Effect of Spleen 6-point Acupressure on Pain Intensity among Late Adolescents Nursing Students with Primary Dysmenorrhea

Nehal Shalaby Awad Mahmoud, Assistant lecturer
Obstetric and Gynecologic Nursing, Faculty of Nursing, Alexandria University.

Magda Y. Helmi Mourad, *Professor Emeritus*
Obstetric and Gynecologic Nursing, Faculty of Nursing,Alexandria University

Sahar Mansour Lamadah, *Assistant Professor*
Obstetric and Gynecologic Nursing, Faculty of Nursing, Alexandria University

Abstract:

Background: *Primary dysmenorrhea is a menstrual disorder characterized by colicy pain in the suprapubic region and radiate to the lumbar and thighs. Its prevalence varies from 45 to 95 % globally with higher rates reported among adolescent populations. It can reduce the quality of life and hinders social activities among adolescents, especially when it is accompanied by symptoms such as headache, backache, fatigue, nausea and vomiting, diarrhea, general malaise, weakness, boredom and chills.* ***The aim of the study*** *was to determine the effect of Spleen 6 point acupressure on pain intensity among late adolescents nursing students with primary dysmenorrhea.* ***Materials and method:*** *A quasi-experimental research design was used. The study was conducted in the faculty of Nursing, Alexandria University, obstetric & gynecologic nursing skills lab. A convenient sample of 80 female students was selected from the third academic year in the faculty of nursing. Three tools were used for data collection (female student's basic data questionnaire, Visual Analogue Scale and a modified version of Chamber Price Pain Rating Scale).* ***Results:*** *The study results revealed a highly statistically significant difference regarding pain intensity among female students before and after SP6 acupressure, where ($p<0.000$).* ***Conclusion:*** *SP6 acupressure can be used as an effective intervention to decrease menstrual pain among adolescents.* ***Recommendations:*** *SP6 acupressure is effective intervention for adolescents with primary dysmenorrhea and thus should be used as a nursing management method of this group of adolescents.*

Keywords: Spleen 6-point, acupressure, pain intensity, late adolescents, primary dysmenorrhea.

Introduction

Menstruation is a cyclical discharging of blood, secretions, and tissue debris from the uterus that recurs in non-pregnant breeding-age primate females at approximately monthly intervals. It is considered a readjustment of the uterus to the non-pregnant state following proliferative changes accompanying the preceding ovulation and lasting from menarche to menopause **(Thompson & Appétit**, **2020; Magsaysay& Times, 2020).**

Dysmenorrhea is characterized by the presence of painful cramps of uterine origin that occur during menstruation and represents one of the most common causes of pelvic pain and menstrual disorder **(Lghoul et al., 2020; Shewte & Sirpurkar, 2016).** Dysmenorrhea is categorized into two types as primary and secondary. Primary dysmenorrhea is one of the most common gynecological problems that may affect more than 50% of menstruating women where 12% of them described it as severe that can reduce the quality of life and hinders social activities. Prevalence rate varies from 45 to 95 % globally with higher rates reported among adolescent populations **(Lghoul et al., 2020; Iacovides et al., 2015; Berkley, 2013).**

Primary dysmenorrhea is defined as colicy pain in the suprapubic region with radiation to the lumbar and thighs that occurs before or during menstruation in the absence of pelvic illness. It usually begins with the onset of ovulatory cycles, around age 15 or 16 years with highest prevalence during adolescence. The onset of pain is usually a few hours before blood flow starts and lasts from 8 to 72 hours and is most severe on the 1st and 2nd days of menstruation, it may be accompanied by backache, anorexia, vomiting, diarrhea, syncope, and headache **(Burnett & Lemyre, 2017; McCance & Huether, 2014).** Primary dysmenorrhea is caused by excessive levels of prostaglandins hormones that are responsible about uterine contractions during menstruation and childbirth. The pain results from the release of these hormones when the lining (endometrium) is sloughing off during menstrual period. This leads to uterine contractions and decreased blood flow to the uterus **(Iacovides et al., 2015).**

Treatment for primary dysmenorrhea includes a variety of pharmacological and non-pharmacological management. Common pharmacological interventions include non-steroidal anti-inflammatory drug (NSAIDs), acetaminophen and oral contraceptives (OCs) **(Iacovides et al., 2015; Marjoribanks et al., 2015; Mavrelos & Saridoga, 2017; Chiu et al., 2017; Othman et al., 2019).** Non-pharmacological treatment (Complementary Therapies) of primary dysmenorrhea includes dietary supplement and vitamins, exercises, heat therapies, herbal therapy, behavioral intervention, acupuncture and acupressure **(Pattanittum et al., 2016).**

Acupressure is one of Chinese approaches used for relief of pain symptoms that places physical pressure on different points on the surface of the body through greater balance and circulation of energies in the body **(Badiee Aval et al., 2018; Kılıç et al., 2013; Luo et al, 2013).** Acupressure at sanyinjiao point (SP6) works as self-manageable approach to improve women's general health **(Kashefi, et al., 2011).**

The spleen 6 point is the junction point of the liver, spleen, and kidney meridians and is located above the ankle, on the backside of the shinbone (lower tibia). It is about the distance of four finger widths above the inner ankle bone and this point is considered as a selective point in treating women's diseases. Acupressure on

this point was used to reduce many disorders, including gynecological conditions **(Othman et al, 2019).**

The results of the study are expected to enrich the knowledge about non pharmacological nursing management of primary dysmenorrhea. This will in turn equip obstetrics and gynecological nurses with evidence-based measures to alleviate young females' discomforts without the side effects of chemical medicine.

Aim of the study

The aim of the study was to determine the effect of Spleen 6-point acupressure on pain intensity among late adolescents nursing students with primary dysmenorrhea.

Research Hypotheses:

Late adolescents nursing students who receive Spleen 6-point acupressure during primary dysmenorrhea exhibit less pain intensity.

Materials and Method

Materials:

Research Design*:*

A quasi-experimental research design was used in this study.

Setting:

This study was conducted at the Faculty of Nursing, Alexandria University, Obstetric & Gynecologic nursing skills lab.

Subjects:

The sample size was estimated using Epi info 7 statistical program using the following parameters; total population (female students from the third academic year) = 150 in the first and second semester, Expected frequency 50%, confidence level 95% and with 5% Acceptable error. The minimum sample size estimated to be 78 female students. The final sample size was 80 female students for possible normal response.

A Convenient sample of 80 female students was selected from the third academic year in the faculty of nursing according to the following inclusion criteria: willing to participate in the study, single, 18-21 years old, suffering from primary dysmenorrhea, having history of regular menstrual cycle with an interval of 21 to 35days and duration of 3-7days, No prior history of any gynecologic condition, never taking any pharmacological pain relief measures and/or any hormonal therapy and with intact leg skin and free from arthritis, phlebitis, burn, wound or any scar, injury, inflammation and eczema.

Tools: three tools were used:

Tool (I): Basic data questionnaire: this tool was developed and used by the researcher to collect the following data: socio-demographic data, health profile data, menstrual history, characteristics of primary dysmenorrhea and subjects' health practices during primary dysmenorrhea.

Tool (II): The Visual Analogue Scale (VAS): It is one of the pain rating scales used for the first time in 1921 by Hayes and Patterson**.** It was adopted and used by the researcher. It is a self-report device consisting of a horizontal line used for subjective estimation of pain. It comprises 10-point numerical scale, corresponding to the degree of pain with zero representing no pain and 10 representing the worst degree of pain. In between these two opposite ends, words as mild, moderate, severe are assigned to each 3 cm distance, respectively. Student was asked to place a mark on the line at the point representing the severity of their pain to assess pain intensity **(Alghadir et al., 2018; Delgado et al., 2018; Karcioglu et al., 2018).** The total score ranged from 0-10 as follows: no pain (0), mild pain (1-3), moderate pain (4-6), severe pain (7-9) and unbearable pain (10)

Tool (III): A modified version of Chamber Price pain rating scale

(CPPRS): it was adopted and used by the researcher. It measures pain intensity through observable behaviors. It includes (12) items divided into four categories: postures, gross motor activity, facial expression and verbalization. For each of these four major behavioral categories, one of a three alternative choices was elicited by the researcher **(Deborah, 1984).** The total score ranges from 0-8. This score was translated to the corresponding pain intensity as follows: no pain (0), mild pain (1-2), moderate pain (3-4), severe pain (5-6) and unbearable pain (7-8)

Method:

1- Training program: the researcher attended a training program on acupressure therapy for 3 days (18 hrs) at The Arab African Union, Supreme Body for Complementary Medicine affiliated to Ministry of Culture and Investment at Alexandria governorate and an accredited certificate was obtained.

2-Approvals: approval from Ethical research committee was obtained and an official letter was directed to the Dean of the Faculty of Nursing, University of Alexandria to obtain their permission to conduct the study and collect the necessary data after explanation of research purpose.

3-Tools development:

- Tool (I) was developed by the researcher after an extensive recent & relevant literature review.
- Tool (II) & (III) were adopted by the researcher and used for data collection to determine the effect of Spleen 6 point acupressure on pain intensity among late adolescents nursing students with primary dysmenorrhea.
- Tool (I) was tested for content validity by jury of five experts in the field of obstetrics and gynecology and the necessary modification were done.

4- Pilot study: it was carried out on 8 students who were excluded from the study sample. It was performed to detect the applicability and clarity of the tools and estimate the needed time to collect the data. After pilot study, the necessary modifications were done.

5- Ethical consideration: written informed consent was obtained from students before data collection and after explanation of the study aim. Privacy of the study participants was asserted. Confidentiality of the collected data was maintained and every student was informed that her participation in the study was voluntary and she could withdraw at any time.

6- Collection of data:

Assessment:

- At the beginning, the researcher met the students during the break time of clinical training. She introduced herself and explained title and purpose of the study. The researcher asked them if they are suffering from primary dysmenorrhea (The onset of pain is usually a few hours before the beginning of blood flow and will typically last from 8 to 72 hours) then written consents were obtained from them.
- 80 female students were selected to participate in the study. The researcher took their names, phone numbers and gave them her phone and whatsApp and asked them to inform her when they start suffering from primary dysmenorrhea) Burnett **& Lemyre, 2017).**
- The researcher met these students during the first or second day of menstruation according to each student's menstrual cycle in obstetric &gynecologic nursing skills lab away from time of clinical training. Then, the researcher distributed tool (I) to be filled by students.
- The researcher evaluated pain intensity for students before applying the acupressure sessions using tool II and III.

Implementation:

- The researcher washed her hands and rubbed them with (70-80%) Alcohol-based Hand rubs.
- She instructed the students to assume supine position with supporting the head and legs with pillows and encouraged them to relax and take slow deep breath from nose then exhale slowly through slightly pursed lips, doing this exercise three times to five during acupressure session **(Ankrom et al, 2022).**
- Then, the researcher used index finger to apply firm pressure and massage on spleen point 6 (SP6) that was located on the medial side of the leg 3 Cun (four finger widths) above the tip of the medial malleolus (the inner ankle bone) and posterior to the edge of the tibia for a few seconds (4-5 sec) and took a 1-minute break before repeating it.
- The researcher did two sessions; each session took 10 minutes for each leg. Then, the second session was applied two hours after the first one.
- After the procedure, the researcher helped the students to assume comfortable position and to avoid standing immediately in order to prevent postural hypotension.

Evaluation:

- The researcher evaluated pain intensity again for students two times after each of the two sessions of acupressure using tool II and III.
- Collection of data covered a period of 3 months from the beginning of February to the end of April 2021.

7- Statistical analysis:

Analysis of data was carried out using Statistical Package for Social Sciences (SPSS) version 20 program. The collected data were categorized, coded, computerized, tabulated and analyzed. Frequency and distribution were used for describing and summarizing categorical data. Cross tabulation with percentages were used to explore relationships between variables. Appropriate tests such as arithmetic mean and Chi-square at 0.05 level of significance were used.

Results

As shown in **table (1),** It was found that three-fifths (60.0%) of female students were equal or more than 21 years old. However, female students' mean age was 20.60 ± 0.51 years. Concerning the number of family members**,** three-fifths (60.0%) of female students had five members or more.

It can be observed that, the majority of the female students (96.25%) have not any diseases. Regarding the surgical history, most of the female students (87.5%) did not have any surgery **(Table 2)**.

Table (3) illustrates menstrual data**,** it was found that more than half (53.8%) of female students less than 14 years old. In addition, (53.8%) of female students reported that they used from 3 to 5 pads per day. About onset of menstrual pain, it was found that the majority of female students (95%) reported that their pain started from the beginning of menarche. More than three quarters (82.5%) of female students experienced pain at lower abdomen and radiated to back and thighs.

As regards to characteristics of menstrual pain, it was obvious that more than three-quarters (81.3%) of female students experienced colicky pain. Furthermore, most of female students (82.5%) reported that the pain recurred every month.

Figure (1) reveals the aggravated factors of menstrual pain, it was found that about two-thirds (66.3%) of female students reported anxiety and stress. Moreover, less than half (45.0% & 43.8%) of them reported study burden and cold weather respectively.

Figure (2) portrays measures used by girls to relieve menstrual pain, it was obvious that, slightly less than two-thirds (63.8%, 63.8%) respectively of female students reported warm fluids intake and

rest and sleep. More than half (52.5%) of them reported analgesics or antispasmodics.

Table (4) illustrates pain intensity as measured by visual analogue scale (VAS) before and after intervention. A highly statistically significant difference was observed among female students before and after intervention regarding pain intensity, where (p<0.000).

As shown in **figure (4)**, more than three-fifths (61.3%) of female students had unbearable pain. After the first intervention session, it was found that more than half (53.8%) of female students had mild pain. After the second intervention session, it was noticed that 100% of female students had mild pain.

Discussion

Results of the current study supported the following investigated hypothesis that late adolescents nursing students who received Spleen 6-point acupressure during primary dysmenorrhea exhibited less pain intensity as the study revealed a statistically significant difference (p<0.001) in pain intensity among female students before and after intervention.

This finding is somewhat similar to the results of several other researches. First, **Abaraogu et al., (2016)** studied the "Effectiveness of SP6 (Sanyinjiao) acupressure for relief of primary dysmenorrhea symptoms: A systematic review with meta- and sensitivity analyses''. They showed that SP6 acupressure delivered by trained personnel significantly decreased pain intensity immediately after the intervention (p = 0.000), and pain relief remained up to 3 h after the intervention (p = 0.000).

Second, **Gharloghi et al., (2012)** studied "The effects of acupressure on severity of primary dysmenorrhea''. The aim of this research was to determine the effects of acupressure at Sanyinjiao (SP6) point and DiJi (SP8) point on pain severity of primary dysmenorrhea and the associated systemic symptoms. The study results revealed that the severity of dysmenorrhea pain diminished significantly for up to 2 hours following treatment with acupressure at the SP6 and SP8 points (P = 0.001). Furthermore, the severity of systemic symptoms accompanying dysmenorrhea reduced significantly after acupressure at the same points.

Third, **Kashefi et al., (2010)** carried out a study about the "Effect of acupressure at the Sanyinjiao point on primary dysmenorrhea: a randomized controlled trial", they found that the severity of pain decreased among the study group at 30 min, 1, 2 and 3h after intervention (p<0.05). Acupressure at Sanyinjiao point can be an effective, feasible, cost-effective intervention for improving primary dysmenorrhea.

Fourth, **Chen et al., (2010)** studied "Effect of acupressure on menstrual distress in adolescent girls: a comparison between Hegu-Sanyinjiao matched points and Hegu, Zusanli single point" who revealed that acupressure at the SP6 reduced the pain and the stress resulted from dysmenorrhea during the first session of pressure. These studies were concluded that spleen 6 point acupressure can reduce the menstrual pain.

Furthermore, the results of the present study showed a statistically highly significant decrease in pain scores assessed by VAS and modified version of chamber price pain rating scale (CPPRS) (p<0.001) before and after intervention. This finding is matching with the study of **Othman et al., (2019)** that aimed to evaluate the effect of acupressure on Sanyinjiao Acupoint (SP6) on primary dysmenorrhea among adolescents. The study reported that there was a highly statistically significant difference between the two studied groups regarding pain intensity according to VAS ($P \leq 0.001$).

The current finding is in agreement with the finding of **Subbiah (2017)** in India about "A study to assess the effectiveness of acupressure in reducing menstrual pain among adolescent girls with primary dysmenorrhea studying in selected schools at Bengaluru Karnataka". He found that there was a statistically significant decrease in pain score for PVAS (value for comparing between before and after intervention). This data shows that application of acupressure over Sp6 point is effective to reduce the pain perception among subjects during menstruation for at least 2 hours.

Again, this finding is in harmony with the study done by **Sharma et al., (2014)** who showed that the mean pain score by VAS difference before and immediately after intervention with significant p value of <0.001. Moreover**,** This finding is in accordance with the study done by **Alizadeh et al., (2011)** about "the effect of acupressure at the Sanyinjiao point (SP6) on primary dysmenorrhea in students resident in dormitories of Tabriz". They showed that acupressure at the Sanyinjiao point (SP-6) had a significant effect on reduction of menstrual pain intensity (VAS). They added that a significant reduction was also observed in reduced the severity of other menstrual symptoms, duration of resting time period and the number of used ibuprofen similarly in both spasmodic and congestive types of dysmenorrhea.

In addition**,** this finding is also similar to the study done by **Mirbagher Ajorpaz et al., (2011)**, they studied "The effects of acupressure on primary dysmenorrhea: a randomized controlled trial", the aim of this study was to evaluate the effect of SP6 acupressure on primary dysmenorrhea in Iranian medical sciences students. The study revealed that significant differences in the VAS scores of dysmenorrhea between the experimental and control groups, immediately after intervention (p = 0.004) and also 3 h later (p = 0.000). Findings of their study clearly indicate that 20 min acupressure is an effective complementary method for reducing dysmenorrhea without any adverse effects.

***Conclusion*:**

Based on the findings of the present study, it can be concluded that: Sp6 acupressure seems to have a positive effect on reducing the menstrual pain intensity among female students with primary dysmenorrhea as measured by visual analogue scale (VAS). Sp6 acupressure was likely to have an outstanding decline in menstrual pain intensity among female students with primary dysmenorrhea as measured by modified version of chamber price pain rating scale (CPPRS).

Recommendations:

In line with the findings of the study, the following recommendations are made:

1. Sp6 acupressure should be advocated as a non-pharmacological approach for management of menstrual pain.
2. Females, medical and nursing staff should be encouraged and educated about the application of sp6 acupressure as a non-invasive treatment for primary dysmenorrhea.
3. Future studies about the use of acupressure for the treatment of other gynecological symptoms are needed.

Table (1): Distribution of the female students according to their socio-demographic characteristics

Socio-demographic characteristics	No (n = 80)	%
Age (years)		
<21	**32**	**40.0**
≥21	**48**	**60.0**
Min. – Max.	**19.0 – 21.0**	
Mean ± SD.	**20.60 ± 0.51**	
Median	**21.0**	
Number of family members		
≤4	**32**	**40.0**
5+	**48**	**60.0**

Table (2): Distribution of the female students according to health data

Health data	No (n = 80)	%
Presence of the diseases		
-Yes	**3**	**3.75**
-No	**77**	**96.25**
Type of diseases (n = 3)*		
-Hypertension	**1**	**33.4**
-Autoimmune as (Rheumatoid arthritis)	**2**	**66.6**
Surgical history		
-Yes	**10**	**12.5**
-No	**70**	**87.5**

Table (3): Distribution of the female Students according to their menstrual data

Menstrual data	No. (n = 80)	%
Age of menarche		
-Less than 14 years old	**43**	**53.8**
-From 14 to 16 years	**37**	**46.2**
Number of soaked sanitary pad per day		
< 3	**32**	**40.0**
3 - 5	**43**	**53.8**
> 5	**5**	**6.2**
Onset of menstrual pain		
-Since the menarche	**76**	**95.0**
-Last 4 years	**4**	**5.0**
Site of menstrual pain		
-Lower abdomen and radiate to back and thighs	**66**	**82.5**
-Lower abdomen only	**13**	**16.3**
-In the back and abdomen	**1**	**1.2**
Characteristics of menstrual pain *		
-Colicky	**65**	**81.3**
-Throbbing	**38**	**47.5**
-Heaviness	**28**	**35.0**
Recurrence of menstrual pain every month		
-Yes	**66**	**82.5**
-No	**14**	**17.5**

*** More than one answer**

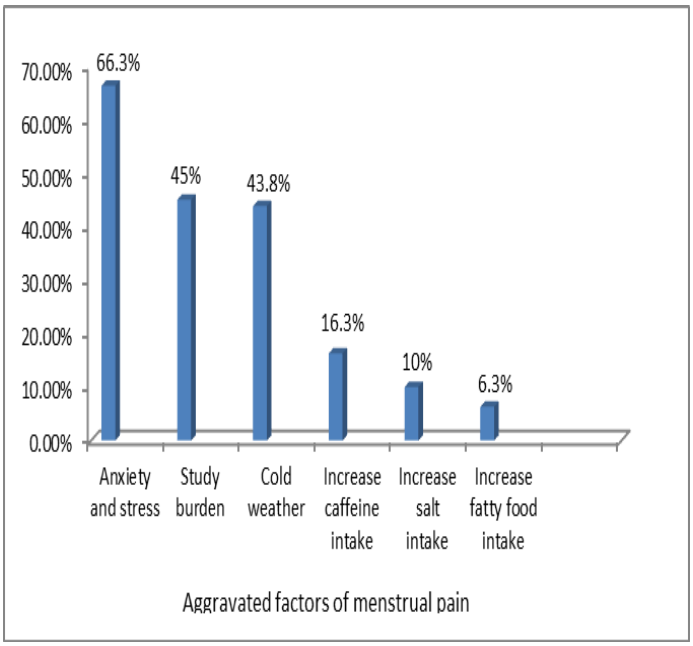

Figure (1): Distribution of the female students according to aggravated factors of menstrual pain

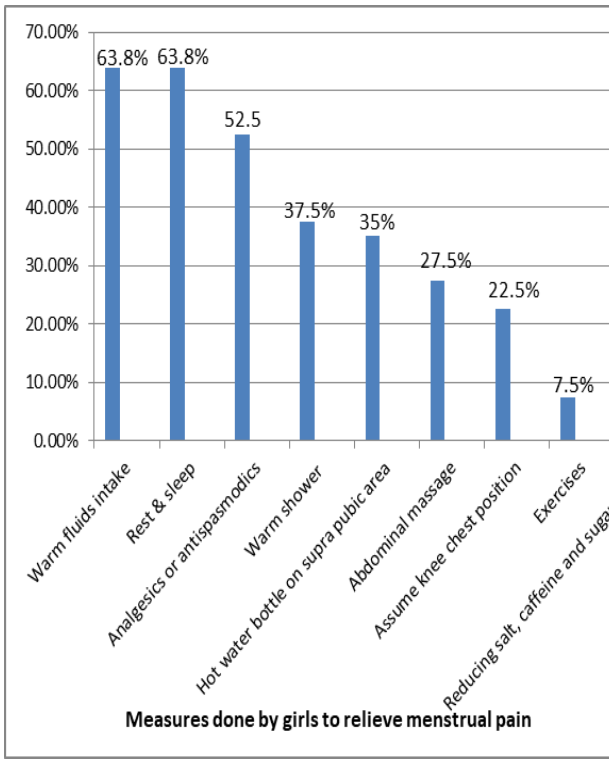

Figure (2): Distribution of the female students according to measures done by girls to relieve menstrual pain

Table (4): Distribution of the female students according to pain intensity as measured by visual analogue scale (VAS) before and after intervention

Intensity of pain using VAS	Before intervention		After the first intervention session (immediately)		After the second intervention Session (after 2 hours)		Fr	p
	No. (n = 80)	%	No. (n = 80)	%	No.	%		
No pain (Zero)	0	0.0	0	0.0	28	35.0	160.0*	<0.001*
Mild pain	0	0.0	19	23.8	52	65.0		
Moderate pain	2	2.5	61	76.2	0	0.0		
Severe pain	78	97.5	0	0.0	0	0.0		
Min. – Max.	6.0 – 9.0		1.0 – 6.0		0.0 – 3.0			
Mean ± SD.	8.03 ± 0.78		4.16 ± 1.02		0.86 ± 0.76			
Median	8.0		4.0		1.0			
Sig. bet. Periods	$p_1<0.001^*, p_2<0.001^*, p_3<0.001^*$							

*: Statistically significant at $p \leq 0.05$

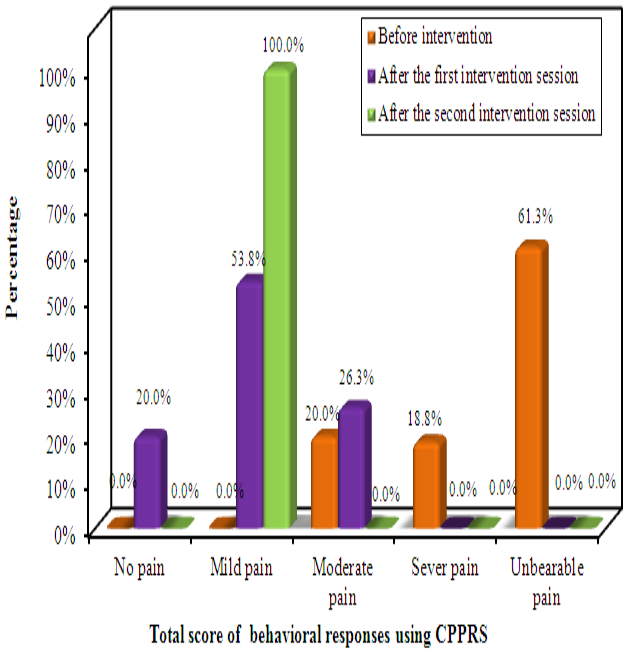

Figure (4): Distribution of the female students according to total score of behavioral responses to pain as measured by modified version of chamber price pain rating scale (CPPRS) before and after intervention.

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