Effect of Jacobson's Relaxation Technique on Primary Dysmenorrhea among Nursing Students

Hayam Magdy Elsayed[1], Soad Abdel-Salam Ramadan[2], Eman Mohamed Abdelhakam[3] and Mai Mahmoud Hassan[4]

(1) Clinical Instructor at Ashmun Secondary Technical Nursing School, Menoufia Governorate, (2,3) Professor of Obstetrics & Gynecology Nursing, Faculty of Nursing, Benha University and (4) Lecturer of Obstetrics & Gynecology Nursing, Faculty of Nursing Benha University.

Abstract

Background: Primary dysmenorrhea disturbs the quality of life of nursing students females which decreases students' academic performance, peers class concentration and increase absenteeism. **Aim**: The present study aimed to evaluate the effect of Jacobson's relaxation technique on primary dysmenorrhea among nursing students. **Design**: Quasi-experimental study design. **Setting**: The study was conducted at Faculty of Nursing, Benha University. **Sample:** A purposive sample of 100 who suffered from dysmenorrhea in the first academic year. **Tools of data collection**: Tool (I): Self- administered questionnaire sheet. Tool (II) Visual Analogue scale. Tool (III) Nursing Student's Satisfaction Sheet. **Results:** There was highly statistically significance improvement in students' knowledge post application. There was highly statistical significance difference between pain level pre and post application of Jacobson's relaxation technique. The majority of nursing students were satisfied with Jacobson's relaxation technique. **Conclusion**: Application of Jacobson's relaxation technique had a positive effect in reducing primary dysmenorrhea among nursing students and most students were satisfied with Jacobson's relaxation technique application. **Recommendation:** Integration of Jacobson relaxation technique into nursing courses, particularly in subjects related to women's health or pain management.

Keywords: Jacobson's relaxation technique, Nursing students, Primary dysmenorrhea

Introduction:

The transitional stage between childhood and adulthood is known as adolescence. It includes some changes to the body, and to the way a young person relates to the world. For adolescents and families, the physical, sexual, cognitive, social, and emotional changes that occur during this time can cause anticipation and anxiety. Being aware of what to anticipate at each stage can help adolescents and young adults develop healthily throughout adolescence and early adulthood. Recognizing irregular periods could be useful in managing potential health issues like dysmenorrhea (**Augustine, 2024).**

Menstruation is shedding of the endometrium every month during the menstrual cycle which is regulated by a combination of the hypothalamus, hypophysis, ovaries, and uterus. The hypothalamus and the pituitary gland regulate the reproductive hormones. Menstrual disorders are a common problem in adolescents which are often the source of anxiety for the patients and the families. The common menstrual disorders in adolescents are amenorrhea, excessive uterine bleeding, dysmenorrhea, and premenstrual syndrome **(Fedorcsak, 2024).**

Dysmenorrhea is commonly known as menstrual pain, and is often operationalized, in diagnosis, as crampy abdominal pain that happens while or shortly before menstruating. It is also defined as a severe, painful, cramping sensation in the lower abdomen that is often accompanied by other symptoms, such as lower back pain, pain radiating down the

legs, sweating, headaches, nausea, vomiting, diarrhea, and tremulousness, all occurring just before or during the menses **(Serrahima & Martínez, 2023; Fortney, 2024).**

Dysmenorrhea can be divided into two types: Primary dysmenorrhea and secondary dysmenorrhea. Primary dysmenorrhea is pain in the lower abdomen that occurs before or during menses and in the absence of pelvic pathology due to increased prostaglandin production and endometrial irritation. Primary dysmenorrhea can be treated with both pharmacological (hormones and nonhormonal therapy) and non-pharmacological approaches (exercise, rest, food changes, heat therapy, acupuncture, and aromatherapy). Hormonal therapy consists of combination oral contraceptives and progestin regimens. In non-hormonal medical therapy, acetaminophen and non-steroidal anti-inflammatory medications are employed. Secondary dysmenorrhea caused by adenomyosis, endometriosis, and other pelvic pathologies **(MacGregor et al., 2023; Fitriani & Setiana, 2024).**

Dysmenorrhea has a negative impact on the quality of life of adolescence because it affects relationships with family and friends, university performance and leisure activities. The pain of dysmenorrhea affects the adolescent's academic performance, studies, the ability to concentrate on the courses and the volume of information. Daily activities are affected in different ways, there are also women who avoid exercising during menstruation and the quality of sleep declines, compared to other periods of the menstrual cycle. Dysmenorrhea is associated with increased anxiety and depression **(Ma et al., 2023).**

Dr. Edmund Jacobson invented the method that is currently widely used and carries his name. Progressive relaxation treatment was introduced by Dr. Jacobson in 1938. Jacobson's relaxation technique is another kind of therapy for primary dysmenorrhea, which focuses on sequentially contracting and relaxing particular muscle groups **(Veena, 2023).**

Primary dysmenorrhea may be effectively managed with Jacobson's relaxation technique through a number of potential reasons. One of these processes involves the brain and spinal cord producing endorphins, which have a calming and comforting effect. Progressive relaxation, on the other hand, is straightforward, simple to use, self-administered, and free of negative consequences. Thus, it has a positive impact on the decrease of primary dysmenorrhea **(Celenay et al., 2024).**

Nurses play an important role in explaining the physiological processes that lead to menstrual pain to adolescent nursing students. Nurses educate nursing students in self-care techniques that alleviate dysmenorrhea such as heat therapy, regular exercise, Jacobson's relaxation and dietary adjustments. Nurses can persuade nursing students to use Jacobson's relaxation technique because it's important in reducing primary dysmenorrhea and can describe the technique and the effect on the body whether from physical, psychological or social relationships **(Wallbing et al.,2023).**

Significance of the study

Adolescents' quality of life is adversely affected by dysmenorrhea because it interferes with social interactions, academic achievement, and leisure time, class concentration and increase absenteeism. Dysmenorrhea also affects quality of sleep as falling asleep during studies, inability to complete the homework, reduced physical activity, feelings of isolation, anxiety and depressive symptoms **(Ghandour et al., 2024).**

Up to 91% of people worldwide suffer from dysmenorrhea, and 10–20% of those

people have severe dysmenorrhea. It is the most frequent reason for repeated absences from school (80%), difficulty concentration in class (66%), low participation (47%), difficulty doing assignments (21%), test failure (15.4%), and limited activities (29.9%) **(Osman et al., 2024).** Egypt has a high prevalence of dysmenorrhea (66.0%), with 28.4% of cases being mild, 24.3% being moderate, and 13.3% being severe **(Elsawy et al., 2023).**

Jacobson's or progressive relaxation technique is a type of therapy for primary dysmenorrhea that focuses on tightening and relaxing specific muscle groups in sequence. The relaxing method lessens the severity and impact of menstruation discomfort, hence eliminating dysmenorrhea or its related symptoms. Because the technique is a methodical way to reduce stress, anxiety, depression, pain perception, muscle tension and contractions, and to promote sleep, it has recently become a crucial part of nursing care **(IŞIK et al., 2024).**

Aim of the study:

Evaluate the effect of Jacobson's relaxation technique on primary dysmenorrhea among nursing students.

Research hypothesis:

The application of Jacobson's relaxation technique would alleviate the symptoms of primary dysmenorrhea among nursing students than before.

Operational definitions:

Primary dysmenorrhea:

Primary dysmenorrhea is spasmodic and painful cramps in the lower abdomen that begin shortly before or at the onset of menses in the absence of any pelvic pathology **(Syamsudi et al., 2024).**

Jacobson's relaxation technique:

A type of therapy that focuses on tightening and relaxing specific muscle groups in sequence **(Evans & Bee, 2022).**

Subjects and Method:

Study design:

A Quasi- experimental design (one group; pre and posttest) was used to fulfill the aim of the study.

Quasi-experimental design is an empirical interventional study used to estimate the causal impact of an intervention on its target population without random assignment **(Israel & Priscilla, 2023).**

Study setting:

This study was conducted at Faculty of Nursing- Benha University.

Sampling:

Sample type:

A purposive sample of Female nursing students.

A purposive sample is a technique used in qualitative research to select a specific group of individuals or units for analysis **(Adeoye, 2023).**

Sample size:

Female nursing students (100 students) in the first academic year 2023-2024 who met the following inclusion criteria:

1-Nursing students who suffered from moderate to severe primary dysmenorrhea according to visual analogue scale.

2- Nursing students who had regular menses.

Tools of data collection:

Three tools were utilized for collecting data:

Tool I: Self- administered questionnaire sheet:

It was constructed by researchers after reviewing related literature then translated into Arabic language. It included the following four parts:

Part A: General characteristics of the studied sample: Age, residence, weight, height and body mass index.

Part B: Menstrual history such as: Age at menarche, amount of menstrual flow, character of blood flow, regularity, interval,

duration of menstruation and pads used. It was adapted from (**Khan et al., 2021).**

Part C: History of Dysmenorrhea such as: Time of dysmenorrhea, character of pain, duration of pain, Pain location, effect of dysmenorrhea on faculty attendance, effect of dysmenorrhea on faculty achievement and methods to relieve menstrual pain.

Part D: Nursing students Knowledge regarding dysmenorrhea: It was designed to assess nursing students' knowledge regarding dysmenorrhea through 8 questions such as (definition, types, causes, contributing factors, physical symptoms, psychological symptoms, complications and treatment of dysmenorrhea). It adapted from **(Mohamed et al., 2020; Veena & Rajan, 2022; Chaurasia et al., 2021).**

Knowledge scoring system:

All knowledge variables were weighted according to items included in each question. The answer scored as (2) for correct complete answer, (1) for correct incomplete answer, while (0) is scored when the answer was incorrect or I don't know.

Total knowledge score:

The total score was calculated by summation of scores of all items. The higher scores mean higher level of knowledge. The total knowledge was scored as follows: (The total score 100% (16 point))

- Good >75 % (>12 point)
- Average 50-75 % (8-12 points)
- Poor <50 % (<8 point)

Tools (II): Visual Analogue scale:

Visual analogue scale was adopted from **(Khosravu and Moghadam, 2012)** to assess the severity of dysmenorrhea. The visual analogue scale consisted of 10 cm blank line used to describe the extremes of pain. The nursing students were asked to place marks on the line that indicated the pain experienced.

The scoring system.

- zero (0) (no pain)
- 1-3 cm (mild pain)
- 4-7 cm (moderate pain)
- 8-10 cm (severe pain**)**

Tool (III): Nursing Student's Satisfaction Sheet:

This was adapted from **(Bijlani and Pardeshi, 2016; Beena, 2016)** and used to appraise satisfaction levels regarding application Jacobson's relaxation technique on primary dysmenorrhea among nursing students.

Scoring system:

Each statement scored as 2 if the response satisfied, while 1 if it was dissatisfied.

Total satisfaction score:

The total score was calculated by summation of scores of all items. Higher scores mean higher level of satisfaction. The total satisfaction was scored as following :(The total score 100% (14 point)

- Satisfied ≥80 % (≥11 point)
- Dissatisfied <80 % (<11 point)

Validity of the tools:

The validity of questionnaires was reviewed by a panel of three jury experts in the field of obstetrics & gynecology nursing at Benha University to ascertain clarity, relevance, comprehensiveness, and applicability of tools. Modifications were made such as adding, rephrasing and omitting some questions.

Reliability of the tools:

The reliability was done by Cronbach's Alpha coefficient test which revealed that; the value was 0.755 for reliability of knowledge sheet, 0.97 for reliability of visual analogue scale and 0.911 for reliability of satisfaction sheet.

Ethical consideration:

- The study approval was obtained from scientific research ethical committee of

the faculty of nursing at Benha University for fulfillment of the study (code:REC-OBSN-74).

- Before applying the tools, the researchers explained the aim and importance of the study to gain student's confidence and trust.
- The researchers took informed consent from students to participate in the study and confidentialities were assured.
- Nursing students who accepted to participate in the study.
- The study did not have any physical, social or psychological risks on the students.
  - All data collection tools were burned after statistical analysis to promote confidentiality of the participating student.
  - The student was free to withdraw from study at any time.

Pilot study:

The pilot study was conducted on 10 % of sample that were (10 students). It was done to estimate the time required for each tool to be filled also to check the simplicity, clarity, applicability and feasibility of the developed tools as well as to identify any possible obstacles that may hinder data collection. There were no modifications made. Thus, students involved in the pilot study were excluded in the study.

Field work:

The study was carried out from the beginning of October 2023 to the end of March 2024. The researchers visited Faculty of Nursing Benha University three days /week (Saturday, Monday, Wednesday) from 9am to 3pm according to the schedule of students presence in the college until the predetermined size of sample was completed.

The study was achieved through the following phases:

Preparatory phase:

It was the first phase of the study, and it included reviewing current and related literatures. Also, theoretical knowledge of various aspects of the study using books, articles, periodicals, magazines and internet to develop tools for data collection.

Assessment phase:

- The researchers visited the previously mentioned study setting 3days/week from 9am to 3pm.
- The researchers greeted the students and introduced themselves then explained the purpose of the study, scheduled times and frequency of sessions to assure adherence to selected interventions and to gain their cooperation.
- The researchers obtained informed consent from the students to participate in the study then applied the research.
- The researchers assessed whether she had dysmenorrhea or not, taking into account the privacy of each student that took 20minutes for each student.
- Due to the presence of female nursing students in different groups (10 groups) according to their schedule of the clinical course in the college, the researchers assessed about 7-8 nursing student per day.
- Data was collected by the researchers through the distribution of a self-administered questionnaire to assess nursing students general characteristics, menstrual history, history of dysmenorrhea and students' knowledge regarding dysmenorrhea (Tool I) which took around (25-30) minutes.
- After that, the researchers distributed visual analogue scale (Tool II) to assess the severity of pain during menstruation. This assessment took 5minutes.
- The total time taken for completing all sheets was around 30-35 minutes depending on the understanding of the students.

Planning phase:

Based on results that were obtained during assessment phase, the brochure regarding Jacobson's relaxation technique for relieving

dysmenorrhea was developed by the researchers in the form of printed brochure. The printed brochure was designed specifically for nursing students with dysmenorrhea in simple Arabic language to suit the studied nursing student's deficit knowledge regarding Jacobson's relaxation technique for relieving dysmenorrhea. Sessions number and its contents, different methods of teaching, and instructional media were determined. Objectives were constructed to be attained after completion of educational sessions. The general objective was that by the end of the educational sessions, each student would be able to acquire essential knowledge regarding dysmenorrhea and able to apply Jacobson's relaxation technique for relieving dysmenorrhea.

Implementation phase:

This phase included application of Jacobson's relaxation technique through determining steps of applying of this technique, using educational methods as discussion, role play, and pictures used in an Arabic language and using educational media as lab top, written material as brochure to gain information and facilitate discussion. The implementation phase was achieved through 2 sessions; the sessions are as follows:

•**The first session** (theoretical) was conducted to equip the students with knowledge regarding dysmenorrhea (definition, types, causes, time of dysmenorrhea relief, risk factors, physical symptoms, psychological symptoms, complications and treatment of dysmenorrhea and effect of primary dysmenorrhea).

•**The second session** (practical) JPMR was applied three times a week from the estimated date of ovulation to the onset of the next menstruation) was conducted to educate nursing students how to apply Jacobson's relaxation technique as follow: **(Mushtaq and Khan, 2018).**

- Be calm and comfortable.
- Keep the eye closed.
- Avoid stray thoughts.
- Avoid extra movements of the body.
- Tense the muscle tightly for 5 seconds.
- Relaxing the muscle quickly and completely, let the mind relax and appreciate how relaxed the muscle is feeling for 10 seconds.
- Try to keep all other muscles relaxed as the exercise specific muscle group.
- This exercise is from head to toe and includes facial muscles, hands, arms, neck, shoulder, chest, stomach, bac, thigh, buttocks, lower legs and toes).
- After the exercise, keep your eyes closed and let the body in a relaxed position, open the eyes, enjoy renewed energy, feel relaxed, sit up, stretch and stand up slowly. The time for relaxation after the exercise is 2 min.

Break phase:

- The researchers created Whats App group for the students to ensure that they applied techniques correctly and effectively. The researchers provided any required advice to students during break. The researchers assured students to feel free to chat with researchers during a specific one-time hour daily (researchers set one afternoon hour/day for participants to chat for any further discussion).
- Students with dysmenorrhea followed by phone to avoid their drop out from the study, but no care provided to students to prevent study bias.

Evaluation phase:

To evaluate the effectiveness of Jacobson's relaxation techniques , the researchers done post-test after three times of application the technique to evaluate students with dysmenorrhea through the same format of pre-test as (nursing students knowledge regarding dysmenorrhea, visual analogue scale to assess the severity of pain during menstruation) and

the satisfaction scale to assess satisfaction levels on application Jacobson's relaxation technique on primary dysmenorrhea among nursing students).

Statistical analysis:

Data was verified prior to computerized entry. The Statistical Package for Social Sciences (SPSS version 20.0) was used. Descriptive statistics were applied (e.g., mean, standard deviation, frequency and percentages). Tests of significance (chi square, fisher exact test, independent t test, Pearson correlation and coefficient test) were applied to test the study hypothesis. The statistical significance was considered as follows:

- P value >0.05 non- statistically significant relation.
- P value <0.05 statistically significant relation.
- P value <0.01 highly- statistically significant relation.

Results:

Table (1): Clarified that 48% of studied students aged (18:<19) years with the mean and SD 17.76±0.68, 68% of studied students lived in rural area, weight of studied students ranged from 42-85 with the mean and SD 58.07±7.50, while the height ranged from 145-180 with the mean and SD 157.38±8.22, and 59% of them had normal body mass index with the mean ±SD 23.57±3.51

Table (2): Showed that 72% of studied students had menarche at age 12-14 years with the mean ±SD of 13.19±0.62, while 94% of students menstruated 4-6 days with the mean ±SD of 5.101±0.7213, and all students had regular menstruation with interval from 21-35 days while 64% of students had moderate follow of menstruation.

Table (3): Showed that 28% of studied students had pain lasts for two days with the same percentage had pain lasted for week before menstruation, this pain appeared in 56% of studied students suddenly. Dysmenorrhea lasted more than 36 hours in 69 % of studied students with the mean ±SD 43.36±6.95 and affected more than one site in 90% of them and also affected on students' attendance and achievement in 96% of them.

Figure (1): Demonstrated that 10% of studied students had a good total knowledge level pre and increased to 80% post application of Jacobson's relaxation technique.

Table (4): Demonstrated that two thirds of studied nursing students had moderate pain pre intervention compared to less than quarters of students had moderate pain post intervention and high statistically significant difference between pre and post intervention.

Table (5): Demonstrated that there were statistical significance correlations between body mass index and students' knowledge with pain level pre-application and not statistically significance correlation between pain level and body mass index post-application of Jacobson's relaxation technique, while there was highly statistically significance positive correlation between students' knowledge and pain level post application of Jacobson's relaxation technique.

Figure (2): Demonstrated that 88% of studied students were satisfied regarding Jacobson's relaxation technique, while 12% of them were unsatisfied regarding Jacobson's relaxation technique.

Table (1): Distribution of studied students regarding personal characteristics (n=100).

Personal characteristics	No	%
Age (years)		
17 : <18	38	38.0
18 : <19	**48**	**48.0**
≥19	14	14.0
Mean ±SD	17.76±0.68	
Residence		
Rural	**68**	**68.0**
Urban	12	12.0
Weight		
Min –max	42-85	
Mean ±SD	58.07±7.50	
Height		
Min –max	145-180	
Mean ±SD	157.38±8.22	
Body mass index (BMI)		
Underweight >18.5	2	2.0
Normal 18.5-24	**59**	**59.0**
Over weight 25-35	36	36.0
Obese <35	3	3.0
Min –max	16-33	
Mean ±SD	23.57±3.51	

Table (2): Distribution of studied students regarding menstrual history (n=100).

Menstrual history	No	%
Age at menarche		
<12	5	5.0
12-<14	**72**	**72.0**
14<16	23	23.0
Min –max	11-15	
Mean ±SD	13.19±0.62	
Days of menstruation		
1-3	3	3.0
4-6	**94**	**94.0**
6-9	3	3.0
Min –max	3-7	
Mean ±SD	5.101±0.7213	
Menstrual intervals		
21-35 days	**100**	**100.0**
Min –max	21-30	
Mean ±SD	24.460±2.5243	
Regularity of menstruation		
Yes	**100**	**100.0**
Amount of blood loss		
Moderate	**64**	**64.0**
Severe	36	36.0
Pads used		
2-3	**81**	**81.0**
More than 3pads	19	19.0
Character of blood flow		
Intermittent menstrual bleeding	10	10.0
Continuous menstrual bleeding	**90**	**90.0**

Table (3): Distribution of studied students regarding history of dysmenorrhea (n=100).

History of dysmenorrhea	No	%
Time of dysmenorrhea		
Before menstruation	20	20.0
In the first day	24	24.0
Lasts for two days	**28**	**28.0**
Week before menstruation	**28**	**28.0**
Character of pain		
Gradually	26	26.0
Suddenly	**56**	**56.0**
Interrupted	18	18.0
Pain duration		
24: <36 hours	31	31.0
≥36 hours	**69**	**69.0**
min –max	24-48	
Mean ±SD	43.36±6.95	
Pain location		
Lower abdomen	4	4.0
Low back	5	5.0
Lower limbs	1	1.0
More than one site	**90**	**90.0**
Effect of dysmenorrhea on Faculty attendance		
Yes	**96**	**96.0**
No	4	4.0
Effect of dysmenorrhea on Faculty achievement		
Yes	**96**	**96.0**
No	4	4.0

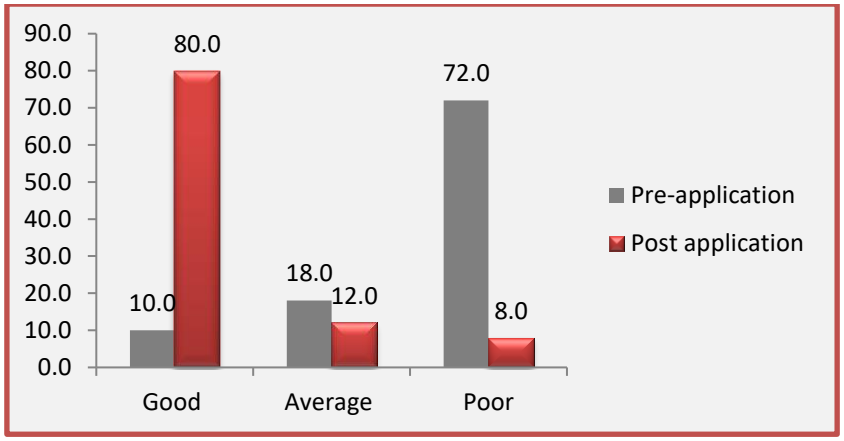

Figure (1): Percentage distribution of studied students' total knowledge level pre and post application of Jacobson's relaxation technique (n=100)

Table (4): Distribution of studied students regarding pain level pre and post application of Jacobson's relaxation technique

Items	Pain level				X^2	p-value
	Pre –application		Post –application			
	No	%	No	%		
No pain	0	0.0	7	7.0	138.82	.000**
Mild	0	0.0	73	73.0		
Moderate	65	65.0	20	20.0		
Severe	35	35.0	0	0.0		
Mean ±SD	7.05±1.12		2.95±1.11			

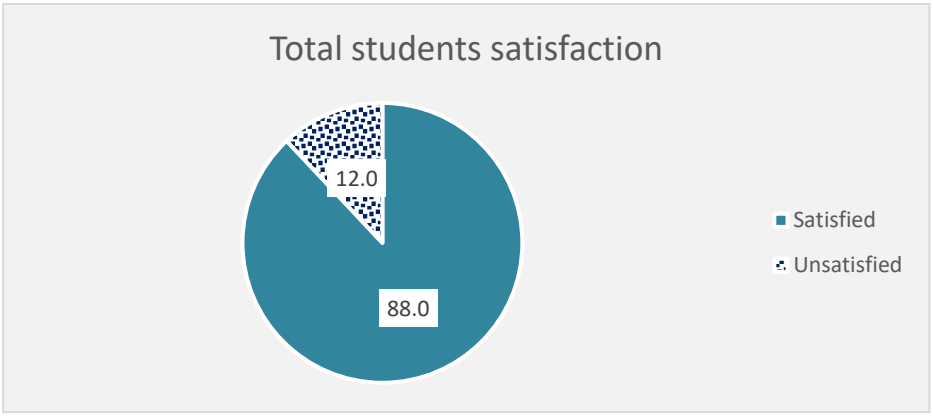

Figure (2): Percentage distribution of studied students' satisfaction regarding Jacobson's relaxation technique

Table (5): Correlation between pain score and students' Body mass index and knowledge pre and post application of Jacobson's relaxation technique

Items	Pain			
	Pre		Post	
	r	p-value	r	p-value
Body mass index	.222	.026*	.126	.212
Knowledge score	.311	.024*	.757	.000**

Discussion:

Primary dysmenorrhea or painful menstrual cramps is a common health issue faced by many nursing students. It is not associated with any underlying reproductive health conditions unlike secondary dysmenorrhea is a painful cramp that result from an underlying reproductive health issue, such as endometriosis. Students suffering from dysmenorrhea experience intense pain in the abdomen and lower back, making it difficult to concentrate on studies or daily activities leading to absenteeism from classes and clinical training negatively affecting academic achievement and development of practical skills **(Küçükkaya & Başgöl, 2024).**

Jacobson's relaxation technique is a progressive muscle relaxation method that can help manage dysmenorrhea. By tensing and relaxing muscle groups, students can alleviate physical tension and reduce menstrual pain. This technique promotes mindfulness and deep breathing, enhancing relaxation and stress relief. Regular practice may help lessen cramps, allowing students to focus better on their studies. Incorporating Jacobson's technique into self-care routines can provide valuable relief during difficult menstrual days **(IŞIK et al., 2024).**

Concerning general characteristics of studied nursing students, the result of the present study showed that near to half of studied students aged (18:<19) years with the mean and SD 17.76±0.68. From the researchers' points of view this age group represents the beginning of college life, where young female students might experience primary dysmenorrhea more frequently and intensely for the first time. This age group also often faces academic stress and psychological tension, which can worsen the symptoms, making it an ideal sample for studying the effectiveness of relaxation techniques like the Jacobson relaxation technique.

These results were near similar with (**Afifi et al., 2024)** who studied "Effect of William's Flexion Exercises on Menstrual Pain, Depression and Sleep Quality among Nursing Students Primary Dysmenorrhea" and revealed that less than two thirds of studied nursing students were (18:<19) years with the mean and SD 18.05±0.58.

These results disagreed with (**Mostafa et al., 2023)** who studied "The Effect of Maya Abdominal Massage on Dysmenorrhea Symptoms among Female Nursing Students" which reported that the majority of studied nursing students were between the ages 20-22 years with the mean and SD 21±0.

Considering residence of studied nursing students, the present study showed that about two third lived in rural area. The results were near similar to **(Afifi et al., 2024)** who found that more than half of nursing students lived in rural area. While the results disagreed with **(Mammo et al., 2022)** who revealed that the highest percentage of studied students lived in urban area.

Regarding weight of studied nursing students, the present study illustrated that the weight of studied students ranged from 42-85 with the mean and SD 58.07±7.50, while the height ranged from 145-180 with the mean and SD 157.38±8.22, and 59% of them had normal body mass index with the mean 23.57±3.51. From the researchers` points of view this may be due to the selected age of the students characterized by a high metabolic rate which helps in maintaining optimal weight. In addition, the curriculum of nursing includes courses such as nutrition and public health which emphasize the importance of healthy habits.

The results agreed with **(Kandari & Massey, 2023)** who found that the height of more than half of students ranged from 153 -

161 and the weight of less than half of students ranged from 47-54 while near to three quarters of students had BMI ranged from 18.5-24.99.

The results disagreed with (**Mostafa et al., 2023)** who illustrated that the height of more than half of studied students ranged from 150-160 with the mean and SD 160.97±3.54, the weight of more than one third of nursing students ranged from 51-60 with the mean and SD 61.05±10.39.

Regarding menstrual history of dysmenorrhea of studied nursing students, the results of current study revealed that the highest percentage of studied students had menarche at age <14 years with the mean ±SD of 13.19±0.62, while the majority of students menstruated 4-6 days with the mean ±SD of 5.101±0.7213, and all students had regular menstruation with interval from 21-35 days while about two third of students had moderate follow of menstruation, also the majority of them used 2-3 sanitary pads.

These results were supported with **(Osman et al., 2024)** who studied " Effect of Self-acupressure on Sanyinjiao acupoint (SP6) on dysmenorrhea among Faculty of Nursing Students" and found that the majority of nursing students had menarche at age less than 14 years, menstrual interval ≥ 28 days and they used 2-3 sanitary pads while less than two third menstruated 3-6 days.

In contrast the results disagreed with (**Masliha, 2024)** who studied "The Effectiveness of Kneading Massage in Reducing Dysmenorrhea Pain in Stikes Aksari Indramayu Students" and reported that less than two third of nursing students had menarche at11years. Additionally, (**Mammo et al., 2022)** showed that about two third of nursing students had menarche at age 13-14years, more than half menstruated 3-7 days and more than half of nursing students had irregular menstruation.

Pertaining to history of dysmenorrhea, the result of current study illustrated that more than one quarter of studied nursing students had pain lasts for two days and equal with week before menstruation, this pain appear in more than half of studied students suddenly and about two third of studied students lasts more than 36 hours with the mean ±SD 43.36±6.95, it also affected more than one site in the majority of studied students, and had effect on students attendance and achievement, this is due to similar age group and exposure to similar academic conditions or stressors. From the researchers' point of view, pain lasts for two days and equal with week before menstruation, this result could be related to that is the normal physiological changes for most females that associated with menstruation and menstrual cramps are a usually begins prior or with the onset of menstruation.

These results were in agreement with **(Alateeq et al., 2022)** who studied "Dysmenorrhea and depressive symptoms among female university students: a descriptive study from Saudi Arabia" revealed that about three quarters of nursing students had pain lasts for two days and near to half of students' dysmenorrhea affected their academic achievement.

The result disagreed with (**Azabu et al., 2023)** who studied "Effect Of a Gym Ball Exercise Program on Dysmenorrhea in Nursing Students of a Selected College in Mangaluru, India: A Quasi-experimental Study" revealed that three quarters of nursing students had pain lasts for 1st day of menstruation and less than to third of students had pain lasts for 8 hours while the majority of students had the pain intermittent and in the lower abdomen.

Concerning pain level pre and post application of Jacobson's relaxation technique, the result showed that there was highly statistical significance difference between pain level pre and post application of Jacobson's relaxation technique in that two third of studied nursing students had moderate pain pre application and about three quarters of nursing students had mild pain post application of the technique. This may be due to Jacobson relaxation technique can cause the release of endorphins, relaxation, stress relief, and improved blood flow can reduce the severity and duration of dysmenorrhea. This improvement may be due to increased blood flow and uterine metabolism during exercise which may be effective in reducing dysmenorrhea symptoms

These results were consistent with **(Elsawy et al., 2023)** who studied "Effect of Progressive Muscle Relaxation Technique on Menstrual Cramps among Adolescent students" and reported that the majority of the nursing students had moderate pain in the pre-test compared to mild pain in the post-test.

On the other hand the results were in difference with **(Ibrahim et al., 2023)** who studied "Effect of Jacobson's Relaxation Technique versus Warm Compresses on Pain Intensity, Fatigue and Quality of Life among Nursing Students with Primary Dysmenorrhea" found that about half of nursing students had unbearable pain in the pretest and about three quarters had moderate pain in the post test.

Pertaining to satisfaction regarding the application of Jacobson's relaxation technique, the result of the current study showed that the majority of studied nursing students were satisfied with Jacobson's relaxation technique application. Meanwhile, less than one quarter of them were unsatisfied. From the researchers' point of view this may reflect the extension regarding effectiveness of applying of Jacobson's relaxation technique in reducing primary dysmenorrhea among nursing students which was consistent with the advantages of this technique as a simple non-invasive technique without side effects on nursing students, ease of use, permanent availability of this technique and most importantly, being non-pharmacological, without cost and no specialized abilities or manpower required.

The current study noted that there was statistically significant positive correlation between weight and body mass index with pain level pre application, while there was no statistically significant correlation between pain level and anthropometric measurement post application of Jacobson's relaxation technique.

This may be due to the fact that higher weight and body mass index (BMI) can contribute to increased inflammatory responses, hormonal imbalances, and physical stress, which are known to aggravate the intensity of pain **(Goda et al., 2020).** However, post-application Jacobson's relaxation technique effectively mitigated pain levels regardless of the students' anthropometric measurements. This highlights the potential of relaxation techniques to override physiological predispositions, such as weight and BMI, in managing dysmenorrhea pain.

These results aligned with the findings of **(Qorita & Maryanti, 2024)**, who studied "Factors Associated with The Incidence of Primary Dysmenorrhea in Adolescent Girls" in Indonesia, and reported that there was significant association between the studied adolescent girls' abnormal body mass index and the experienced primary dysmenorrhea, they added that the excessive or insufficient levels of fat can affect the ovulation phase

and affect the menstrual cycle. Similar to the current study findings, **(IŞIK et al., 2024)** who studied "Investigation of The Efficacy of the Relaxation Technique on Primary Dysmenorrhea and Menstrual Symptoms" in Turkey, reported that there was no significant correlation between women's body mass index in the intervention group and their dysmenorrhea after intervention.

Conversely, a study performed by **(Saida et al., 2024)** who conducted a study about "Frequency and Factors Associated with Primary Dysmenorrhea among Adolescents Living in Kendari City, Indonesia" and found that there was not significant association of primary dysmenorrhea with the studied participants' body weight.

Pertaining correlation between pain score and students' knowledge pre and post application of Jacobson's relaxation technique, the current study reflected that there was statistically significant positive correlation between pain level and students' knowledge pre application and highly statistically significance positive correlation post application of Jacobson's relaxation technique.

This may be due to the fact that students with greater knowledge about primary dysmenorrhea are more aware of their symptoms and may report their pain levels more accurately, leading to the observed positive correlation. Additionally, the highly statistically significant correlation post-application of Jacobson's relaxation technique could be attributed to the effectiveness of the technique in alleviating pain, which reinforces the relationship between improved knowledge, application of relaxation methods, and pain management outcomes. This suggests that enhanced understanding, coupled with practical interventions like relaxation techniques, plays a pivotal role in improving students' ability to manage dysmenorrhea effectively.

These results were in accordance with **(Afifi et al., 2024)** who found that there was positive correlation between educational interventions and students' ability to effectively manage dysmenorrhea-related pain. These studies support the idea that knowledge empowers individuals to take proactive measures, leading to improved outcomes. In this concern, **(Santoso & Christiany, 2024)** about "Effectiveness of Animated Video Education in Improving Knowledge and Attitudes towards Primary Dysmenorrhea Management among Students in Surabaya" stated the combining theoretical knowledge with practical interventions like relaxation exercises significantly enhanced participants' ability to cope with dysmenorrhea-related pain.

In addition, **(Astuti et al., 2024)** who studied "Impact of Dysmenorrhea Management Health Education On Adolescent Girls' Knowledge And Attitude About Dysmenorrhea Management" in Indonesia and affirmed that the health education provided on dysmenorrhea and its management enhances the knowledge of adolescent girls, enabling them to understand and address menstrual pain properly.

Conclusion:

Application of Jacobson relaxation technique had appositive effect on reducing primary dysmenorrhea among nursing students as there was highly statistically significance improvement in students' knowledge and pain level post application compared with pre-application. Also, the majority of nursing students were satisfied with Jacobson's relaxation technique. Therefore, the study hypothesis was supported and aim of the study was achieved.

Recommendations

1. Integration of Jacobson relaxation technique into nursing courses, particularly in subjects related to women's health or pain management.
2. Distributed posters or pamphlets to all nursing students to clarify steps of Jacobson relaxation technique.
3. Replication of the study using a larger probability sample for generalization of results.

Further studies:

1. Conduct comparative studies between female nursing students with dysmenorrhea and male students experiencing muscle pain from stress to evaluate the broader applicability of Jacobson relaxation technique.
2. Similar studies are needed to assess the long term effect of Jacobson relaxation technique on reducing symptoms of primary dysmenorrhea.

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تأثير تقنية الاسترخاء لجاكوبسون على عسر الطمث الأولى لدى طالبات كلية التمريض

هيام مجدى السيد - سعاد عبدالسلام رمضان- ايمان محمد عبدالحكم- مي محمود حسن

يؤثر عسر الطمث الأولي سلبًا على جودة حياة الطالبات في كلية التمريض. فهي تقلل من أدائهن الأكاديمي، وتضعف تركيزهن في الصفوف الدراسية، وتزيد من نسبة الغياب لذلك هدفت الدراسة الى تقييم تأثير تقنية الاسترخاء لجاكوبسون على عسر الطمث الأولي بين طالبات كلية التمريض ،وقد تم استخدام الدراسة شبه التجريبية لتحقيق هدف الدراسة، و أجريت هذه الدراسة فى كلية التمريض جامعة بنها، و قد شملت الدراسة على عينة غرضيه من طالبات كلية التمريض مكونة من ١٠٠ طالبة فى الفرقة الدراسية الأولى تعانى من عسر الطمث الأولى، وقد أسفرت النتائج على ان كان هناك تحسن ذو دلالة إحصائية عالية في معرفة الطالبات بعد التطبيق. كما كان هناك فرق ذو دلالة إحصائية عالية بين مستوى الألم قبل وبعد تطبيق تقنية الاسترخاء لجاكوبسون. وكانت غالبية طالبات التمريض راضيات عن تقنية الاسترخاء لجاكوبسون ،وقد لخصت النتائج أن تطبيق تقنية الاسترخاء لجاكوبسون له تأثير إيجابي في تقليل عسر الطمث الأولي بين طالبات كلية التمريض وكان معظم الطالبات راضيات عن تطبيق تقنية الاسترخاء لجاكوبسون،وقد أوصت الدراسة على دمج تقنية استرخاء جاكوبسون في مناهج التمريض، وخاصة في المواضيع المتعلقة بصحة المرأة أو إدارة الألم.