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The Effect of Self-Care Strategies on Primary Dysmenorrhea among a Convenient Sample of Female Nursing Students

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Abstract: Background and aims: Primary dysmenorrhea is the most common gynecologic complaint affecting adolescents and young women. Many university students do not seek medical consultation and remain suffering from pain. It decreases academic performance and is a cause of absenteeism in female students. A Quasi-experimental study was conducted to study the effectiveness of self-care strategies in primary dysmenorrhea and monthly hormonal concentrations. **Subjects and methods:** The study was conducted in the College of Applied Medical Science, Shaqra University in the academic year 2021-2022. A convenient sample of eighty-two female nursing students volunteered to participate in the study, allocated into two groups the self-care strategies group (46) and the control group (36). Three tools for data collection were used; a structured interviewing questionnaire, a visual analogue scale, and menstrual changes follow-up chart. The concentrations of follicle stimulating hormone, luteinizing hormone, 17-β-estradiol, progesterone, and prolactin were measured by Enzyme-Linked Immunosorbent Assay. Other menstrual characteristics were also estimated using a mobile phone applications. **Results:** The current study revealed that the severity of pain and the associated symptoms was decreased in the self-care strategies group compared to the control group, with a highly statistically significant difference found between groups. Self-care strategies affected all the menstrual hormone concentrations significantly ($P<0.001$) compared to the control group. **Conclusion:** Using self-care strategies was very effective in relieving primary dysmenorrhea and improving menstrual health in female nursing students. **Recommendation:** Considering self-care strategies as one of an effective option for girls suffering from primary dysmenorrhea and very important for menstrual health.

Keywords: *Self-Care Strategies, Primary Dysmenorrhea, Female Nursing Students, Menstrual Characteristics, Menstrual Health.*

Introduction

Hu et al, 2020 defined Primary dysmenorrhea (PD) as recurrent menstrual cramps during the menstrual period and painful menses that are not associated with any other apparent medical pathology or pelvic diseases, with a sensation of pain a few days prior to menstruation, that normally persists approximately forty- eight to seventy-two hours after the onset of menstrual bleeding, and usually starts during or after adolescence.

Fisher et al, 2016 concluded that PD was considered the commonest complaint for adolescents as well as, women of reproductive age, and this condition manifests through a wide variety of symptoms, either physiological or emotional, Hu et al, 2020 & , Sharghi et al, 2019 concluded that PD had many associated symptoms such as back pain, abdominal and pelvic pain, headaches, migraines, insomnia, nausea & vomiting, dizziness, fatigue, abdominal cramps, sweating, irritability, emotional liability, and depression, with a negative impact on the overall quality of life (QoL).

Fernández et al, 2019 & Iacovides et al,2014 estimated that PD negatively affects female university students'

QoL. Armour et al, 2019; Fernández et al, 2020 estimated that in the case of university students, there are further connotations, as PD impacts academic performance and has been related to decreased concentration because of menstrual headache and migraine, among the other associate symptoms, entailing greater absenteeism during menstruation, reduced practicing sports and social activities, and increasing sleeping problems.

Orem, 2001 defined self-care strategies (SCS) as practicing activities that individuals initiate and perform on their own behalf in maintaining a healthy life, and well-being. Chen et al, 2016 explained that SCS included seeking services from healthcare providers and self-activities to treat any disorders and promote health. Rivera et al, 2019 explained that SCS included also a healthy diet with fresh vegetables and fruits such as eating date fruits instead of sweets and chocolate; Date fruits are believed to be one of the valuable fruit crops universally, because of their excellent nutritional value and economic benefits. Date palm (Phoenix dactylifera L.) parts, e.g., fruits, leaves, pits, and pollen, were used in treating some health disorders especially endocrine and reproductive system disorders.

Significant of the study:

Jaafarpour et al, 2015 concluded that PD with an estimated prevalence of 43% to 90% is one of the most common health problems among women younger than 25 years and one of the main reasons for short-term school or work absence, resulting in a significant economic loss. Mohamed and Neaem, 2013 added that the use of non-pharmacological therapy is a time-honored approach in modern investigation and research to strengthen the body and treat the disease without side effects. Therefore, using self-care strategies are very effective for the management of PD. There are few studies indicating that self-care strategies can reduce menstrual cramps and associated symptoms; however, it is used in Europe to deal with health problems. Improvement of research evidence was found in quality, quantity, and reporting, but still more studies are needed, particularly for self-care strategies.

OConnell et al, 2006 and Lee et al, 2006 showed that eating healthy food instead of chocolate and sweets, and consuming date fruits every day has a great effect on menstrual health. Self-care strategies are a natural way to relieve menstrual pain and associated symptoms. It is a safe, non-invasive, economical, and cost-free pain-relieving technique especially many for young women who discuss painful menses and associated symptoms with their mothers and friends rather than with health care providers. Hence, primary dysmenorrhea-coping behaviors mostly involve traditional rather than formal health care. The vital strength of this research project is the study of PD among Shaqra nursing students. These future healthcare professionals will have direct access to and influence the general public in the area of healthcare and the acquisition of healthy habits and the prevention of harmful behavior such as (self-medication) and eating unhealthy food. Thus this research aimed to investigate the effect of self-care strategies in relieving PD and improving menstrual health in a convenient sample of female nursing students.

Objectives of the Study:

To study the effectiveness of SCS in PD among a convenient sample of female nursing students through:

1) Identifying the severity of PD cramps and associated symptoms by

using the Visual Analogue Scale (VAS).
2) Evaluate the effectiveness of SCS in PD and menstrual health.

Research question:
1) Is the use of SCS effective in relieving PD among a convenient sample of female nursing students?
2) Is the use of SCS affect menstrual hormone concentrations among a convenient sample of female nursing students?

Research hypothesis:
1) The convenient sample of female nursing students who will use SCS are more likely to be relieved PD than those who do not.
2) The convenient samples of female nursing students who will use SCS are more likely to be increased menstrual health than those who do not.

SUBJECTS AND METHODS

Research Design, setting, and timing:
A Quasi-experimental study design was conducted in the College of Applied Medical Sciences, Shaqra University during the academic year 2021-2022.

Sampling size and technique:
A total of eighty-two female nursing students were allocated into two groups; the self-care strategies group (SCS) (n= 46) and the control group (n= 36) during the academic year 2021-2022. They participated in the current study by using the convenience sampling technique. Note: College of Applied Medical Sciences-Shaqra University system works by academic levels with credit hours from level 3 to level 8, so the researcher selected the groups according to the levels; the SCS group included the students in levels four, six, and eight, while the control group included the students in the levels three, five, and seven.

"Inclusion criteria": Unmarried female students have regular menstrual cycles of 21-35 days without any menstrual irregularities and any pelvic diseases, don't take any medication that affects or regulates the menstrual cycle, and do not follow any special diet.

"Exclusion criteria": Included pelvic diseases, abdominal and pelvic surgeries, or having severe psychological stress such as parents' divorce, death of close relatives, and, taking sedatives or analgesics.

Tools for data collection:
Three tools were used for data collection. These consisted of students` structured interviewing questionnaire sheet regarding PD, a visual analogue scale for pain assessment, and menstrual changes follow-up chart.

1. **A Structure Interviewing Questionnaire:**
   Was developed by the researcher to collect data after an comprehensive extensive literature review related to 1-a) demographic characteristics (name, age, educational level...) and 1-b) menstrual characteristics (age at menarche, duration, and frequency of the menstrual cycle….).
2. **Visual Analogue Scale (VAS):**
   Was adopted by Gould, 2001 used to assess "menstrual pain intensity". It consists of a blank line anchored at each end of the line by adjectives that describe the extremes of pain. The anchoring adjectives commonly used are "no pain" (zero scores) and "severe pain" (the worst possible pain) the top scores (ten). The student was asked to place a mark on the line that best indicates the pain intensity being experienced. Dimensions measured by this scale are sensory and affective. This tool takes two to five minutes to be completed. It was divided into five main parts: the first part graded 0

means no pain, grades 1-3 reflects mild pain, the third part graded from 4 to 6 for moderate and severe pain, the fourth part graded from 7 to 9 for very severe pain, and fifth part graded from 9 to 10 for worst pain. These scores were recorded before and after the nursing intervention for the two groups.

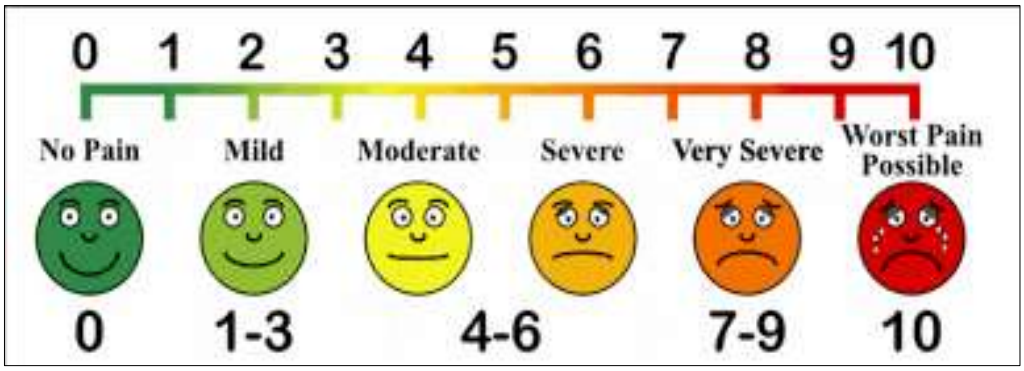

Figure (1) The grading scores for VAS

3. **Menstrual changes follow-up chart:**
   Included a daily chart developed by the researcher after an extensive review of relevant and recent literature. Consisted of two parts: Part one included recording the severity of primary dysmenorrhea for 4 consecutive cycles (before the intervention; first cycle, second cycle, third cycle, and the fourth cycle) and also to prospective recorded the impact and severity of the menstrual symptoms for the two groups. Part two included recording hormonal concentrations before and after nursing intervention: Follicle Stimulating Hormone (FSH), Luteinizing Hormone (LH), Prolactin (Prol), Progesterone (Prog), and 17-β-estradiol (E2) for the two groups.

Content validity and reliability

Study tools were submitted to a panel of five experts in the field of "maternity nursing", to test the content validity. Modifications were done according to the panel's judgment on the clarity of sentences and content appropriateness. Reliability analysis was conducted to investigate the instrument's internal consistency used in the study. Internal consistency describes the extent to which all the questionnaire items measure the same concept or construct. The Cronbach alpha coefficients were calculated to examine the measurement reliability with multipoint items. The accepted values of the Cronbach alpha coefficient range from 0.60 to 0.95. The questionnaire items of the present study were proven reliable where $\alpha = 0.91$ (Sun et al ,2007, Tavakol, and Dennick, 2011).

Pilot Study

It was conducted on 10 % of the participants, who were selected randomly and excluded from the main study sample. Its aim was to evaluate the simplicity and clarity of the tools. It also helped in the estimation of the time needed to fill in the forms. According to the pilot study results, simple modifications were done by rephrasing some questions.

Ethical consideration

Official permission was granted from the dean of applied medical sciences college, Shaqra University. The study was approved by the scientific research ethics committee at Shaqra University. The researcher introduced themselves to the students who met the inclusion

criteria and informed them about the purpose of this study in order to obtain their written consent acceptance to participate in the study. The researcher ensured that the study posed no risk or hazards to their health and their participation in the study is voluntary and they can withdraw from the study at any time. All students were instructed that all the information used only for the purpose of scientific research, and students' privacy and confidentiality were ensured.

Fieldwork:

The collection of data covered a period of 6 months from October 2021 to March 2022. All of the female nursing students had been fully informed about the research and consented to participate in the research, followed by a baseline interview. During the interview, the collected data included the student's age, age at menarche, length of the menstrual cycle, duration of menstrual flow, regularity of menstruation, amount of blood loss, severity, onset, and duration of pain, then the SCS and control groups were selected where the odd level numbers were recruited as a control group and the even numbers are recruited as the SCS group. The intervention was done through three consecutive phases; pre-Intervention Phase, Intervention Phase, and Post- Intervention Follow-up Phase.

1. Pre-intervention phase:

After introducing themselves the researcher concisely explained the aim of the study to the participants. Each meeting took around 10-15 minutes. All participants were informed about their freedom to participate voluntarily. After obtaining the written acceptance of participants to participate in the study, the researchers gave them an overview and explanation of the assessment sheet question. Before starting the research and at each follicular phase, instruct each student in both groups to donate a 5 ml blood sample to measure the hormonal concentrations: Follicle Stimulating Hormone (FSH), Luteinizing Hormone (LH), Prolactin (Prol), Progesterone (Prog), and 17-β-estradiol (E2). Blood samples were drawn by a qualified laboratory technician at a regional laboratory in Riyadh –Health affairs in Riyadh region-Ministry of health-Kingdom of Saudi Arabia, and blood hormone concentrations were measured by Enzyme-Linked Immunosorbent Assay (ELISA). Before starting the study, a mobile application was developed and uploaded on the cell phones of the study students to remind them to eat the healthy diet, fill the menstrual changes follow-up charts, the day and time for a donation of their blood samples, and predict the date of the next menstrual cycle. Any female student who met the inclusion criteria and accepted the study conditions was given the choice to participate in any of the study groups (Self Care Strategies or control group).

2. Intervention phase:

The intervention groups met for four sessions' consecutive weekly sessions that lasted approximately 2 hrs. This intervention has a set of precise goals for each of the four sessions. This used be carried out through several teaching strategies such as brainstorming, lecture, discussion, demonstration, data show, video, and pictures have been used as media, and the educational booklet was given to each participant. At the end of every session summary, feedback, and further clarification were performed for vague items.

The sessions on the self-care strategies:

The first session, in this session, the researcher instructed the study students about a healthy diet such as eating fresh vegetables and fruits especially

date palm fruits, importance of milk and its products, and drinking large amount of water every day.

The second session was about giving health education for reducing physical activity, keeping warm, drinking warm beverages, and avoiding cold drinks, spicy greasy foods, caffeine, and sugary foods.

The third session was about using natural methods for pain-relieving such as heat therapy, self-regulation of negative emotions, and using distracting activities. Other methods that are combined with heat include placing the hands over the area or massaging the painful area, breathing exercises, and listening to relaxing music.

The fourth session included communicating dysmenorrhea to the researcher for expressing emotions and advice. Educating them about the importance of adopting antalgic positions such as the fetal position will help in pain-relieving during menstruation.

The control group: They made the traditional care during menstruation.

Both groups were instructed to assess pain intensity and severity of symptoms before and after the intervention for "four consecutive menstrual cycles". Both groups are instructed to avoid eating soybean, chocolate, sesame and sesame paste, chickpea dip, flaxseed, walnuts, seed bread, cinnamon, and licorice.

3. Post- Intervention Follow-up Phase:

After 4 consecutive menstrual cycles, the researcher instructed all the students in the groups to fill the menstrual changes follow-up charts. At each follicular phase, each student donated a 5 ml blood sample to measure the hormonal concentrations: Follicle Stimulating Hormone (FSH), Luteinizing Hormone (LH), Prolactin (Prol), Progesterone (Prog), and 17-β-estradiol (E2), and blood hormone concentrations were measured by Enzyme-Linked Immunosorbent Assay (ELISA).

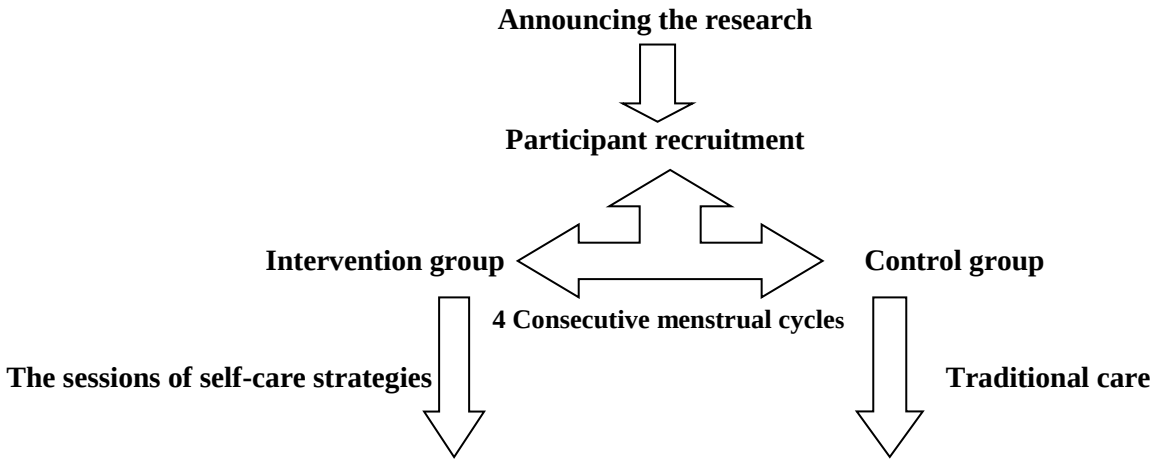

Figure (2): Schematic Representation of the Study Protocol

Statistical design

All statistical analyses were done using SPSS version 23. Initially, the internal consistency coefficients were examined to ensure the reliability of the used instrument for the present samples. Frequencies, means, and standard deviations were calculated to describe the samples. T-test and analysis of variance ANOVA were used to compare the means of two different groups. Statistical significance was considered at a p-value ≤ 0.05.

RESULTS

Table (1) Showed that the mean ages of students in the Self-Care Strategies Group (SCS) and control groups were (22.4±4.5) and (19.89±1.75) respectively, While the mean ages at menarche were (13.35 ± 1.4) and (13.06±1.28) for both groups respectively. Also, it was found that the mean duration of the menstrual cycle for the SCS and control groups was (5.65±4.1) days and (5.5± 3.0) days, meanwhile the mean frequency of the menstrual cycle was (27.0 ± 3.4) days and (28.3 ± 3.5) days for both groups respectively. Most of them had a moderate amount of blood loss in both groups 78.3% in the SCS group and 77.7% in the control group, about less than half of female nursing students (43.4 %) had moderate pain and (47.9%) of them had severe pain in the SCS group compared to (22.2 %) and (63.9%) of the students had moderate and severe pain in the control group respectively. Regarding the onset and duration of the menstrual pain among the students, it was found that more than half of the students had pain before the beginning of the menstruation and up to 24-48 hours in the intervention group at (52.2%) and control group at (63.9%), while (41.3%) and (30.5%) of the SCS and control groups respectively had pain from the beginning of the menstruation and up to 24-48 hours, and 6.5% in the SCS group, 5.5% in the control group had pain after 24 hours of menstruation.

Table (2) Revealed that there was no statistically significant difference between the SCS and the control groups related to pain scores before the intervention at (p= 0.28), while there were highly statistically significant differences between groups at different time intervals for four consecutive menstrual cycles after the intervention at ($p < 0.001$).

Figure (3) Showed decreases in the menstrual pain mean scores among the participants nursing students in the SCS group during the initial assessment (pre-intervention), then in the first, second, third, and fourth menstrual cycles (4 consecutive cycles).

Table (3) Indicated that the SCS group reduced significantly the concentration of the hormones: LH 5.649± 0.813 IU/L compared to 6.143± 1.697 IU/L in the control group (P<0.001**).Prog 0.980± 0.559 nmoI/L compared to 1.998± 0.594 nmoI/L in the control group nmoI/L(P<0.005**). On the contrary SCS group increased significantly the concentration of the hormones: FSH 7.578± 0.597 IU/L compared to 5.998± 0.458 IU/L in the control group (P<0.001**) and17-β-estradiol (E2) 54.335± 3.982 pg/ml compared to33.560± 4.440 pg/ml in the control group(P<0.001**).

Table (4) Indicated that there was no statistically significant difference between groups on mean scores of menstrual symptoms at (t= -1.86, p-value 0.066) before the intervention while there were highly statistically significant differences between groups at (t = -7.29, p-value .000 *) after the intervention.

Table (1): Demographic and menstrual characteristics of the study participants

Items	SCS (N= 46)		Control (N= 36)	
	No.	%	No.	%
Age:				
≤ 20 years	15	32.7	24	66.7
21-25 years	27	58.6	10	27.8
>25 years	4	8.7	2	5.5
Mean ±SD	22.4±4.5		19.89±1.75	
Age at Menarche				
9-12 years	15	32.6	16	44.5
13-16 years	30	65.2	20	55.5
> 16 years	1	2.2	0	0
Mean ±SD	13.35 ± 1.4		13.06±1.28	
Duration of menstrual cycle				
1-3 days	0	0	2	5.6
4-6 days	35	77.2	25	69.4
> 6 days	10	22.8	9	25
Mean ±SD	5.65±4.1		5.5± 3.0	
Frequency of menstrual cycle				
21-25 days	17	36.9	9	25
26-30 days	22	47.9	17	47.2
31-35 days	7	15.2	10	27.8
Mean ±SD	27.0 ± 3.4		28.3 ± 3.5	
Amount of blood loss				
Mild	4	8.7	2	5.5
Moderate	36	78.3	28	77.7
Severe	6	13	6	16.6
Severity of pain:				
- Mild (1-3)	4	8.7	5	13.9
- Moderate (4-7)	20	43.4	8	22.2
- Severe (8-10)	22	47.9	23	63.9
Onset & duration of pain				
- Before menstruation and up to 24-48 hours	24	52.2	23	63.9
- With onset of menstruation and up to 24-48 hours.	19	41.3	11	30.6
- After 24 hours of menstruation and continue with it.	3	6.5	2	5.5

Table (2): Comparison of pain severity scores between groups after four consecutive menstrual cycles at different time intervals

Pain score at different time intervals	SCS (N= 46)	Control (N= 36)	P- value
	Mean ± SD	Mean ± SD	
Pre-intervention pain score	2.35± .65	6.5± 0.859	0.28
Post-intervention pain score			
After 2 Menstrual Cycle:			
- Immediately after intervention.	1.41 ±.88	2.4± 0.86	0.001**
At 1 hour after intervention.	1.0 ±.84	1.8± 0.88	0.001**
At 2 hours after intervention.	0.61 ±.77	1.9± 0.66	0.001**
At 3 hours after intervention.	0.33 ±.59	1.5± 0.74	0.001**
After 4 Menstrual Cycle:			
Immediately after intervention.	1.5±.93	2.7± 0.75	0.001**
At 1 hour after intervention.	1.2±.87	1.8± 0.86	0.002**
At 2 hours after intervention.	0.62±.81	1.9± 0.95	0.000**
At 3 hours after intervention.	0.18±.78	1.3± 0.83	0.000**

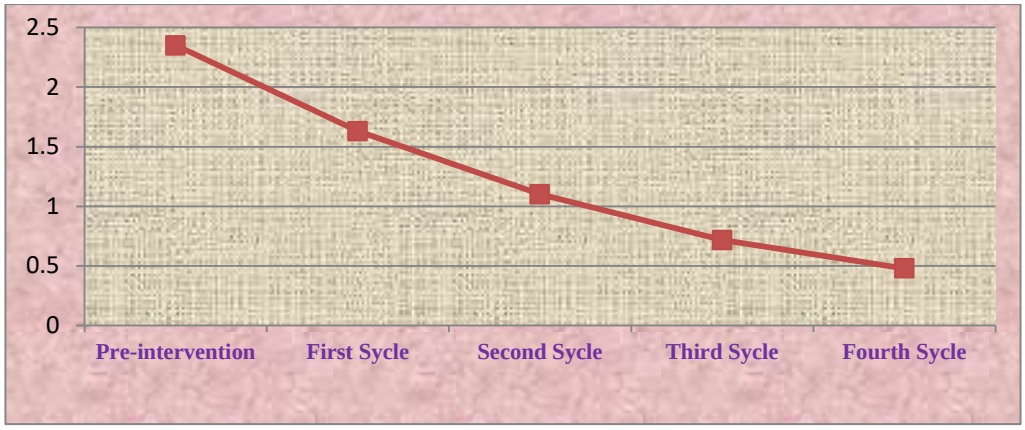

Figure (3): Mean menstrual pain Scores for the SCS Group in four consecutive menstrual cycles

Table(3): Effect of self-care strategies on the serum hormone concentration of the study participants

Hormones	SCS (N= 46)	Control (N= 36)	P- value	Normal Range
	Mean ± SD	Mean ± SD		
Luteinizing Hormone (LH) (IU/L)	5.649± 0.813	6.143± 1.697	<0.001**	2.4-12.6 IU/L
Follicle Stimulating Hormone (FSH) (IU/L)	7.578± 0.597	5.998± 0.458	<0.001**	3.5-12.5 IU/L
Progesterone (Prog) (nmoI/L)	0.980± 0.559	1.998± 0.594	0.005**	0.181-2.84 nmoI/L
Prolactin (Pro) (mIU/L)	252.457± 39.893	116.223± 35.532	<0.001**	100.6-489.3 mIU/L
17-β-estradiol (E2) (pg/ml)	54.335± 3.982	33.560± 4.440	<0.001**	11.3-43.2 pg/ml

*** * Highly statistically significant at p< 0.001**

Table (4): Comparison of symptoms severity scores between SCS and control groups

Symptoms	SCS (N= 46)		Control (N= 36)	
	Before Mean ± SD	After Mean ± SD	Before Mean ± SD	After Mean ± SD
Tension and Anxiety	0.75 ± .88	0.39 ± 0.69	1.22 ± 1.18	1.11 ± 0.99
Bowel Disturbances	0.73 ± .95	0.09 ± 0.29	1.11 ± 1.17	1.11 ± 0.55
Constipation	0.75 ± 0.84	0.30 ± .69	1.28 ± 1.08	1.08 ±.85
Abdominal Distension	1.77 ± 1.22	0.59 ± 0.99	1.28 ± 1.06	1.67 ± 1.13
Backache	1.22 ± 1.36	0.46 ± 0.68	1.67 ± 1.14	1.06 ± 1.08
Breast tenderness	1.45 ± 1.33	0.30 ± 0.59	1.06 ± 1.08	1.28 ± 1.12
Legs pain	0.68 ± .94	0.48 ± 0.78	1.28 ± 1.12	1.97 ± 0.17
Nausea and vomiting	1.39 ± 1.32	0.43 ± 0.67	1.83 ± 0.98	1.28 ± 1.24
Anorexia	1.97 ± 1.13	0.33 ± 0.58	1.28 ± 1.65	1.72 ± 1.22
Fatigue	0.89 ± 1.12	0.41 ± 0.88	1.72 ±1.51	1.78 ± 1.38
Nervousness	0.97 ± 1.27	0.17 ± 0.49	1.78 ± 1.87	1.22 ± 1.08
Vertigo	0.58 ±. 86	0.11 ± 0.39	1.22 ± 1.99	0.61± 0.48
Pre-intervention symptoms score	10.99 ± 6.2		16.1 ± 8.96	
	t= -1.86		p-value= 0.066	
Post-intervention symptoms score	3.5 ± 3.6		15.35 ± 7.9	
	T = -7. 29		p-value 0 .000 **	

**** Highly statistically significant at p< 0.001**

DISCUSSION

PD is the pain and discomfort experienced during, or just before or after menstruation. The intention of this study was to identify the severity of PD cramps and associated symptoms by using the Visual Analogue Scale (VAS) and study the effectiveness of self-care strategies (SCS) in PD among a convenient sample of female nursing students.

Regarding" the severity of pain and symptoms of PD", the present study illustrated a high prevalence of PD among female nursing students, most of them had moderate and severe pain and a very low rate had mild pain in both groups (SCS and control groups). "This result is congruent with" a study conducted in Mansour, Egypt by Mohamed and Neaem, (2013) who indicated more than half of the technical secondary school girls suffered from PD (78.8%). Also El-Gilany et al., (2005) who studied PD among sixty-six four secondary school students from rural and urban areas in Mansoura, Egypt, reported that all the study participants had PD, most of them had mild and moderate pain; rated mild in more than half (55.3%), moderate in one third (30%) and severe in less than one third (14.7%) among female students. The differences could be related to different cultures, and study population types, and sizes.

Also, Kamel et al (2017) reported that PD is highly prevalent among female college students at Cairo University with many physiological impacts and associated activity limitations and recommended collaborative comprehensive efforts from health care providers program coordinators, and parents especially the mothers should focus on effective communication, increasing awareness and improving management strategies to treat PD.

PD associated symptoms" were reported in the present study included; tension, anxiety, bowel disturbances, constipation, abdominal distension, backache, breast tenderness, leg pain, nausea& vomiting, anorexia, vertigo, fatigue, and nervousness with mean scores (10.99 ± 6.24) and (16.20± 8.96) in the SCS and control groups respectively. The finding of the present study was in agreement with Ling Chen et al (2019) who found in their study that "PD" the prevalence rates of mild, moderate, and severe pain in PD were 18.1%, 27.7% , and 5.4%, respectively. The most common symptoms associated with PD were cramps (96.9%), weakness (70.0%), backache (65.1%), facial blemishes (55.3%), and irritability (55.3%).

Research question (1) Is the use of (SCS) effective in relieving PD among a convenient sample of female nursing students?

Research hypotheses(1): The convenient sample of female nursing students who will use SCS are more likely to be relieved PD than those who do not.

The present study indicated that using the SCS was very effective in relieving menstrual pain and associated symptoms; this was supported by Ling Chen et al (2019) who reported that SCS was very effective in relieving PD among Chinese students girls. Also, our finding is in accordance with Elia Fernández-Martínez et al (2020) who reported that giving supportive sessions to female nursing students during menstruation was very important and effective for relieving PD and achieving menstrual health.

The current study revealed that there were highly statistically "significant differences" between the SCS and the control group regarding menstrual pain at different time intervals for four consecutive cycles after the nursing intervention and this is congruent with "a randomized control" trial study conducted by Orestis Tsonis et al., (2021) who focused on lifestyle changes

and alternative methods that could potentially result in minimizing symptoms of PD and improving overall Quality of life QoL among university students.

The current study revealed that there was a statistical reduction in the menstrual pain mean scores among the participants nursing students in the SCS group during the initial assessment (pre-intervention), then in the first, second, third, and fourth menstrual cycles. In the same line with Elia Fernández-Martínez1et al., (2021) who estimated that there was a significant decrease in the menstrual pain mean scores among the participants nursing students in the initial assessment (pre-intervention), then in the first, second, third, and fourth menstrual cycles after using non-pharmacological strategies of SCS. Furthermore, this result is congruent with Mike Armour et al., (2019) who reported that using alternative non-pharmacological measures was very effective in alleviating PD and worthwhile using it.

Research question (2) Is the use of SCS affect menstrual hormone concentrations among a convenient sample of female nursing students?

Research hypothesis (2) The convenient sample of female nursing students who will use SCS are more likely to be increased menstrual health than those who do not.

The current study" illustrated the SCS group reduced significantly the concentrations of the hormones: LH 5.649± 0.813 IU/L compared to 6.143± 1.697 IU/L in the control group (P<0.001**). Prog 0.980± 0.559 nmoI/L compared to 1.998± 0.594 nmoI/L in the control group nmoI/L(P<0.005**). On the contrary SCS group increased significantly the concentration of the hormones: FSH 7.578± 0.597 IU/L compared to 5.998± 0.458 IU/L in the control group (P<0.001**) and17-β-estradiol (E2) 54.335± 3.982 pg/ml compared to 33.560± 4.440 pg/ml in the control group (P<0.001**). This finding was supported by Al. Sayyed & Takruri (2018) who reported that SCS will help in improving menstrual health and fertility because of eating a healthy food such as date fruits instead of sweets and practicing a healthy life style.

The current study illustrated that there was decreasing in menstrual symptoms severity scores between the SCS and control groups. This finding was supported by Ling Chen et al (2019) who reported that SCS was very effective in relieving PD symptoms among Chinese students girls. Tension and anxiety were reported symptoms in the study, which improved after the nursing intervention. This was congruent with Elia Fernández-Martínez et al (2020) who reported that giving supportive sessions to female nursing students during menstruation was very important for alleviating PD and associated symptoms and achieving menstrual health.

Furthermore, other symptoms were reported in the current study, such as abdominal distension, headache, backache, nausea and vomiting, which improved after the use of SCS and this is congruent with "a randomized control" trial study conducted by Orestis Tsonis et al., (2021) who focused on lifestyle changes and alternative methods that could potentially result in minimizing symptoms of PD and improving overall university students Quality of life QoL.

The application of SCS is very important and very effective in PD and associated symptoms and improving menstrual health among a convenient sample of female nursing students. Mothers should talk with their daughters about how to achieve menstrual health during menstruation and alleviate the suffering of their menstrual pain.

CONCLUSION

Based on the findings of the present study, it was concluded that the self-care strategies had a significant effect on

primary dysmenorrhea and menstrual health.

RECOMMENDATIONS

Based on the "findings of the current study", the following was recommended: (1) Encouraging the use of self-care strategies during menstruation to reduce the severity of menstrual pain and improve menstrual health. (2) Further investigations are necessary to replicate the beneficial findings of the present study on large populations. (3) Also, "further research" are needed to investigate the effect of self-care strategies in resolving other "health problems".

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