the menstrual cycle preprograms, and this percentage increased to 82.0% of them post-program. More than half of students (54.0%) correctly answered the definition of menstruation preprogram, compared to the majority of them post-program (81.0%). 60.0 percent of students correctly answered the follicular phase preprogram, compared to nearly three-quarters of them (74.0%) post-program. It was also portrayed that less than half of students (47.0%) correctly answered the ovulation phase preprogram, and this percentage

increased to two-thirds of them post-program (71.0%). More than half of the students correctly answered the luteal phase and correctly mentioned the structure of the female reproductive system preprogram (60.0% and 54.0%, respectively), compared to more than three- quarters of them post-program (79.0% and 76.0%, respectively).

Moreover, it was shown that more than half of students (52.0%) correctly answered the symptoms of premenstrual syndrome preprogram, and this percentage increased to 95.0% of them post-program. Nearly two-thirds of students (64.0%) correctly answered about menstrual bleeding preprogram, compared to the majority of them (86.0%) post-program. It was also observed that more than half of students (61.0%) correctly answered about the occurrence of menstruation as a result of ovulation preprogram compared to the majority of them post-program (90.0%). More than three-quarters of students (76.0%) correctly answered the common disorders of the menstrual cycle preprogram, and this percentage increased to 86.0% of them post-program. More than half of students correctly answered about the definition of dysmenorrhea and reported analgesic taken during their menstrual period preprogram (55.0% and 68.0, respectively), compared to the majority of them post-program (87.0% and 83.0%, respectively). It was found from the same table that more than half of students (61.0%) correctly answered the causes of irregular menstruation preprogram compared to 91.0% of them post-program. While more than two-thirds of students correctly answered about the time they should visit the physician preprogram, this percentage increased to more than three-quarters of them post-program (77.0%).

Table (6) portrays the general self-care practices in study groups pre- and post-program. It was shown that a small percent of students (28.0%) correctly answered the general instructions during the menstruation preprogram compared to almost all of them post-program (99.0%). The majority of students (89.0%) correctly answered what type of sanitary pads are recommended to use during the menstrual cycle preprogram, and this percentage increased to 97.0% of them post-program. It was also revealed that small percentages of students correctly answered about using cloth pads and the time of taking a shower during their menstrual period preprogram (12.0% and 20.0%, respectively), compared to the majority of them post-program (97.0% and 95.0%, respectively).

It was found from the same table that small percentages of students correctly answered about the cleansing of themselves from the menstrual cycle and the frequencies of washing external genitalia preprogram (16.0% and 27.0%, respectively), and these percentages increased to more than half of them post-program (62.0% and 59.0%, respectively). In addition, it was also observed that nearly one-third of students correctly answered the direction of the external rinsing of the external genitalia (31.0%) preprogram compared to more than three-quarters of them post-program (79.0%). On the other hand, less than half of students (40.0%) correctly answered the question about the frequency of changing sanitary pads during their menstrual cycle preprogram, and this percent decreased to only 1.0% of them post-program. The majority of students correctly answered the correct way to dispose of a single-use

sanitary pad (89.0%) preprogram compared to all of them post-program (100.0%). Only 8.0% of students correctly answered how to prevent infections preprogram, compared to the majority of them post-program.

Table (7) Correlation table between the study variables. This table portrays the correlation between the study variables. It was found that significant correlations were found between the general self-care practices of students and their knowledge about menses (0.509*: P 0.001). It was also shown that significant correlations were found between the following study variables: student age, number of siblings, mother's age, mother's education level, father's education level, family monthly income, and knowledge about menses and their general self-care practices (P 0.001* for each). While significant correlations were found between the father's job, the mother's job, and their general self-care practices only (P = 0.001 for each).

Table (8) multiple Linear Regression Analysis Showing the Effect of demographics on knowledge and practice (n =200): Table 8 displays the Effect of demographics on knowledge and practice through Multiple Linear Regression Analysis. It was found that significant relationships were found between the number of siblings, the mother's age, the mother's education level, and the student's knowledge (P = 0.001*).

On the other hand, the same table found that significant relationships were found between the mother's educational level, the father's job, and their practices (P: 0.049* and P:< 0.001*, respectively).

Table (9, 10) direct and indirect effect of study variables on students' knowledge and their practices: Tables 9 and 10 show the direct and indirect effects of study variables on students' knowledge and practices. It was found that there were direct and significant relationships between students' knowledge and the number of siblings, the mother's age, and the mother's education level (P = 0.001* for each). Moreover, it was revealed that there were direct and significant relationships between students' practice and their knowledge, their mother's education level, and their father's job (P: <0.001*, 0.001*, and 0.041*, respectively).

Table (1): Distribution of the studied subjects according to their demographic data

Demographic data	Control (n=100)		Study (n=100)		Test of sig.	p
	No	%	No	%		
Place of residence						
Urban	100	100%	100	100%	-	-
Rural	0	0.0%	0	0.0%		
Student age						
14	38	38.0%	27	27.0%	χ^2= 3.014	0.222
15	49	49.0%	55	55.0%		
16	13	13.0%	18	18.0%		
Mean ± SD	**14.75±0.67**		**14.91±0.66**		**t = 1.688**	0.093
Student Height	144.6±8.56		144.9±8.60		**t =0.074**	0.941
Student Weight	69.44±18.62		70.05±18.0		**t =0.151**	0.880
Number of siblings						
1	17	17.0%	21	21.0%	χ^2 = 2.821	0.420
2	45	45.0%	45	45.0%		
3	34	34.0%	26	26.0%		
4	4	4.0%	8	8.0%		
Mean ± SD	2.25±0.78		2.21±0.88		**t = 0.342**	0.733
Birth order						
1	9	9.0%	12	12.0%	χ^2 =0.545	0.969
2	40	40.0%	37	37.0%		
3	24	24.0%	24	24.0%		
4	17	17.0%	17	17.0%		
5	10	10.0%	10	10.0%		
Mean ± SD	2.79±1.14		2.70±1.17		**t =0.183**	0.855
Mother's age						
<35	1	1.0%	3	3.0%	χ^2 = 5.847	$^{MC}p = 0.111$
35-<45	57	57.0%	55	55.0%		
45-<55	41	41.0%	35	35.0%		
55-<65	1	1.0%	7	7.0%		
Mean ±SD	**48.78±9.04**		**48.93± 8.76**		t = 0.111	**0.912**

χ^2: Chi square test MC: Monte Carlo t: Student t-test

Continue, Table (1): Distribution of the studied subjects according to their demographic data

Demographic data	Control (n=100)		Study (n=100)		Test of sig.	p
	No	%	No	%		
Mother's education level						
Illiterate	1	1.0%	0	0.0%	$\chi^2 = 1.932$	$^{MC}p = 0.825$
Read and write	6	6.0%	8	8.0%		
preparatory school	29	29.0%	33	33.0%		
Secondary school	50	50.0%	44	44.0%		
University education	14	14.0%	15	15.0%		
Mother's job						
House wife	48	48.0%	53	53.0%	$\chi^2 = 0.632$	0.729
Employee	17	17.0%	17	17.0%		
Other	35	35.0%	30	30.0%		
The father's education level						
Read and write	2	2.0%	1	1.0%	$\chi^2 = 1.544$	$^{MC}p = 0.697$
Preparatory school	66	66.0%	72	72.0%		
Secondary school	28	28.0%	22	22.0%		
University education	4	4.0%	5	5.0%		
Father's job						
Worker/Farmer	17	17.0%	22	22.0%	$\chi^2 = 0.935$	0.817
Technical work	25	25.0%	25	25.0%		
Professional work	13	13.0%	13	13.0%		
Trades/business	45	45.0%	40	40.0%		
Family monthly income						
Sufficient	15	15.0%	20	20.0%	$\chi^2 = 0.866$	0.352
Insufficient	85	85.0%	80	80.0%		

χ^2: Chi square test MC: Monte Carlo t: Student t-test

Table (2): Distribution of the studied subjects according to their menstrual data

Menstrual data	Control (n=100)		Study (n=100)		X^2	p
	No	%	No	%		
Have the first menstrual period						
No	0	0.0%	0	0.0%	-	-
Yes	100	100.0%	100	100.0%		
Previous explain menstrual cycle before it occurs						
Yes	50	50.0%	43	43.0%	0.985	0.321
No	50	50.0%	57	57.0%		
Source of knowledge						
Mother	21	21.0%	32	32.0%	7.486	0.107
Friend	17	17.0%	7	7.0%		
Internet	53	53.0%	55	55.0%		
Teachers	6	6.0%	3	3.0%		
Books	3	3.0%	3	3.0%		
Amount of menstrual blood						
Scanty	35	35.0%	31	31.0%	0.499	0.779
Moderate	57	57.0%	59	59.0%		
Heavy	8	8.0%	10	10.0%		
The pattern of the menstrual cycle						
Regular	68	68.0%	65	65.0%	0.202	0.653
Irregular	32	32.0%	35	35.0%		
Duration of menstruation						
< 2 days	1	1.0%	0	0.0%	1.346	^{MC}p =0.572
3- 5 days	54	54.0%	59	59.0%		
>6 days	45	45.0%	41	41.0%		

χ^2: Chi square test **MC: Monte Carlo**

Table (3): Knowledge about menstruation in the control group pre and post program

Knowledge about menstrual	Mean ±SD	Pre-program				Mean ±SD	Post-program			
		Incorrect		Correct			Incorrect		Correct	
		No.	%	No.	%		No.	%	No.	%
1- Definition of the menstrual cycle.	0.60±0.49	40	40.0%	60	60.0	0.60±0.49	40	40.0	60	60.0
2-Physiology of menstruation.	0.51±0.50	49	49.0%	51	51.0	0.58±0.50	42	42.0	58	58.0
3- The age of menarche.	.71±0.46	29	29.0%	71	71.0	0.48±0.50	52	52.0	48	48.0
4- Duration of menstruation.	0.71±0.46	29	29.0%	71	71.0	0.35±0.48	65	65.0	35	35.0
5- Interval of menstruation.	0.62±0.49	38	38.0%	62	62.0	0.33±0.47	67	67.0	33	33.0
6- Natural age of menopause.	0.67±0.47	33	33.0%	67	67.0	0.45±0.50	55	55.0	45	45.0
7- Phases of the cycle.	0.48±0.50	52	52.0%	48	48.0	0.56±0.50	44	44.0	56	56.0
8- Menstrual bleeding.	0.60±0.49	40	40.0%	60	60.0	0.60±0.49	40	40.0	60	60.0
9- Meaning of the follicular phase.	0.49±0.50	51	51.0%	49	49.0	0.52±0.50	48	48.0	52	52.0
10- Meaning of the ovulation phase.	0.50±0.50	50	50.0%	50	50.0	0.48±0.50	52	52.0	48	48.0
11- Meaning of luteal phase.	0.58±0.50	42	42.0%	58	58.0	0.60±0.49	40	40.0	60	60.0
12- Structure of the female reproductive system.	0.63±0.49	37	37.0%	63	63.0	0.63±0.49	37	37.0	63	63.0
13- Symptoms of premenstrual syndrome.	0.51±0.50	49	49.0%	51	51.0	0.46±0.50	54	54.0	46	46.0
14- Source of menstrual bleeding.	0.62±0.49	38	38.0%	62	62.0	0.59±0.49	41	41.0	59	59.0
15- Occurrence of menstruation as a result of ovulation.	0.44±0.50	56	56.0%	44	44.0	0.49±0.50	51	51.0	49	49.0
16- Common disorders of the menstrual cycle.	0.66±0.48	34	34.0%	66	66.0	0.65±0.48	35	35.0	65	65.0
17- Meaning of dysmenorrhea.	0.39±0.49	61	61.0%	39	39.0	0.36±0.48	64	64.0	36	36.0
18- Receive analgesic during the menstrual cycle.	0.57±0.50	43	43.0%	57	57.0	0.52±0.50	48	48.0	52	52.0
19-Causes of menstrual disorders	0.44±0.50	56	56.0%	44	44.0	0.46±0.50	54	54.0	46	46.0
20- Visit the physician.	0.56±0.50	44	44.0%	56	56.0	0.59±0.49	41	41.0	59	59.0
Total of knowledge about menses.	11.29±3.25					10.30±3.35				

Table (4): General self-care practices in the control group pre and post program

General self-care practices	Mean ± SD	Pre-program				Mean ± SD	Post-program			
		Incorrect		Correct			Incorrect		Correct	
		No.	%	No.	%		No.	%	No.	%
1- General instructions during menstruation.	0.97±0.17	3	3.0	97	97.0	0.98±0.14	2	2.0	98	98.0
2- type of sanitary pads is used during the menstrual cycle.	0.78±0.42	22	22.0	78	78.0	0.77±0.42	23	23.0	77	77.0
3- using cloth pads	0.24±0.43	76	76.0	24	24.0	0.26±0.44	74	74.0	26	26.0
4- take a shower during your menstruation.	0.17±0.38	83	83.0	17	17.0	0.20±0.40	80	80.0	20	20.0
5- clean oneself from the menstrual cycle	0.65±0.48	35	35.0	65	65.0	0.61±0.49	39	39.0	61	61.0
6- Wash external genitalia.	0.34±0.48	66	66.0	34	34.0	0.36±0.48	64	64.0	36	36.0
7- The direction of the external rinsing of the external genitalia	0.25±0.44	75	75.0	25	25.0	0.23±0.42	77	77.0	23	23.0
8- The number of times to change sanitary pads during the menstrual cycle	0.01±0.10	99	99.0	1	1.0	0.02±0.20	99	99.0	1	1.0
9- The correct way to dispose of a single-use sanitary pad	0.80±0.40	20	20.0	80	80.0	0.77±0.42	23	23.0	77	77.0
10- prevent cross infections	0.90±0.30	10	10.0	90	90.0	0.88±0.33	12	12.0	88	88.0
Total of general self-care practices	**5.11±1.09**					**5.08±1.20**				

Table (5): Knowledge about menstruation in the study group pre and post program

Knowledge about menstrual	Mean ±SD	Pre-program				Mean ±SD	Post-program			
		Incorrect		Correct			Incorrect		Correct	
		No.	%	No.	%		No.	%	No.	%
1- Definition of the menstrual cycle.	0.54±0.50	46	46.0	54	54.0	0.81±0.39	19	19.0	81	81.0
2- Physiology of menstruation.	0.51±0.50	49	49.0	51	51.0	0.93±0.26	7	7.0	93	93.0
3- Age of menarche.	0.63±0.49	37	37.0	63	63.0	0.78±0.42	22	22.0	78	78.0
4- Duration of menstruation.	0.66±0.48	34	34.0	66	66.0	0.70±0.46	30	30.0	70	70.0
5- Interval of menstruation.	0.59±0.49	41	41.0	59	59.0	0.85±0.36	15	15.0	85	85.0
6- Natural age of menopause.	0.65±0.48	35	35.0	65	65.0	0.86±0.35	14	14.0	86	86.0
7- Phases of the menstrual cycle.	0.49±0.50	51	51.0	49	49.0	0.82±0.39	18	18.0	82	82.0
8- Meaning of menstrual bleeding.	0.54±0.50	46	46.0	54	54.0	0.81±0.39	19	19.0	81	81.0
9- Meaning of follicular phase.	0.60±0.49	40	40.0	60	60.0	0.74±0.44	26	26.0	74	74.0
10- Meaning of Ovulation phase.	0.47±0.50	53	53.0	47	47.0	0.71±0.46	29	29.0	71	71.0
11- Meaning of luteal phase.	0.60±0.49	40	40.0	60	60.0	0.79±0.41	21	21.0	79	79.0
12- Structure of the female reproductive system.	0.54±0.50	46	46.0	54	54.0	0.76±0.43	24	24.0	76	76.0
13- Symptoms of premenstrual syndrome.	0.52±0.50	48	48.0	52	52.0	0.95±0.22	5	5.0	95	95.0
14- Source of menstrual bleeding.	0.64±0.48	36	36.0	64	64.0	0.86±0.35	14	14.0	86	86.0
15- The occurrence of menstruation as a result of ovulation.	0.61±0.49	39	39.0	61	61.0	0.90±0.30	10	10.0	90	90.0
16- Common disorders of the menstrual cycle.	0.76±0.43	24	24.0	76	76.0	0.86±0.35	14	14.0	86	86.0
17- Meaning of dysmenorrhea.	0.55±0.50	45	45.0	55	55.0	0.87±0.34	13	13.0	87	87.0
18- Receive analgesic during the menstrual cycle.	0.68±0.47	32	32.0	68	68.0	0.83±0.38	17	17.0	83	83.0
19-Causes of menstrual disorders.	0.61±0.49	39	39.0	61	61.0	0.91±0.29	9	9.0	91	91.0
20- Visit the physician.	0.64±0.48	36	36.0	64	64.0	0.77±0.42	23	23.0	77	77.0
Total of knowledge about menses	**11.83±3.49**					**16.51±1.91**				

Table (6): General self-care practices about menstruation in the study group pre and post program

General self-care practices	Mean ±SD	Pre-program				Mean ±SD	Post-program			
		Incorrect		Correct			Incorrect		Correct	
		No.	%	No.	%		No.	%	No.	%
1- General instructions during menstruation	0.99±0.10	72	72.0	28	28.0	0.28±0.45	1	1.0	99	99.0
2- Type of sanitary pads is recommended to be used during the menstrual cycle.	0.89±0.31	11	11.0	89	89.0	0.97±0.17	3	3.0	97	97.0
3- When using cloth pads	0.12±0.33	88	88.0	12	12.0	0.03±0.17	3	3.0	97	97.0
4- Times do you take a shower during your period.	0.20±0.40	80	80.0	20	20.0	0.95±0.22	5	5.0	95	95.0
5-Purify oneself from the menstrual cycle.	0.62±0.49	84	84.0	16	16.0	0.96±0.37	38	38.0	62	62.0
6- Wash external genitalia.	0.27±0.45	73	73.0	27	27.0	0.59±0.49	41	41.0	59	59.0
7- The direction of the external rinsing of the external genitalia	0.31±0.46	69	69.0	31	31.0	0.79±0.41	21	21.0	79	79.0
8- number of change sanitary pads during the menstrual cycle.	0.01±0.10	60	60.0	40	40.0	0.40±0.49	99	99.0	1	1.0
9- correct way to dispose of a single-use sanitary pad.	0.89±0.31	11	11.0	89	89.0	1.00±0.00	0	0.0	100	100.0
10- prevent cross infections	0.89±0.31	92	92.0	8	8.0	0.08±0.27	11	11.0	89	89.0
Total of general self-care practices	**5.19±1.01**					**6.33±1.54**				

Table (7): Correlation table between the study variables

	Knowledge about menses		General self-care practices	
	R	**P**	**R**	**p**
General self-care practices	0.509*	<0.001*	-	-
Student age	0.595*	<0.001*	0.242*	0.001*
Student Height	-0.106	0.136	0.089	0.208
Student Weight	0.048	0.502	0.035	0.620
Number of siblings	0.710*	<0.001*	0.291*	<0.001*
Birth order	0.666*	<0.001*	0.339*	<0.001*
Mother's age	0.797*	<0.001*	0.394*	<0.001*
Mother's education level	0.821*	<0.001*	0.235*	0.001*
Mother's job	0.092	0.196	0.232*	0.001*
The father's education level	0.550*	<0.001*	0.305*	<0.001*
Father's job	0.124	0.080	0.275*	<0.001*
Family monthly income	0.139*	0.049*	0.204*	0.004*

r: Pearson coefficient ***: Statistically significant at $p \leq 0.05$**

Table (8): Multiple Linear Regression Analysis Showing the Effect of demographics

Demographics	Knowledge						Practice					
	B	Beta	t	p	95% CI		B	Beta	t	p	95% CI	
					LL	UL					LL	UL
Student age	-0.410	-0.082	-1.722	0.087	-0.881	0.060	-0.066	-0.042	-0.507	0.613	-0.324	0.191
Student Height	0.000	0.001	0.035	0.972	-0.025	0.026	0.010	0.081	1.401	0.163	-0.004	0.024
Student Weight	0.005	0.029	0.882	0.379	-0.006	0.017	0.000	-0.003	-0.048	0.962	-0.006	0.006
Number of siblings	0.967	0.236	4.908*	<0.001*	0.578	1.355	-0.102	-0.080	-0.895	0.372	-0.326	0.123
Birth order	0.084	0.029	0.498	0.619	-0.249	0.417	0.015	0.017	0.165	0.869	-0.166	0.196
Mother's age	0.146	0.383	7.316*	<0.001*	0.106	0.185	0.010	0.085	0.824	0.411	-0.014	0.034
Mother's education level	1.635	0.400	7.822*	<0.001*	1.223	2.048	0.735	0.578	5.619*	<0.001*	0.993	0.477
Mother's job	-0.071	-0.019	-0.239	0.812	-0.654	0.513	-0.110	-0.094	-0.687	0.493	-0.428	0.207
The father's education level	0.388	0.067	1.500	0.135	-0.122	0.898	0.008	0.004	0.057	0.955	-0.271	0.287
Father's job	0.033	0.012	0.119	0.905	-0.509	0.574	0.295	0.334	1.978*	0.049*	0.001	0.589
Family monthly income	0.227	0.026	0.481	0.631	-0.703	1.157	-0.093	-0.034	-0.363	0.717	-0.599	0.413
Father's job	-	-	-	-	-	-	0.300	0.965	7.573*	<0.001*	0.222	0.378
R^2=0.813, F=74.345*, p<0.001*							R^2=0.433, F=11.899*, p<0.001*					

data on knowledge and self- care practice (n =200)

F, p: f and p values for the model
R^2: Coefficient of determination
B: Unstandardized Coefficients
Beta: Standardized Coefficients
t: t-test of significance
LL: Lower limit
UL: Upper Limit
***:** Statistically significant at $p \leq 0.05$

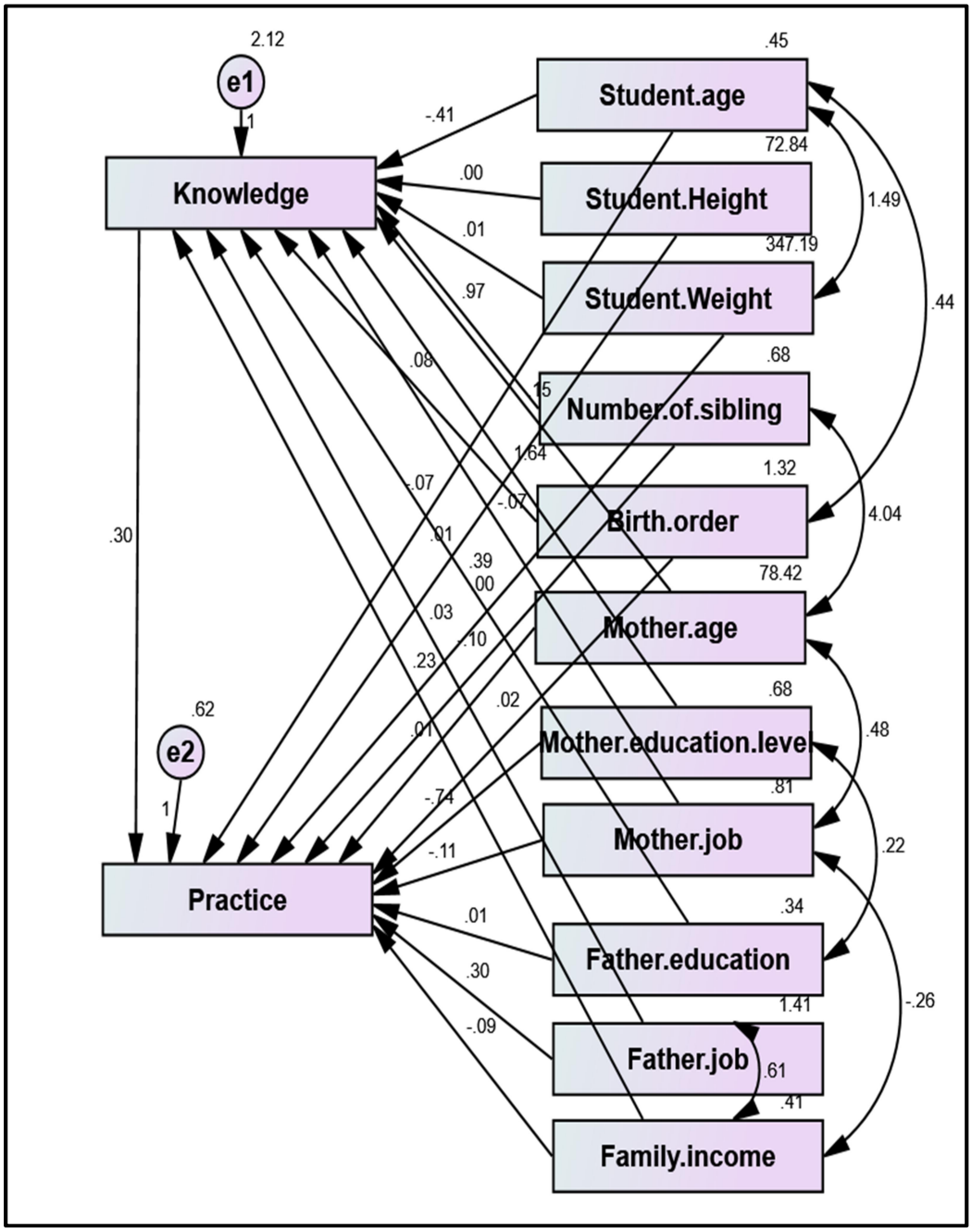

Figure (1): Structure Equation Modeling (n = 200)

Model fit parameters CFI; IFI; RMSEA (0.502; 0.511; 0.291).

CFI = Comparative fit index; IFI = incremental fit index; and RMSEA = Root Mean Square Error of Approximation.

Model □ □; significance 21.789*(<0.001*)

Table (9): Direct and Indirect Effect of the study variables on students' knowledge and their practices

Variable 1		Variable 2	Standardized regression weights	S.E	C.R	p-value
Knowledge	←	Student age	-0.410	0.232	-1.772	0.076
Knowledge	←	Student Height	0.000	0.013	0.036	0.972
Knowledge	←	Student Weight	0.005	0.006	0.908	0.364
Knowledge	←	Number of siblings	0.967	0.191	5.050*	<0.001*
Knowledge	←	Birth order	0.084	0.164	0.512	0.609
Knowledge	←	Mother's age	0.146	0.019	7.527*	<0.001*
Knowledge	←	Mother's education level	1.635	0.203	8.047*	<0.001*
Knowledge	←	Mother's job	-0.071	0.287	-0.246	0.806
Knowledge	←	The father's education level	0.388	0.251	1.544	0.123
Knowledge	←	Father's job	0.033	0.267	0.123	0.902
Knowledge	←	Family monthly income	0.227	0.458	0.495	0.621
Practice	←	Knowledge	0.300	0.038	7.812*	<0.001*
Practice	←	Student age	-0.066	0.127	-0.523	0.601
Practice	←	Student Height	0.010	0.007	1.445	0.148
Practice	←	Student Weight	0.000	0.003	-0.049	0.961
Practice	←	Number of siblings	-0.102	0.110	-0.923	0.356
Practice	←	Birth order	0.015	0.089	0.171	0.864
Practice	←	Mother's age	0.010	0.012	0.850	0.395
Practice	←	Mother's education level	0.735	0.127	5.796*	<0.001*
Practice	←	Mother's job	-0.110	0.156	-0.708	0.479
Practice	←	The father's education level	0.008	0.137	0.059	0.953
Practice	←	Father's job	0.295	0.145	2.041*	0.041*
Practice	←	Family monthly income	-0.093	0.249	-0.374	0.708

Table (10): Direct and Indirect Effect of study variables on students' knowledge and their practices

Variables		Direct effect	Indirect effect	CI			p-value
Knowledge - >	Student age	-0.410	0.0	-0.642	-	0.886	0.076
Knowledge - >	Student Height	0.000	0.0	-0.013	-	0.667	0.972
Knowledge - >	Student Weight	0.005	0.0	-0.001	-	0.66	0.364
Knowledge - >	Number of siblings	0.967	0.0	0.776	-	0.845	<0.001*
Knowledge - >	Birth order	0.084	0.0	-0.08	-	0.818	0.609
Knowledge - >	Mother's age	0.146	0.0	0.127	-	0.673	<0.001*
Knowledge - >	Mother's education level	1.635	0.0	1.432	-	0.857	<0.001*
Knowledge - >	Mother's job	-0.071	0.0	-0.358	-	0.941	0.806
Knowledge - >	The father's education level	0.388	0.0	0.137	-	0.905	0.123
Knowledge - >	Father's job	0.033	0.0	-0.234	-	0.921	0.902
Knowledge - >	Family monthly income	0.227	0.0	-0.231	-	0.511	0.621
Practice - >	Knowledge	0.300	0.0	0.262	-	0.692	<0.001*
Practice - >	Student age	-0.066	-0.123	-0.193	-	0.658	0.601
Practice - >	Student Height	0.010	0.0	0.003	-	0.661	0.148
Practice - >	Student Weight	0.000	0.002	-0.003	-	0.659	0.961
Practice - >	Number of siblings	-0.102	0.290	-0.212	-	0.554	0.356
Practice - >	Birth order	0.015	0.025	-0.074	-	0.768	0.864
Practice - >	Mother's age	0.010	0.044	-0.002	-	0.71	0.395
Practice - >	Mother's education level	0.735	0.491	0.608	-	0.972	<0.001*
Practice - >	Mother's job	-0.110	-0.021	-0.266	-	0.789	0.479
Practice - >	The father's education level	0.008	0.116	-0.129	-	0.907	0.953
Practice - >	Father's job	0.295	0.010	0.15	-	0.809	0.041*
Practice - >	Family monthly income	-0.093	0.068	-0.342	-	0.971	0.708

Discussion

Adolescence is the most dynamic period in human development. During this period the adolescent girls may experience physical changes; as growth of breast buds and body, growth of pubic and underarm hair, as well as menarche and widening of hips. The main pubertal change that occurs in girls is menstruation. It is considered the most important landmark in the process of growth and maturation which prepares them for motherhood because yesterday's girl is today's adolescent and tomorrow's mother (**Sawyer, 2018).**

Knowledge about menstruation as a part of natural female reproductive health that is one of the goals of a program to correct misconceptions in adolescents. Although menstruation is a natural process, it is linked with several misconceptions. Societies hand down traditions from generation to generation by teaching certain practices, legends, customs, and habits. Girls usually share whatever local customs and beliefs their parents' practice. Some traditional practices are useful, while some are harmful, and some are harmless. Faulty perceptions or misconceptions on menstruation and menstrual cycle will lead to faulty menstrual practices. Either of these may engender reproductive health problems during this crucial period. Hence the current study aimed to assess the effect of applying menarche educational program on knowledge and self- care practice of female preparatory school students **(Alharbi, 2018)**.

The discussion of the study results will be presented under three main headings: (1) knowledge assessment (2) self-care practice assessment, (3) choices, care, and disposable sanitary pad.

Generally speaking, in relation to the study subjects' socio-demographic data, the results of the present study revealed that both the study and control groups were matching in almost all aspects of their professional characters and their menstrual pattern, (Tables I & II). This can be interpreted in the light that most female preparatory school students are from the same socioeconomic class. Also, this matching is valued in controlling extraneous factors which could interfere with the effect of the proposed menarche educational program on knowledge and self- care practice on female preparatory school. It also aided in comprehending and ensuring the validity and relevance upcoming findings of the current study.

As regarding to knowledge assessment, Pre educational program at a glance the results of this study showed that the study and control groups had low level of knowledge regarding menarche with no statistically significant difference between them. This result is probably attributed to the fact that both groups had not attended any teaching classes about physiology of puberty and menarche hygiene. In fact, they did study puberty through only one lecture in the theoretical part of the science course during their third academic year.

This result is consistent with the findings of two other researchers. First: (**Parasuraman et al., 2022**). They had investigated the impact of health education intervention on menstruation and its hygiene among urban school-going adolescent girls, in Thiruvallur, Tamilnadu. Their results revealed that a majority of the students had low mean knowledge score pre intervention. Second (**Mohamed et al., 2018**). They had conducted a study entitled " Effect of Health Education Program on Menstrual Practices among Secondary School Girls'‘. Their results showed that the presence of low knowledge level pre intervention among the adolescent girls with no statistically

significant differences between the study and control groups.

Post educational program, the findings of the present study showed that the majority of the study group had higher knowledge level than the control group with a statistically significant difference between them in favor of the study group. This result may be attributed to many reasons. **First,** communicating the high expectations to study group pre-program implementation had motivated them to exert effort for achieving a high score in the knowledge test. **Second,** the integration of knowledge acquired through the educational training sessions as well as the use of different learning activates such as power point presentation, diagrams, and photos about physiology of menarche and its hygiene. In addition to the use of brain storming, and problem-based learning scenarios all of these techniques encourage the retention and repletion of knowledge.

This result is consistent with the findings of the previously mentioned study by (**Parasuraman et al., 2022**) their results revealed that an improvement in the median scores of knowledges is more observed among the girls who attained menarche education at late age. Second the previously mentioned study by (**Mohamed et al., 2018**). Their results explored the presence of a statistically significant increase in knowledge level post intervention among the study group. Third the study conducted by (**El-Mowafy et al., 2014**) they had conducted a study entitled" Effect of Health Education Program on Knowledge and Practices about Menstrual Hygiene among Adolescents Girls at Orphanage Home. Their results showed that participants' knowledge regarding puberty and menstruation was improved significantly after the intervention ($p < .005$).

Such an agreement between the results of the present study and the previously mentioned studies is probably attributed to the fact that repetition of knowledge in theoretical part through educational sessions more than one time brought additional improvement and increased knowledge retention among the study subjects.

As regard to self-care practices, the result of the present study showed that the majority of the participants had poor self-care practices related to menstrual hygiene with no statistically significant difference between the study and control groups at pretest. Whereas as in the post-test, the majority of the study group had good self - care practices related to menstrual hygiene, and there is a significant difference between the pre-test and post-test level of practice regarding menstrual physiology and hygiene in favor of the study group, which implies that the conducted health education program had a good impact on improving the level of practice among the adolescent girls.

This result is coinciding with two other studies conducted by (**Arasteh, 2019**), they conducted a study entitled " Effect of group counseling on adolescent girls in improving knowledge and practice of menstrual hygiene in welfare boarding centers". The second one (**Vandana, 2016**) they had investigated the knowledge of adolescent school-going girls regarding menstruation and menstrual hygiene. Both studies mentioned that there was a significant improvement in the level of practice after the intervention program.

Specifically speaking, good hygiene practices such as use of sanitary napkins and adequate washing of genital area are essential during menstruation to decrease the incidence of morbidity rate. The results of the present study revealed that the overall hygienic practice was insignificantly

improved after menstrual educational program. There was a significant improvement in number of students washing their hands every time using the toilet, cleaning the genital area as well as changing their sanitary pads every 4-6 hours. These findings are similar to the findings by (**Santhanakrishnan et al., 2018**) they investigated the "Impact of health education on menstrual hygiene: An intervention study among adolescent schoolgirls''. Their results concluded that menstrual hygiene practices such as cleaning external genitalia and washing with water and soap the cloths was improved after intervention among the study group. This agreement between the finding of this study and the current study - in this respect- may be attributed to the fact that the present study sample size was almost equal to that of the Santhanakrishnan, I. et al study's sample (200 adolescent girls) also the similarity in the study area, as well as the study design.

Concerning the choices, care and the disposable of sanitary pad, the result of the present study showed that there is no statistically significant difference between the study group was observed pre intervention. this picture was changed at post intervention period whereas, a statistically significant difference was noticed between the study and control groups in favor of the study group. About one half of the study group had used the disposable sanitary pads preprogram compared to the majority of them post-program. It was also showed that more than one third of preparatory female students in study group had reported that they wash their clothes alone pre-program compared to the majority of them post program. Meanwhile less than one third of students in study exposed their clothes to sun as a method of drying pre-program compared to more than half of them post program. This result is probably attributed to the fact that following each education session, the researcher provided a debriefing as an intuitive activity. This lasted about 15 minutes; it included constructive feedback, correction, clarification, and discussion of the most important points; to identify the strength and weakness in the students' hygienic practice and how to improve it. This same result is almost congruent with the findings of (**Nuganti, 2020**) they conducted a study entitled " Impact of Menstrual Health Education: A Community Based Interventional Analytical Study Among Rural Women of Eastern Telangana Regarding hygienic practices" their result revealed that all students' hygienic practices as using of Sanitary napkins, methods of washing their clothes as well as the way of dryness are significantly improved post intervention among the study group.

From these results and discussion in addition to more previous studies confirmed that menarche education program improves the knowledge and self-care practices among the adolescent girls.

Conclusion

Based on the present study's findings, it can be concluded that menarche education program has significantly impact on improvement of preparatory school student's knowledge and their self-care practices. Hence, our study aim and hypothesis were achieved within the framework of the present study.

Recommendation

1. Development of in-service training programs for health care providers who take care of adolescent girls about issues related to menstruation and reproductive health.
2. Maternal and Child Health Centers (MCH) or health setting should provide health teaching for adolescent Community

campaigns using various educational media is essential to increase knowledge and improve self-care practices about menstruation among all girls.

3. Preparatory school students need to be supported with clean school environment supplied with clean bathrooms in addition to other basic hygienic products to help them manage their hygiene.
4. Further additional studies may be needed using a wider geographic scope and a larger sample size that should include young girls and their mothers emphasizing cultural variations in order to provide sufficient and comprehensive information in all Egyptian governorates.
5. The mothers of young girls should be educated about the appropriate puberty hygiene, and be empowered with the necessary skills to communicate with and transfer the obtained information to their children.

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