Arvigo Mayan Abdominal Massage: Its Effect on Dysmenorrhea Intensity among Adolescent Females

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Abstract

Background: Dysmenorrhea is recognized as a global public health issue. It can be either primary or secondary and is a common issue among teenagers and women who are fertile. The **aim** of the study was to investigate the effect of the Arvigo Mayan abdominal massage on dysmenorrhea intensity among adolescent females. **Design**: A quasi-experimental research design was used in the study. **Settings**: This research took place in three secondary schools in Sirs Al-Layan City: Martyr Pilot Izzat Secondary School, Secondary Joint Developer School, and Sirs Al-Layan Combined Commercial Secondary School. **Sample:** A purposive sample of 285 adolescent female students was chosen. **Instruments**: Three instruments were used to gather data including the adolescent female structured interview questionnaire, the menstruation history assessment questionnaire, and a numerical rating scale. **Results:** The findings indicated many individuals in both study and control groups experienced intense pain prior to the intervention (82.0% and 81.0%, respectively), but only 4.0% and 76.0% of participants in the study group and control group, respectively, experienced severe pain four weeks post-intervention. Moreover, 2.0% of study group individuals and 71.0% of control group participants experienced severe pain eight weeks after the intervention. **Conclusion:** Mayan abdominal massage effectively decreases pain intensity in teenage girls with dysmenorrhea. **Recommendations**: Conduct educational sessions about the significance of Mayan abdominal massage and its ability to alleviate dysmenorrhea symptoms and menstrual pain within the community.

Keywords: Adolescent females, Arvigo Mayan abdominal massage, dysmenorrhea intensity.

Introduction

Painful menstruation, or dysmenorrhea, is a worldwide public health concern. It can occur as either primary or secondary and is a frequent issue among teens and women in their reproductive years. Despite being a frequent occurrence, it often goes undiagnosed due to most women not seeking medical help (Almanasef & Alqarni, 2023).

In the absence of pelvic illness, primary dysmenorrhea is defined as suprapubic colic pain accompanied by radiation to the lumbar and thigh during or before menstruation. It typically appears six months after a girl's first period, occurring only during cycles when ovulation is present. Symptoms commonly include tiredness, migraines, backaches, nausea, vomiting, and mood swings. Pain usually lasts for 8 to 72 hours and is at its worst during the initial and second days of the menstrual cycle, due to the increased production of prostaglandins during that time (Guimarães & Póvoa, 2020).

In contrast, secondary dysmenorrhea is described as menstrual pain that is linked to underlying conditions inside or outside the uterus (Nagy & Khan, 2022). Between 50% and 90% of teenage girls and women of childbearing age are estimated to be affected (McKenna & Fogleman, 2021).

This issue has become more prominent and significant, as recent research has demonstrated that dysmenorrhea is linked to a reduced quality of life, missed work, and decreased academic achievements, causing a considerable economic impact (Parra-Fernández et al., 2020). Previous studies indicate that potential triggers for primary dysmenorrhea consist of being less than 20 years old, having a family history of dysmenorrhea, experiencing early menarche, having a history of menorrhagia and null parity, low or high omega-3 consumption, alcohol and cigarette use, excessive caffeine consumption, and experiencing emotional issues like stress, anxiety, and depression (Duman et al., 2022).

Numerous young women utilize self-care methods to handle their menstrual pain and alleviate other related symptoms without consulting a healthcare professional. Methods of self-care encompass physical actions like exercise, stretching, or resting; medication like pain relief; non-medication treatments such as herbal remedies or heat; and psychological approaches like prayer or meditation. This method is becoming more common because it does not have any negative side effects. Alternative or complementary therapies have been around for millennia. Manipulative and body-based methods like massage have been used as healing therapies by various cultures, such as the Greeks, Romans, Egyptians, Arabs, and Indians (El-Hosary, 2022).

The practice of Maya abdominal self-care massage, known as "Arvigo techniques," is a form of complementary alternative therapy created by Dr. Rosita Arvigo that focuses on traditional Mayan methods. It is a non-invasive external massage that supports the uterus and ovaries while strengthening muscles and ligaments. Abdominal massage Arvigo Maya focuses on the position and health of the pelvic and abdominal organs, improving their function by releasing mental and physical blockages from the uterus (Ng et al., 2022).

Nurses play a crucial part in complementary alternative therapy as part of the health profession. Nevertheless, nurses need to be knowledgeable and equipped with the right skills and clinical judgments, which, informed by recent, precise, and unbiased evidence, seemed to impact their stance on complementary alternative therapy in assisting women in using it safely and effectively for an improved quality of life. When school-age girls have menstruation pain, the nurse is usually their first healthcare provider, yet the help they receive usually focuses solely on managing the discomfort in the moment by occasionally giving them medications. (Soliman et al., 2023).

However, nurses have a unique chance and duty to actively address issues related to menstruation to enhance the health and overall wellness of women. The nurses need to offer enough information and support for prompt handling and treatment of menstrual pains and possible underlying conditions (Angelhoff & Grundström, 2023). The maternity nurse's job is to offer expert guidance and support to adolescent girls experiencing painful periods to alleviate discomfort, enhance their daily routines and well-being, and reduce their absence from school or work. An essential aspect of a maternity nurse's role is to promote and back non-drug, complementary, and alternative methods for treating primary dysmenorrhea. These can include physical activity, warm baths, dietary supplements, breathing exercises, hot patches, acupuncture, yoga, massage, acupressure, relaxation techniques, and staying hydrated (Itani et al., 2022).

Significance of the study

The problem of dysmenorrhea is common in gynecology. It is the main cause of missed work and school days among young women. The prevalence of dysmenorrhea varies greatly amongst countries worldwide, ranging from 50% to 90% (Molla et al., 2022). Primary dysmenorrhea is extremely common, especially in teenagers. Elsawy et al. (2023) report that up to 90% of teenage girls and 45% to 95% of women worldwide report having it, with 2% to 29% reporting severe discomfort. According to an Egyptian study, dysmenorrhea affected 74.6% of adolescent girls. Different research carried out in Egypt on students attending multiple El-Minia Nursing Schools revealed that 94.4% of the study participants were found to have dysmenorrhea (Moustafa et al., 2023).

Dysmenorrhea can also cause bodily problems like headaches, bloating, cramps, exhaustion, and sore breasts. In addition, it may cause emotional symptoms like irritability, despair, hyperplasia, mood swings, and amnesia. It may also impair one's ability to focus and negatively affect one's social and personal life. Moreover, it can impede everyday tasks, lead to mood issues, and disrupt sleep. Maya's natural and traditional self-care massage for the belly targets the abdominal muscles, connective tissues, and internal organs. Another name for it is sobada de matriz, or womb massage. This technique helps organs return to their proper places. Congestion and blockages lessen when the body and internal organs are positioned correctly, facilitating better nutrition, communication, energy, and waste elimination. These techniques enhance the insufficient blood flow to the belly and its constituent

organs, which is necessary for functions like secretions, digestion, absorption, excretion, and reproduction (Mostafa et al., 2023). To lessen the severity of dysmenorrhea in young female adolescents, the current study applies an evidence-based nursing intervention, such as the Mayan abdominal massage technique. Thus, the goal of this research is to investigate whether Mayan abdominal massage might lessen teenage girls' suffering when they have primary dysmenorrhea.

The aim of the study

To investigate the effect of the Arvigo Mayan abdominal massage on dysmenorrhea intensity among adolescent females.

Research hypotheses:

(H0): Arvigo Mayan Abdominal Massage has no significant effect on the intensity of dysmenorrhea among adolescent females.

(H1): Arvigo Mayan Abdominal Massage significantly reduces the intensity of dysmenorrhea among adolescent females compared to those who do not practice the massage.

Operational definition:

Arvigo Mayan Abdominal Massage: A traditional, natural and noninvasive external massage to the pelvis and abdomen. It relieves both physical and emotional congestion to improve the flow of blood, lymph, nerve impulses, and hormonal flow to the abdomen. It was measured using Part III (Mayan abdominal massage checklist) of Instrument II (The Menstruation History Assessment Questionnaire).

Dysmenorrhea intensity refers to the occurrence of painful cramps during menstruation and was measured using instrument III (pain assessment instrument of numerical rating scale).

Method

Research Design: Using a quasi-experimental research design, the current study was carried out.

Research Settings: The research took place in three secondary schools within Sirs Al-Layan City, including Martyr Pilot Izzat Secondary School, Secondary Joint Developer School, and Sirs Al-Layan Combined Commercial Secondary School. Sirs Al-Layan City, Menoufia Governorate, Egypt's Ministry of Education, is associated with these schools. These settings were chosen due to their easy accessibility and high population of teenage female students. Furthermore, secondary schools provide access to a large, concentrated population of adolescent females; conducting this study in secondary schools targets a group where dysmenorrhea is common. Moreover, this setting aligns well with the research objectives, ensuring access to a relevant population and facilitating a controlled, organized study environment.

Martyr Pilot Ezzat Secondary School; Secondary Joint Developer School; and Sirs Al-Layan Combined Commercial Secondary School: Affiliated with the Ministry of Education, the institutions were founded in 1973, 1968 and 1967, respectively. There are 370 female and 400 male students at Martyr Pilot Ezzat Secondary School, divided into three grades: 120 female and 120 male students in the first grade, 130 female and 150 male students in the second grade, and 120 female and 130 male students in the third grade. There are three grades at Secondary Joint Developer School: 180 girls attend the first grade, 180 attend the second, and 140 attend the third, for a total of 500 female pupils. Sirs Al-Layan Combined Commercial Secondary School consists of three grades: the first grade has 80 girls and 45 boys; the second grade has 75 girls and 50 boys; and the third grade has 70 girls and 40 boys, totaling 225 female students and 135 male students.

Sample Type: 286 adolescent female students were chosen from the mentioned settings (with 143 in each group) using a purposive sample. The study included 286 adolescent females from three different schools: 97 from Martyr Pilot Ezzat Secondary School, 131 from Secondary Joint Developer School, and 58 from Sirs Al-Layan Combined Commercial Secondary School. The girls were proportionally allocated based on their grade levels.

Based on the list of student names, the cases were then randomly assigned (using simple randomization) to two groups: teenage females with odd numbers were assigned to group A, which was the study group, and adolescent girls with even numbers were assigned to group B, which was the control group. This technique assisted in avoiding bias and contaminated samples.

Criteria for inclusion: - Adolescent females between the ages of 10 and 19 who have regular menstrual cycles (range from 21 to 35 days) and a history of primary dysmenorrhea, as determined by the Visual Analogue Scale.

Exclusion criteria: For safety reasons, participants who are pregnant or suspect pregnancy will not be allowed to participate, nor will those with chronic medical conditions (such as diabetes or cardiovascular diseases) that could interfere with the effects of the abdominal massage or who have secondary dysmenorrhea brought on by underlying conditions (such as endometriosis, pelvic inflammatory disease, or ovarian cysts); or who are currently using hormonal contraceptives (like non-steroidal anti-inflammatory drugs) to manage menstrual pain.

Calculation of the sample size: In the sample size calculation, 143 adolescent females per group were included, following Bujang's (2021) study. The equation was used with 95% confidence and 80% power. A minimum of 286 teenage girls were selected for each group, with 143 in each group.

$$n' = \frac{n}{1 + \frac{z^2 \times \hat{p}(1-\hat{p})}{\varepsilon^2 N}}$$

Where n and n' denote the sample size, the margin of error (ε) is 0.05. The symbol z represents the z-score, with a value of 1.96. N is 2347, indicating the total population. p̂ represents the population proportion, which is 0.5 or half.

Instrument I: A structured interview questionnaire for adolescent females was created by researchers through a thorough examination of existing literature (Goda et al., 2020). It was made up of two parts:

Part I included inquiries regarding the socio-demographic attributes.

Part II included queries about the girls' physical attributes.

Instrument II: The Menstruation History Assessment Questionnaire was developed by researchers through a review of previous studies (Sharawi et al., 2023).

Part I: The survey involved inquiries regarding onset of menarche, frequency of periods, length of periods, time between periods, and volume of menstrual blood flow.

Part II: It included inquiries about when the menstrual pain starts, how long it lasts, where it is felt, any accompanying symptoms, impact, and management.

Part III: Mayan abdominal massage checklist

Instrument III: Pain assessment instrument by using Numerical Rating Scale (NRS): Although it is simple to use, the teenage girl needs to be able to mentally understand what pain is. Lafoy and Goden (2000) used this tool to assess the degree and intensity of pain. The teenage females were asked to indicate on a horizontal line, on a scale of 0 to 10, how much pain they were experiencing at any given moment. They could also write a number on the line. Scores of 0 indicate no pain, 1–3 indicate mild pain, which is associated with painful menstruation but rarely interferes with daily activities; analgesics are rarely required, 2–4 indicate moderate pain, which impacts daily activities and is relieved by analgesics, and 3–10 indicate severe pain, which is associated with a low threshold for pain, significantly interferes with activities, and is not significantly improved by analgesics.

A numerical Rating Scale (NRS) measurement of pain level

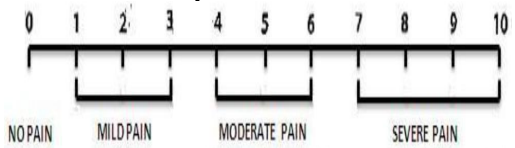


Figure 1 Adopted from Wang, L., Xiao, Y., Urman, R., Yingzi Lin, & Lin, Y. (2020). Cold pressor pain assessment based on the EEG power spectrum. *SN Appl. Sci.* **2,** 1976 (2020). https://doi.org/10.1007/s42452-020-03822-8

Validity:

Five professors with backgrounds in obstetrics, gynecology, and maternal and newborn health nursing evaluated the instruments to make sure they were applicable, clear, comprehensive, and understandable to assess the content validity and make any necessary modifications. For example, some elements were added under the second tool's first section (adding three symptoms and signs associated with menstrual pain), and some points were changed at the third tool's first section (changing the picture of the menstrual pain scale).

Reliability:

Test-retest reliability was employed by researchers to assess the instruments' internal consistency. This was accomplished by working with the same teenage girls in similar circumstances on two or more occasions, using the same tools. After analyzing several test results, the value of "r" was determined. The Cronbach's alpha test was used to confirm the reliability and showed that all the coefficients were satisfactory and met expectations. The results showed that the first, second, and third instruments had high levels of reliability, with reliability coefficients of 0.85, 0.80, and 0.95, respectively.

Administrative Approvals: We received an official letter from Menoufia University's dean of the nursing faculty. An official letter from the directors of Martyr Pilot Izzat Secondary School, Secondary Joint Developer School, and Sirs Al-Layan Combined Commercial Secondary School was also received. Additionally, permission from the Research and Ethics Committee of the Faculty of Nursing at Menoufia University was obtained before starting the study.

Ethical considerations: Approval was received from the Committee of Research and Ethics at Menoufia University's Faculty of Nursing on June 17, 2023. Ways to guarantee ethics were considered in the research concerning confidentiality and informed consent. Privacy was ensured by using sealed documents with numbers instead of names for the female participants. Every female participant was notified that the data shared in the study would be confidential and utilized solely for statistical analysis. Upon completion of the research, the results were shared as collective data, excluding any individual participant details.

A pilot study: Ten percent of the sample, or 29 female teenagers from the schools, were chosen for the pilot study to evaluate the instruments' viability, comprehensibility, and time requirements for responding to questions. Because of changes made to the equipment, the researchers did not include in the sample any of the female adolescents who took part in the original study.

Field work: The research was conducted in four stages:

1. Preparatory phase: A thorough examination was conducted to develop a database of information related to the research topic, which involved reviewing digital theses, books, papers, and magazines. The researchers created various data collection tools and looked for a way to manage the study. The researchers prepared an educational session and a Mayan Abdominal Massage technique booklet with three chapters for adolescent females to learn about the massage and its impact on dysmenorrhea. They also planned various teaching methods and instructional media, such as videos and posters.

2. Interviewing phase: Researchers conducted interviews with teenage females in the study and control groups to collect data during this phase in a waiting room in the schools. Selected public schools participated in the 4-month data gathering process, which began in October 2023 and ended in January 2024. Three days a week, from 9 a.m. to 2 p.m., the researchers were in attendance. During the first meetings, the researchers gave an introduction, went over the goals of the study, and asked the teenage girls whether they could participate in the research. Each participant completed an interview to collect data on their menstrual cycles, physical attributes, medical and surgical history, and sociodemographic background after receiving written consent from eligible minors. Every day, on average, ten teenage girls were interviewed, and each session lasted for roughly thirty minutes. The replies were recorded using the given instruments, and the interviews were performed in Arabic.

3. Implementation phase (just for the study group): In the implementation phase, two educational sessions were conducted by the researchers to teach adolescent females about the Mayan abdominal massage technique, utilizing various instructional methods. Educational methods include teaching lectures, instructional media such as video films, audiovisual demonstrations, group discussions, and a booklet on "Arvigo Techniques of Mayan Abdominal Massage."

The first visit

began immediately after the assessment and consisted of two educational sessions. Each session lasted about 45 to 90 minutes, with a 15-minute break in between. Extra time was allocated for teenage girls to ask questions or

seek clarification about the sessions. Provide teenage girls with clear information about what dysmenorrhea is, the various types of dysmenorrhea, its causes, as well as the signs and symptoms to watch for. After finishing the initial session, the teenage girls took a 15-minute break for snacks and juice.

Second session: Adolescent females are given basic information about the Mayan abdominal massage technique and principles. The importance and contraindications of this message are also discussed with them. The researchers also detailed the proper and safe application of Mayan abdominal massage using the Mayan abdominal massage checklist.

Ask the teenage girl to urinate prior to going to sleep. Lay flat on your back with a cushion or bolster beneath your knees. Make sure she has her knees slightly bent. Take deep breaths and slowly release them for several minutes until you feel relaxed. Take any necessary actions to help her find balance. Join both hands with one thumb tucked under the other, bring all eight fingers close together and slightly bent, then relax them to resemble a hoe.

Step 1: Using her index fingers, locate the pubic bone and press against it. She may feel a small groove. Close her eyes and search for the groove until it's found; that's where she should begin. Position her index fingers on the indentation and start to press firmly into the gentle muscle of her pelvis, just above the pubic bone. Explore extensively in this area. If her uterus is in the correct position, she will feel a spacious sensation without any blockage. A uterus that has descended feels like a water-filled balloon and will push back against her touch. Massage upward towards the belly button 9-10 times. She should only move up 2-3 inches.

Step 2: Place one pinkie finger on the pubic bone and the other on the hip bone. Locate the center point, which should be cushioned and free from discomfort. Move the hand in the same position, towards the center line and slightly upward. Shape a letter "J."

Step 3: Perform the same actions on the opposite side. Remember, stop short of reaching the belly button.

Step 4: Next, gently make circular motions over the groin region, moving towards the navel. Avoid applying excessive pressure; the touch should be gentle.

Step 5: Perform gentle circular movements approximately four fingers above her navel.

Step 6: Under her breastbone, position your fingers facing down and apply strong pressure towards the navel 9-10 times.

Step 7: Maintain your fingers towards the belly button, apply pressure under the rib, and then, in a slanting direction, move all the way to the belly button.

Step 8: Repeat the same action from step 7 on the opposite side.

Step 9: Next, form the shape of an "M" using your fingers. Once again, lower your hands below the sternum and start moving in a zigzag pattern all the way to the belly button. Take your time and pay attention to any areas of tension. If you discover a narrow space, wait for a prolonged count of 3.

Step 10: Start drawing small circles around the navel. Once more, any tight spots (which could feel like a tiny potato) should be maintained for a slow count of 3. Perform this action five to ten times in every direction. This method is performed two times every day for a consistent three-month period. Each teenage girl should be educated in the following guidelines: prevent constipation, refrain from lifting heavy items, avoid persistent coughing, sustain a healthy weight, and follow a nutritious diet. After the sessions end, every teenage girl receives a booklet written in easy-to-understand Arabic. The researchers supply the adolescent females with castor oil to aid in the application of the Maya abdominal massage. In four weeks, the researchers hope to follow up with each young girl to assess her level of menstrual pain.

4. Evaluation phase:

During the evaluation stage, researchers assessed the level of menstrual pain in all teenage girls involved in the research every four weeks for two cycles using a follow-up form with identical questions to instruments II and III from before the intervention. Mayan abdominal massage was performed on adolescent females in the study group, while the control group received standard care (changing underwear daily; changing sanitary pads every 4 hours; washing the hands before and after changing sanitary pads; avoiding vaginal douching or washing the external genitals with soap; not using tissues to collect blood instead of sanitary pads; avoiding

tampons; and drinking enough water during menstruation). The researchers collected the data by phone to assess the effectiveness of Mayan abdominal massage in specific cases. Additionally, a WhatsApp group was created by the researchers to make it easier to communicate with teenage girls, address their inquiries promptly, and share educational resources like videos and booklets. The post-evaluation session lasted approximately 15-20 minutes per teenage girl, while the phone conversation lasted around 15 minutes.

Data Analysis

Data were collected, tabulated, and statistically analyzed using an IBM personal computer with Statistical Package of Social Science (SPSS) version 25. Descriptive statistics in which quantitative data were presented in the form of mean, standard deviation (SD), and qualitative data were presented in the form of numbers and percentages. Analytical statistics: used to find out the possible association between the study factors and the targeted disease including Chi squared test ($\chi 2$ used for comparison between two groups having qualitative variables and Student t-test used for comparison between two groups having quantitative variables. Where: a significant statistical difference with a P value lower than 0.05.

Results:

The sociodemographic characteristics of the teenage female participants in the study and control groups are shown in **Table 1**. The mean age of the study group was 16.62 ± 0.63, whereas the mean age of the control group was 17.32 ± 0.80. Also, 100% of the participants in the study and control groups were from rural areas. Meanwhile, 53.1% of the control group were in their third academic year, compared to 46.2% of the research group who were in their first and second academic years. The research and control groups had mean heights of 162.67 ± 6.61 and 162.39 ± 6.35, respectively, and mean weights of 62.08 ± 11.71 and 62.50 ± 12.69, respectively. Furthermore, 61.5% of the patients in the study group and the control group were of a normal weight.

Table 2 presents the menstrual history of the adolescent females under investigation in the study and control groups. 100% of the participants in the study and control groups had dysmenorrhea and regular menstruation, which lasted 3-6 days and happened every 21–28 days. Furthermore, 97.2% and 97.9% of the research and control groups, respectively, menarched between the ages of 10 and less than 16 years old. Moreover, 81.1% and 86.0% of the participants in the study and control groups, respectively, experienced modest bleeding in terms of the volume of menstrual blood lost. About 65.7% of research group participants and 83.2% of control group participants changed the pad after it became fully soaked. Regarding the quantity of pads changed daily, 81.8% of the study group participants and 76.2% of control group participants switched 2-3 pads daily. Regarding menstrual hygiene routines, about 41.3% of study group individuals showered every day, compared to 35.7% of control group participants who changed their underwear often. Mothers teach approximately 35.7% of research group participants and 39.9% of control group participants about menstruation and how to take care of it.

The menstrual features of the adolescent females in the research and control groups are displayed in **Table 3**. The data indicates that 81.8% of research participants and 81.1% of control group members, respectively, reported having severe menstrual discomfort. Menstrual pain was described as moderate by 18.2% of the research participants and 18.9% of the control group participants. In terms of how long the pain lasted, 73.4% and 67.8%, respectively of the research participants stated that their menstrual pain persisted for 9–12 hours. It demonstrates that 53.1% of the control group and 47.6% of those in the study reported having back or lower abdominal pain. In terms of the sites to which menstruation pain radiates, 29.4% of the study group and 35.0% of the control group reported pain radiating to numerous sites. Regarding menstrual symptoms, around 21.7% of the study group and 23.8% of the control group experienced vomiting. In terms of using medication to ease this discomfort, 95.1% and 93.0% of the study and control groups, respectively, reported using medication to treat menstrual pain.

The characteristics of dysmenorrhea for the teenage girls in the research and control groups are shown in **Table 4**. According to the study, girls in both groups first had

dysmenorrhea at an average age of 12.25±0.95 and 12.16±0.93, respectively. During the past six months, the study and control groups experienced an average of 5.01±1.26 and 4.99±1.19 cases of dysmenorrhea, respectively. Menstrual discomfort usually starts just before the commencement of the menstrual cycle, according to most participants 80.4% of the study and control groups. Regarding duration, 93.0% and 95.1%, of the research and control groups, respectively, said that menstruation pain usually lasted for one day. Of the adolescent females surveyed, 59.4% and 54.5%, respectively, in the study and control groups reported that their daily activities had been moderately impacted by dysmenorrhea during the previous six months. About 50.3% and 52.4% of the participants in the study and control groups, respectively, reported missing some days of school in the previous six months because of dysmenorrhea. 93.0% in both the study and control groups reported not consulting a doctor about their menstrual discomfort. Within the first six months, about 60.0% of people in the study and control groups sought advice from medical specialists.

The conventional methods used to ease menstruation pain before receiving Maya abdominal massage are depicted in **Figure 1**. In the research and control groups, approximately 25% of participants (26.8% and 20.2%, respectively) reported using full bed rest when they were in bed. Additionally, a change in posture, such as sleeping on the stomach, was observed in 24.4% and 25.1% of study and control group participants, respectively. Meanwhile, 18.1% of participants in the control group and 20.9% of those in the research group drank hot beverages. On the other hand, 16% and 14.6% of study and control group participants applied warm compresses to their back and abdomen, respectively. Furthermore, palliative medicine was used by 11.1% of research group individuals and 8.9% of control group participants. In addition, 7.4% and 6.5% of study and control group participants, respectively, took warm showers.

The degree of menstruation discomfort in the study and control groups before and after the intervention, after using Maya's Abdominal Massage consistently, is shown in **Figure 2**. The findings demonstrated that 82.0% of the experimental group and 81.0% of the control group had severe pain before the intervention. Furthermore, four weeks after the intervention, 4.0% of study group individuals and 76.0% of control group participants reported having severe discomfort. Additionally, eight weeks following the intervention, 2.0% of study group individuals and 71.0% of control group participants reported having severe discomfort.

The comparison of the menstrual pain features in the study and control groups between the examined adolescent females before and after the intervention is displayed in **Table 5**. It demonstrates that, regarding menstrual pain score, site of pain, sites of radiotherapy for menstrual discomfort, and usage of medicines to ease this pain, there were no statistically significant changes between the study and control groups prior to the intervention ($P>0.05$). After four and eight weeks of the intervention, however, very statistically significant changes were seen between the study and control groups ($p\leq0.000$).

Table 1: The Socio-Demographic Attributes of the Studied Adolescent Female (n=286)

Variables	Study group n=143		Control group n=143		t / χ^2	P – value
	No.	%	No.	%		
Age (years) Mean± SD	16.62±0.63		17.32±0.80		t 8.30**	≤ 0.000
Place of residence						
- Urban	0	0.0%	0	0.0%	a	a
- Rural	143	100.0%	143	100.0%		
The level of the academic year						
- 1st	66	46.2%	30	21.0%		
- 2nd	66	46.2%	37	25.9%	70.22ns	> 0.05
- 3rd	11	7.7%	76	53.1%		
Weight Mean± SD	62.08±11.71		62.50±12.69		t 0.29ns	> 0.05
Height Mean± SD	162.67±6.61		162.39±6.35		t 0.36ns	>0.05
Body mass index						
- Underweight (BMI <18.5)	28	19.6%	32	22.4%	0.56ns	
- Normal weight (BMI :18.5-24.5)	94	65.7%	88	61.5%		>0.05
- Overweight (BMI: 25-29.5)	2	1.4%	2	1.4%		
- Obese (BMI >30)	19	13.3%	21	14.7%		

N.B. ** highly statistically significant; ns statistically significant; a No statistics are computed because place of residence is a constant.

Table 2: Menstrual history of the studied adolescent females (n=286).

Variables	Study group n=143		Control group n=143		χ^2	P –value
	No.	%	No.	%		
The age when you had your first menstrual cycle					0.14ns	>0.05
- Less than 10 years	4	2.8%	3	2.1%		
- 10- <16 years	139	97.2%	140	97.9%		
Regularity of menstruation						
- Regular	143	100.0%	143	100.0%	*a	*a
Duration of menstruation (days)						
- 3 - 6 days	143	100.0%	143	100.0%	*a	*a
Interval (days)						
- Between 21-28 days	143	100.0%	143	100.0%	*a	*a
Amount of menstrual blood loss						
- Light bleeding	123	86.0%	116	81.1%		
- Moderate bleeding	20	14.0%	27	18.9%	1.24ns	>0.05
How much blood is in the pad?					11.49**	≤ 0.001
- Totally soaked.	94	65.7%	119	83.2%		
- Partially soaked	49	34.3%	24	16.8%		
Number of pads do you change during the day						
<2 pads per day	0	0.0%	3	2.1%		
2-3 pads per day	117	81.8%	109	76.2%	3.722ns	>0.05
4-5 pads per day	26	18.2%	31	21.7%		
Hygienic practices are used during menstruation.						
Medical disinfectant lotion	9	6.3%	10	6.9%		
Bathing daily	59	41.3%	45	31.5%	3.046ns	>0.05
Change underwear frequently.	42	29.4%	51	35.7%		
Sitting in the warm water	20	13.9%	22	15.4%		
Use sanitary pads made of cotton	13	9.1%	15	10.5%		
Source of information regarding your menstruation and their care:						
Mass media	32	22.3%	33	23.1%	1.401ns	
Sisters	25	17.5%	26	18.1%		>0.05
Peers	35	24.5%	27	18.9%		
Mother	51	35.7%	57	39.9%		
Complaining from menstrual pain					*a	*a
Yes	143	100.0%	143	100.0%		

N.B. ** highly statistically significant; ns statistically significant; a No statistics are computed because these items are constant

Table 3: Menstruation characteristics of the studied adolescent females (n=286).

Variables	Study group n=143		Control group n=143		χ^2	P –value
	No.	%	No.	%		
Complaining from menstrual pain					*a	*a
- Yes	143	100.0%	143	100.0%		
Intensity of menstrual pain						
- Moderate pain	26	18.2%	27	18.9%	0.023ns	>0.05
- Severe pain	117	81.8%	116	81.1%		
Duration of pain						
- 9–12 hours	105	73.4%	97	67.8%		
- 12–18 hours	22	15.4%	23	16.1%	1.739ns	>0.05
- 18–24 hours	14	9.8%	21	14.7%		
- More than 24 hours	2	1.4%	2	1.4%		
Site of pain						
- Lower back	22	15.4%	22	15.4%		
- Lower abdomen	45	31.5%	53	37.0%	1.413ns	>0.05
- Lower abdomen and back	76	53.1%	68	47.6%		
Sites of menstrual pain radiation:						>0.05
- Lower back	27	18.8%	29	20.2%	1.580ns	
- Front and back of the legs.	34	23.8%	31	21.7%		
- Lower abdomen and back	24	16.8%	20	14.0%		
- Suprapubic area	16	11.2%	13	9.1%		
- Multiple sites	42	29.4%	50	35.0%		
Another symptom associated with menstrual pain.						
None	17	11.8%	2	1.3%		>0.05
Nausea	25	17.5%	25	17.5%	16.19ns	
Vomiting	34	23.8%	31	21.7%		
Stress	21	14.7%	27	18.9%		
High temperature	2	1.4%	4	2.8%		
Headache	19	13.3%	17	11.9%		
-Breast pain	10	7.0%	12	8.4%		
More than symptom	15	10.5%	25	17.5%		
Do you use painkillers to relieve this pain?						
- Yes	136	95.1%	133	93.0%	0.563ns	>0.05
- No	7	4.9%	10	7.0%		

N.B. ns statistically significant

Table 4: Dysmenorrhea characteristics of the studied adolescent females (n=286).

Variables	Study group n=143		Control group n=143		t / χ^2	P –value
	No.	%	No.	%		
The age at which you first experienced dysmenorrhea Mean± Standard Deviation	12.25±0.95		12.16±0.93		t 0.81ns	>0.05
The times you experienced dysmenorrhea in the last six months Mean± Standard Deviation	5.01±1.26		4.99±1.19		t 0.14ns	>0.05
The time your menstrual pain usually starts						
- One to two days before menstruation	2	1.4%	3	2.1%		>0.05
- Directly before the menstrual cycle	115	80.4%	115	80.4%	0.22ns	
- With menstrual beginning and continuous for 24 hours	26	18.2%	25	17.5%		
The number of days does your menstrual pain last					0.56ns	>0.05
- 1day	133	93.0%	136	95.1%		
- 2 days	10	7.0%	7	4.9%		
The menstrual pain affects your daily activities within the preceding 6 months						>0.05
- No	0	0.0%	3	2.1%	3.43ns	
- Yes	143	100.0%	140	97.9%		
The menstrual pain affects your school absenteeism during the last six months						
- Every menstruation	23	16.1%	19	13.3%		>0.05
- Alternate menstruation	30	21.0%	39	27.3%	3.90ns	
- Occasionally	72	50.3%	75	52.4%		
- Never	18	12.6%	10	7.0%		
Seeking medical advice regarding your menstrual pain						>0.05
- Yes	10	7.0%	10	7.0%	0.00ns	
- No	133	93.0%	133	93.0%		
If yes, when did you seek it?					1.14ns	>0.05
- Before three months	0	0.0%	1	10.0%		
- From three to six months	6	60.0%	6	60.0%		
- More than six months	4	40.0%	3	30.0%		

N.B. ns statistically significant

Figure 1: The Traditional Techniques Used for Relieving Menstrual Pain before the Application of Maya Abdominal Massage

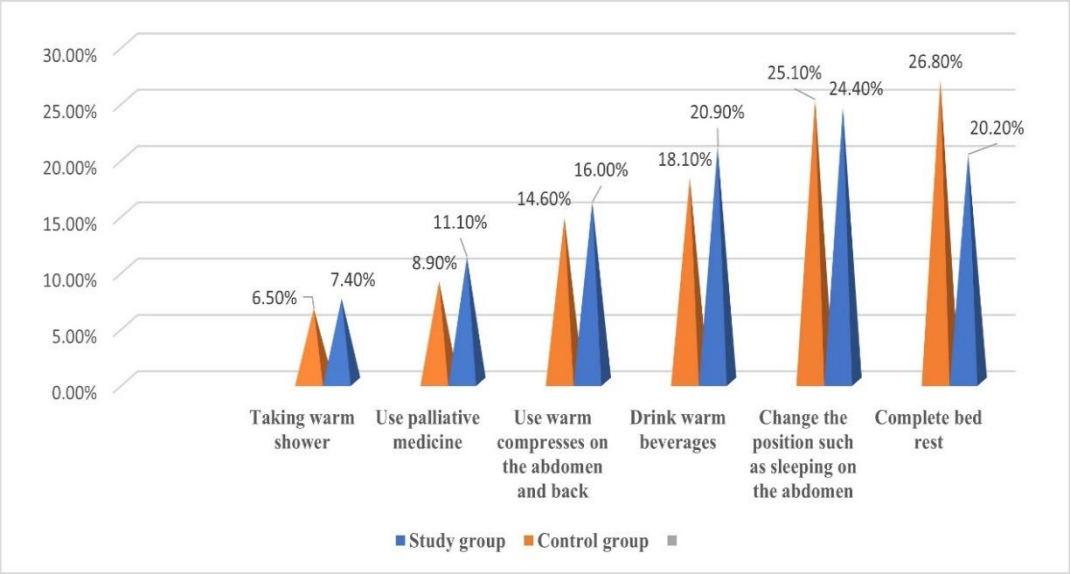
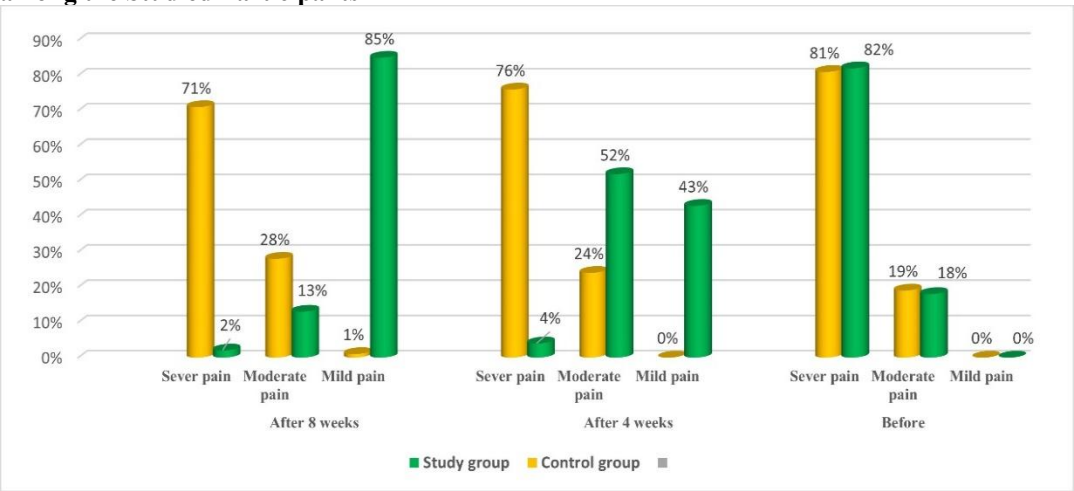


Table 5: Comparing menstrual pain characteristics among the studied adolescent females before and after the intervention (n=286).

Variables	Before				Four weeks				Eight weeks				χ^2	P –value
	Study group (n=143)		Control group (n=143)		Study group (n=143)		Control group (n=143)		Study group (n=143)		Control group (n=143)			
			No.	%	No.	%	No.	%	No.	%	No.	%		
The level of your menstrual pain after applying Maya Abdominal Massage														
- Mild pain	0	0.0	0	0.0	62	43.4%	0	0.0%	122	85.3%	1	0.7%	$\chi^2$1= 0.023ns	P1> 0.05
- Moderate pain	26	18.2%	27	18.9%	75	52.4%	34	23.8%	18	12.6%	40	28.0%	$\chi^2$2=169.67**	P2≤0.000
- Severe pain	117	81.8%	116	81.1%	6	4.2%	109	76.2%	3	2.1%	102	71.3%	$\chi^2$3=220.72**	P3≤0.000
Site of pain: -														
-Abdomen	17	11.9%	23	16.1%	17	11.9%	23	16.1%	17	11.9%	23	16.1%		
-Lower back	22	15.4%	22	15.4%	23	16.1%	22	15.4%	24	16.8%	22	15.4%		
-Lower abdomen and back	76	53.1%	68	47.6%	75	52.4%	68	47.6%	75	52.4%	68	47.6%	$\chi^2$1= 1.413ns $\chi^2$2=1.334**	P1> 0.05 P2≤0.000
-Suprapubic area	28	19.6%	30	21.0%	28	19.6%	30	21.0%	27	18.9%	30	21.0%	$\chi^2$3=1.48**	P3≤0.000
Sites of menstrual pain radiation:				20.3%	26	18.2%	29	20.3%	26	18.2%	29	20.3%		
-Lower back	27	18.9%	29	21.7%	13	9.1%	31	21.7%	13	9.1%	31	21.7%		
-Front and back of the legs.	34	23.8%	31											
-Lower abdomen and back	24	16.8%	20	14.0%	69	48.3%	20	14.0%	69	48.3%	20	14.0%	$\chi^2$1= 1.580ns	P1> 0.05
-Suprapubic area	16	11.2%	13	9.1%	30	21.0%	13	9.1%	30	21.0%	13	9.1%	$\chi^2$2=78.04**	P2≤0.000
-Multiple sites	42	29.4%	50	35.0%	5	3.5%	50	35.0%	5	3.5%	50	35.0%	$\chi^2$3=78.04**	P3≤0.000
Using painkillers to relieve that pain													$\chi^2$1= 0.563ns	P1> 0.05
- Yes	136	95.1%	133	93.0%	24	16.8%	127	88.8%	9	6.3%	119	83.2%	$\chi^2$2=148.84**	P2≤0.000
- No	7	4.9%	10	7.0%	119	83.2%	16	11.2%	134	93.7%	24	16.8%	$\chi^2$3=171.11**	P3≤0.000

N.B. $\chi^2$1 & P1 before the intervention; $\chi^2$2 & P2 after 4 weeks; $\chi^2$3 P3 after eight weeks

Figure 2: The Level of Menstrual Pain before and after Applying Maya Abdominal Massage among the Studied Participants



Discussion:

According to the study's findings, most women in the research and control groups said they did not see a doctor for menstruation discomfort. Menstrual cramps are common and can interfere with everyday activities, but many young women choose to live with the pain rather than seek professional help, thus they are frequently neither successfully treated nor acknowledged. Due to stigma, embarrassment, or a lack of knowledge, women report menstrual troubles at lower rates than they should because they perceive cramps as embarrassing and forbidden and see pain as an unavoidable aspect of menstruation.

The present finding is consistent with the research conducted by Abreu-Sánchez et al. (2020) on the disruption caused by dysmenorrhea in Spanish nursing students, as well as Alateeq et al. (2022) on dysmenorrhea and depressed symptoms in Saudi Arabian female university students. According to their findings, half of the participants did not seek professional assistance, and most students only sought medical attention for dysmenorrhea if they had acute pain and other symptoms.

Consultation with medical specialists on menstrual problems was scarce. The teenage girls didn't know if a doctor could help them with their menstruation issues or weren't sure if one could. This is because young females are going through a period of adolescence where they are going through a lot of changes and don't fully understand how to deal with the problems they run across. Adolescent females in rural communities are reluctant to seek medical assistance for these concerns because they think they should see a gynecologist only after getting married. This demonstrates that teenage girls have a high bar for treatment requests. Girls' lower rates of seeking treatment for dysmenorrhea were linked to cultural norms, social taboos, and a lack of knowledge.

When it came to treating dysmenorrhea naturally, most study participants as well as those in the control group employed this strategy. A quarter or so of the participants in the research and control groups had to be placed on complete bed rest. This explains why menstruation is now more accepted, even though different communities still have diverse perspectives on the matter. Nations, societies, religions, and socioeconomic position are all different. This is consistent with studies conducted by Mohamed et al. (2020) on traditional self-care practices for dysmenorrhea among Egyptian nursing students and Almanasef & Alqarni (2023) on self-care approaches for treating primary dysmenorrhea in young women in Asir, Saudi Arabia. According to the research, students' primary methods of treating menstruation pain were bed rest, natural herbs, and hot compresses or heating pads; massage, exercise, yoga, meditation, and supplements were less frequently used CATs.

Adolescent females with primary dysmenorrhea showed a significant difference in pain severity, duration, and use of painkillers following Mayan abdominal massage,

according to the current study's findings. It is unclear why Mayan abdominal massage reduces the pain associated with primary dysmenorrhea. However, it is thought that by promoting relaxation and lowering stress levels, the Mayan abdominal massage has an analgesic effect. Massage therapists can help to relieve stress, improve circulation, and encourage a deep state of relaxation by working on the body's soft tissues. Benefits of massage therapy include less muscle tension, expanded range of motion, and enhanced flexibility. Psychologically, massage treatment can help with anxiety reduction, mood enhancement, and promoting a sense of well-being (Deetz & Petrie, 2022). The dosage affects the link between dysmenorrhea and stress. Anxiety makes menstruation more uncomfortable and accelerates uterine contractions. Massage treatment can lessen pain by lowering stress and psychological stresses and elevating mood.

Moreover, there is a dearth of precise advice regarding the use of massage techniques to reduce pain. According to the gate control theory of pain, the size of the peripheral fiber's influences how spinal cells in the dorsal horn function as a gate to control the transmission of pain signals. The conduction velocity and axonal diameter of three types of nerve fibers, designated A, B, and C are different from one another. While the unsheathed C fibers convey pain signals slowly, the sheathed A fibers transmit message signals swiftly. These impulses are rapidly transmitted by the message, resulting in pressure signals that close the pain signal gate. According to the hypothesis of gate control, information must go via "nerve gates" in the spinal cord to get to the brain (Najaf Najafi et al., 2021). Moreover, endorphin hormones are released after a massage, and these hormones can increase the pain threshold and reduce the impression of pain (Sholihah and Azizah, 2020).

The study's findings demonstrated that, prior to the intervention, there were no appreciable variations in the study and control groups' average pain scores. But in the control group, there was a substantial difference between follow-up and post-intervention as well as a very significant difference between pre- and post-intervention.

This result is consistent with studies by Moustafa et al. (2023) on the effects of Maya abdominal massage on symptoms of dysmenorrhea in female nursing students at Helwan University, Egypt, and Najaf Najafi et al. (2021), who used a systematic review and meta-analysis to examine the effects of aromatherapy alone or in combination with massage on dysmenorrhea. Before obtaining Maya abdominal massage, slightly more than half reported having moderate discomfort and slightly more than one-fourth reported having severe pain. After the massage, the number of people reporting no pain rose to about three-fourths, while the overall score of menstrual discomfort reduced.

It's also critical to note that the outcomes were different from Ahmadi et al.'s (2021) study, which looked at the effects of stretching exercises and a massage-stretching exercise combination on primary dysmenorrhea in female students at Razi University in Kermanshah. The three groups who underwent stretching, massage, and a combination of both reported similar pain levels in terms of intensity, duration, and kind. Each group's symptoms included people being exposed to excessive amounts of information and training because of the researcher learning about the illness, which raised the possibility that some subjects may become sensitive to it. As a result, it is possible that this circumstance had a significant effect and changed the course of events. There is no clear definition of the relationships amongst the individual members of the experimental group.

The lack of significant differences in physical symptoms between the groups who underwent stretching exercises, massage, and the combination of massage and stretching movements could be the consequence of interactions involving chemical substances and neurotransmitters secreted by the body's endocrine glands. It is formed concurrently with the bodily alterations brought about by the three procedures described, and these alterations are consistent with each method. Furthermore, the current study's findings were not the same as those of a study carried out in Saudi Arabia by Alotibi et al. (2020), which concentrated on non-pharmacological methods for reducing dysmenorrhea among Saudi Arabian health college students. The researchers discovered that there was no discernible variation in the link between the

site of pain and the use of aromatherapy massage, and that nearly 66% of students had never tried utilizing it to relieve their discomfort. Touch treatment is inappropriate in our culture, which may be caused by a lack of knowledge about the benefits of aromatherapy massage and an unfamiliarity with Saudi traditions.

Additionally, Sumardiko et al. (2023) investigated the potential of kunyit asam herbs and abdominal massage to reduce primary menstruation discomfort. The findings demonstrated that, in cases of primary dysmenorrhea, both abdominal massage therapy and sour turmeric herbs can lessen menstrual pain.

Additionally, using single-blind randomized controlled clinical research, Ozturk et al. (2022) investigated the effects of abdominal massage and stretching activities on pain and dysmenorrhea symptoms in female university students. In comparison to the exercise group, the massage group's second-cycle scores for weariness and abdominal-back pain were lower. The symptoms that female students with dysmenorrhea most frequently report having include back discomfort and abdominal pain. This study indicated that the relaxation technique of abdominal massage was useful in getting rid of these symptoms.

Additionally, a study by Mohamed et al. (2020) in Egypt about nursing students self-reporting customary ways to relieve dysmenorrhea supported the current research. According to the research findings of the authors, more than half of the participants regularly used essential oils to their abdomens and applied them to painful places to relieve dysmenorrhea. Based on the findings of this investigation, the research hypothesis was validated.

Conclusion:

This research found that the Mayan Abdominal Massage Technique is a cost-effective, non-pharmacological nursing intervention that effectively reduces the intensity of primary dysmenorrhea.

Recommendations:

- Health education programs in secondary schools and universities should prioritize incorporating regular Mayan abdominal massage techniques to reduce primary dysmenorrhea.
- Conduct educational workshops on the importance of Mayan abdominal massage and how it can lessen the severity of dysmenorrhea within the community.

Further research:

- Further research can be conducted with a larger sample size, diverse demographics, and additional menstrual conditions like secondary dysmenorrhea and premenstrual disorder.
- Researching to identify the causes of dysmenorrhea.
- The efficacy of the Mayan Abdominal Massage Technique and other non-pharmacological treatments in reducing dysmenorrhea in young women can be assessed through a comparative study.
- Assessing high school curricula and incorporating knowledge about dysmenorrhea, menstruation, and coping mechanisms.

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