

# Effect of Cognitive Behavioral Therapy on Depression, Anxiety, Stress, Achievement, and Coping Strategy among Young Female Students with Primary Dysmenorrhea

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## Abstract

**Aim:** This study aimed to explore the effect of cognitive behavioral therapy on depression, anxiety, stress, achievement, and coping strategy among young female students with primary dysmenorrhea. **Materials and method: Design:** Quasi-experimental (pre-post) research design was used. **Setting:** The study was conducted at the Technical Nursing Institute- Mansoura University from November 2020 to January 2021. **Participants:** Purposive sampling as used to divide 116 young female nursing students into two groups (intervention arm and non-intervention arm), who completed the study after implementing a cognitive behavioral therapy program with 12 weekly sessions on the intervention arm. **Tools:** Four tools were used for data collection Interview Questionnaire Schedule, Depression Anxiety Stress Scales (DASS), Numerical pain scale and coping mechanism scale. **Results:** Post intervention, there were statistically significant differences between the two arms regarding depression ( $P = 0.009$ ), anxiety ( $P = 0.044$ ), stress ( $P = 0.003$ ), and coping strategies including ignoring pain ( $P \leq 0.001$ ), physical exercise ( $P \leq 0.001$ ), using home remedies ( $P = 0.047$ ), and hot application ( $P = 0.013$ ), between the two arms. **Conclusion:** Cognitive behavior therapy had a positive effect on pain intensity, poor concentration, and restriction in physical activities, social withdrawal, mood swing and academic achievement. Moreover, there was a significant change in depression, anxiety, stress, and coping mechanism with primary dysmenorrhea. **Recommendations:** Stress on the importance of cognitive behavior therapy sessions had a positive effect on psychological status and educational sessions, for young female nursing students, can be an efficient method to increase awareness and prevent delays in diagnosis.

**Keywords:** Achievement, Anxiety, Cognitive behavioral therapy, Coping Strategy, Depression, Dysmenorrhea and Stress.

## Introduction

The most prominent gynecological problem globally has been dysmenorrhea. Moreover, it is known as painful cycles, which are characterized as menstrual pain. Dysmenorrhea reports are

highest in individuals in their late teens and 20s and typically diminish with maturity. Dysmenorrhea affects more than 80% of women in the reproductive age group (Acheampong et al., 2019). Excluding of pelvic disease, primary (1ry) dysmenorrhea is characterized by painful

menstruation and is among the most frequent complaints in young females (Matthewman et al., 2018, and Ortiz, 2010). Secondary dysmenorrhea is known as menses pain caused by pelvic pathology (Chang & Chaung, 2012). primary dysmenorrhea symptoms include lower abdominal spasming pain that may or may not diffuse to the lower back, preceded by headache, discomfort, fatigue, nausea and vomiting, irritability, dysentery, and general weakness (Hailemeskel et al., 2016).

Based on the level of discomfort endured, dysmenorrhea can be categorized as mild, moderate or extreme (Abu Helwa et al., 2018). Besides physical fitness, (1ry) dysmenorrhea can also affect cultural processes and the daily life of an individual (Midilli et al., 2015). The pain endured by teenagers with (1ry) dysmenorrhea can become quite disabling and thus significantly affect the individual's state of mind (Ortiz, 2010). Previous studies have shown that young individuals with (1ry) dysmenorrhea frequently miss work or school due to irritation, which consequently could hold a substantial public and frugal effect (Arakawa et al., 2018).

Stress is considered an imagined or real threat to individual physical/mental homeostasis. Presently, stress refers to an inseparable and inevitable part of life. It can steadily increase vulnerability to addiction (Andreou et al., 2011). Psychiatric disorders development in adulthood has been related to stress experience during adolescence (Snyder et al., 2015). For example, depression is a psychopathological feeling that is characterized by alteration in the cognitive, inspirational, physical, interpersonal, and behavioral aspects of one's life, depending on Beck's Cognitive Notion of Depression. With a lifetime occurrence of 15.8%, depression is one of the most common psychiatric disorders (Tran, Tran, & Fisher, 2013). Moreover, with a higher incidence of 28.8%, anxiety seems to be a more prevalent mental condition. It is an unsettling sensation of ambiguous apprehension of the individual's dubious provenance which entails hopelessness, confusion, and physical excitement (Hofmann, Wu, & Boettcher, 2014; Khaledian, Kamar Zarin, & Jalalian, 2014). Menstrual distress is generally associated with symptoms such as low back pain, fatigue, general weakness, nausea, irritability, vomiting, abdominal pain, loneliness, skin disorders, breast tenderness, and palpitations. Menstrual distress and painful

menstruation are associated with impairment in quality of life, poor academic achieves and negative socioeconomic outcomes (Asgari et al., 2020).

Coping is known as a persistent adjustment in cognitive and behavioral attempts to overcome the requirements of challenging behaviors that are delegated to behaviors. In the sense of conception, birth outcomes may be influenced by coping attempts. Subsequently, selecting and implementing correct coping reaction may be a basis of versatility which prevents young people from the possible adverse impact on menstruation (Hassan et al., 2020). A few is understood about the processes of therapy that underlie recognition methods. Recognition is a technique that is supposed to improve more than diversion of pain resistance, whereas diversion can contribute to decrease the severity of pain. The impacts of cognitive restructuring on experimental pain are still not fully understood (Kohl et al., 2013).

Stress can contribute to a decline in resilience. In young females, a stress response function is important to preserve their well-being. Flexible cognitive and behavioral efforts such as taxis or bypass tools to meet expandable criteria are performed. The cumulative tension of an individual is influenced by variables affecting the condition and social interactions, existence of money, conflicting views, and impact over the problem. Therefore, demeanor is closely related to adjustment (Hassan et al., 2020). One of the explanations for the efficacy of cognitive behavior therapy (CBT) is that it stresses the detection and reversal of mental deficiencies, practice of correct reasoning, and acquisition of abilities required for identifying and correctly judging suicidal emotions that can potentially minimize grades of fear, depression, and other psychiatric conditions (Hamzeh Pour, 2014, Alamdarloo et al., 2019).

In fulfilling the interpersonal and behavioral beliefs of women who are vulnerable and insecure, nurses play an indispensable role (Arulkumaran & Lightstone, 2013). The nurse's job is to work with other health services, along with stress reducing measures, assess the results of treatments; and function as a psychologist and instructor for females by teaching them to cope with the problems and CBT (Solehati & Rustina, 2013).

#### Significant of study

To date, few studies have explored the

prevalence of menstrual pain and its impact on absenteeism and academic achievement in young female populations. The recurrent presence, occurrence and manifestations of menstrual pain are significant factors that impair the quality of life and social behaviors of teenage girls. Moreover, there is a lack of studies on menstrual issues and female health issues in general (Asgari et al., 2020). To accommodate and cope effectively with physical and psychological associated manifestation with 1ry dysmenorrhea is a valuable goal that is considered lifesaving when using a safe technique like CBT. Therefore, the current study helps in achieving the goal of Egyptian health strategy 2030.

### **Aim of the current study:**

This study aimed to explore the effect of CBT on depression, anxiety, stress, achievement, and coping strategy among young female students with primary dysmenorrhea.

### **Research hypotheses:**

**H1:** The level of depression will be decreased after intervention.

**H2:** The level of anxiety will be decreased after intervention

**H3:** The level of stress will be decreased after intervention

**H4:** Academic achievement will be increased after intervention

**H5:** Coping mechanism will be increased after intervention compared to before the intervention.

### **Materials and method:**

#### **Research design:**

Quasi-experimental (pre-post) research design; the effect of the independent variable (i.e., cognitive behavioral therapy) on the dependent variable (i.e., Depression, anxiety, stress, achievement, and coping strategy among young female students with primary dysmenorrhea) was assessed in this study.

#### **Study Setting:**

It was conducted at the Technical Nursing Institute – Mansoura University from November 2020 to January 2021.

#### **Participants:**

Purposive sampling was used. The study participants included [116 young female nursing students at the first year] who were divided into two groups (intervention arm =58 and non-intervention arm =58)

**Inclusion criteria:** Nursing female students who complained of 1ry dysmenorrhea, were not be pregnant, and completed all sessions.

#### **Tools for Data Collection [TDC]:**

##### **Tool [1]: Interview Questionnaire Schedule**

It was designed by the researchers after checking and reviewing the related & relevant literature. It includes three parts:

**Part 1:** It assesses the general characteristics of the participants as: age, residence.

**Part 2:** Student characteristic in the class (absenteeism, poor concentration, mood swing, social withdrawal, and student achievement)

**Part 3:** Obstetric and menstruation variables data include: age at menarche, regularity of menstruation, nature of menstrual flow, length of cycle duration of menstruation, type of dysmenorrhea and family history of dysmenorrhea.

##### **Tool [2]: Depression Anxiety Stress Scales (DASS) adopted from the study by (Lovibond, & Lovibond, 1995).**

The DASS-42 is a 42 item self-report scale designed to measure the negative emotional states of depression, anxiety, and stress. The principal value of the DASS in a clinical setting is to clarify the locus of emotional disturbance.

DASS (42) scoring	Depression	Anxiety	Stress
Normal	0-9	0-7	0-14
Mild	10-13	8-9	15-18
Moderate	14-20	10-14	19-25
Severe	21-27	15-19	26-33
Extremely severe	28+	20+	34+

**Tool [3]: Pain assessment tool: (Mc Caffery et al., 1989)**

- Numerical pain scale: It assessed from (0 to 10) as mild, moderate and severe. 0 means no pain, 1-3 means mild pain, 4-6 means moderate pain and 7-10 means severe pain
- Pain duration ( $\leq 3$  days or  $> 3$  days)

**Tool [4]: Coping strategy for reducing primary dysmenorrhea**

It was designed by the researchers after checking and reviewing the related & relevant literature. It includes eight items (using self-medication, engages in physical exercise, ignoring the pain, using home remedies for pain, take a rest, using hot application, using herbs and consulting a physician) with two responses, done scored (2) or not done scored (1), the total score ranged from 8 to 16.

**Validity and reliability:**

Content validity was conducted to assure that the utilized tools measure what it was supposed to measure. It was vigorously reviewed through submitted to a jury consisting of five professors in the field of researchers' specialty to be tested for its content and face validity and the looked-for modification were conducted. Reliability was tested for 10 students during the pilot study by using Cronbach's  $\alpha$  (alpha) which was 0.81, 0.71, and 0.73 for DASS-42, pain assessment tool, and coping strategy tool respectively.

**Pilot study:**

The pilot study was conducted on 10% of female nursing students from the Technical Nursing Institute – Mansoura University to measure the feasibility of content validity and time needed for completion of each tool. Finally, the results helped in making the needed modification: the participants of the pilot study were excluded from the actual study.

**Ethical considerations**

Women's Health and Midwifery department approval was obtained. Approval from the director of the Technical Nursing Institute – Mansoura University and the vice dean of student affairs of both the Faculty of Nursing and Technical Nursing Institute – Mansoura University. The aim of the study

was explained to all participants before initiation to collect data and build their confidence and trust. Informed consent was acquired from each participant of the study. Moreover, each student can withdraw from the study at any time.

**Statistical analysis**

Data were analyzed with the Statistical Package for Social Sciences (SPSS) version 22.0 (IBM Corp, Armonk, NY, USA). The participants' characteristics were presented as means and standard deviations for continuous variables. Frequencies and percentages were used to express the categorical variables. The baseline characteristics and variable scores between the intervention and non-intervention arms were compared using the Pearson's chi-square test or Fisher's exact test. Results were considered significant when the probability of error is  $< 5\%$  ( $p < 0.05$ ), non-significant when the probability of error is  $> 5\%$  ( $p > 0.05$ ), and highly significant when the probability of error is  $< 0.1\%$  ( $p < 0.001$ ). The smaller the P-value obtained, the more significant are the results.

**Implementation phase:****Content of Cognitive Behavioral Therapy Program:**

- CBT Program (12 sessions) for managing anxiety and depression and stress in young women complaining of primary dysmenorrhea.
- All sessions were restructured in a simple way to be suitable for all young females' level of understanding.
- Easy and understandable Arabic language and no jargons.
- All sessions consisted of five parts: title of the session, goals of the session, agenda, homework, and terminating phase of the session. Each session takes one hour.

<b>Objectives of the CBT Program:</b>	
<b>General objective:</b>	
At the end of application of the CBT Program, females' levels of depression, stress and anxiety will be decreased and improve physical status	
<b>Session Title:</b>	<b>The main goals:</b>
<b>"Session one"</b> Mutual understanding and rapprochement.	Establish interaction relationship between the investigator and members of the group through ice breaking as a communication technique. Help female nursing students to identify the nature of the CBT Program and rules of the participation. Help female nursing students to identify the real benefits that will accrue to them after participating in the program to encourage active participation.
<b>"Session two"</b> Psycho-education about depression and anxiety.	Provide foundational psycho-education about symptoms of depression and anxiety related to distress. Females nursing students will be able to identify thoughts and rate emotions accompanied with life stressors.
<b>"Session three"</b> Identification of automatic thoughts and cognitive distortions	Help female nursing students to understand the difference between feeling and thoughts, including how these relate to behaviors. Identify automatic thoughts and cognitive distortions, which contribute to the portion of activity restriction that is not determined by actual physical limitations.
<b>"Session four"</b> Relaxation techniques	Mastering the three relaxation techniques for stress management that help in relieving pain.
<b>"Session five"</b> Dealing with cognitive distortions.	Help female nursing students challenge any cognitive distortions and teach them how to deal with them.
<b>"Session six"</b> Using systematic desensitization to overcome anxiety.	Teach female nursing students how to overcome anxiety and life stressors through systematic desensitization technique.
<b>"Session seven"</b> Problem solving skills training.	Train on problem-solving strategies for women's utilization in identifying the best technique for dealing with life difficulties.
<b>"Session Eight"</b> Behavioral activation	Teach female nursing students how to engage in self-enhancement activity. Teach them how to improve mood through increasing behavioral activation.
<b>"Session nine"</b> Reevaluating and prioritizing stressors and coping strategies.	Help female nursing students to identify advantages and disadvantages of the options for dealing with the life stressors.
<b>"Session ten"</b> Self-control triad and Guided Imagery training.	Teach female nursing students to engage in cognitive behavioral rehearsal using the self-control triad technique to manage anxiety. Help female nursing students to deal with life stressors and help them to solve emotional problems using guided imagery technique.
<b>"Session eleven"</b> Maintaining mental health.	Provide health education about characteristics of mental health to help female nursing students to recognize the warning signs for cognitive or behavioral regression.
<b>"Session twelve"</b> The terminating session.	Enhance self-instruction or coaching to maintain progress in reducing depressive and anxiety symptoms and prevent relapse.

## Results

Table 1 presents that general characteristics and health status were well balanced between the two arms at baseline. Table 1 also shows that there were no statistically significant differences between the two arms ( $p > 0.05$ ). The mean ages of the intervention and non-intervention arms were

19.89 and 19.94 years, respectively. More than two-thirds of the participants lived in rural areas, and the age at menarche of about half of them was 13 to <15 years. About two-fifths of the participants had irregular menstrual cycle, and less than one-quarter of them had heavy menstrual flow. Besides, more than two-fifths of the participants had family history of dysmenorrhea.

Table 2 demonstrates the comparison of effects of primary dysmenorrhea on the participants' pre and post the intervention. Pre intervention, there were no statistically significant differences between the two arms ( $P > 0.05$ ). Conversely, post intervention, there were statistically significant differences in pain intensity ( $P \leq 0.001$ ), pain duration ( $P = 0.004$ ), restriction in physical activities ( $P = 0.003$ ), absenteeism ( $P = 0.007$ ), poor concentration ( $P = 0.001$ ), poor academic performance ( $P = 0.028$ ), social withdrawal ( $P = 0.030$ ), and mood swing ( $P = 0.047$ ) between the two arms.

Table 3 represents the comparison of DASS-42 scores pre and post the intervention. Pre intervention, there were no statistically significant differences between the two arms ( $P > 0.05$ ). In contrast, post intervention, there

were statistically significant differences in depression ( $P = 0.009$ ), anxiety ( $P = 0.044$ ), and stress ( $P = 0.003$ ) between the two arms.

Table 4 shows the comparison of coping strategies used by the participants pre and post intervention. Pre intervention, there were no statistically significant differences between the two arms ( $p > 0.05$ ). Conversely, post intervention, there were statistically significant differences in ignoring pain ( $P \leq 0.001$ ), physical exercise ( $P \leq 0.001$ ), using home remedies ( $P = 0.047$ ), hot application ( $P = 0.013$ ), consulting a physician ( $P = 0.024$ ), and using herbs (0.021) between the two arms. There were no statistically significant differences ( $p > 0.05$ ) in self-medication and rest post intervention between the two arms.

**Table 1.** General characteristics and health condition of the participants

Variables	Intervention Arm (CBT) (n=58)	Non- Intervention Arm (n=58)	Test of Significance	P-value
Age (in years) <sup>†</sup>	19.89±1.37	19.94±1.19	-0.217	0.829
Residence (%) <sup>‡</sup>			0.173 <sup>§</sup>	0.836
Rural	41 (70.7)	43 (74.1)		
Urban	17 (29.3)	15 (25.9)		
Age at menarche (%) <sup>‡</sup>			0.321	0.852
< 13	14 (24.1)	1 (27.6)		
13 - < 15	32 (55.2)	29 (50)		
15-19	12 (20.7)	13 (22.4)		
History of the menstrual cycle (%) <sup>‡</sup>			0.875 <sup>§</sup>	0.227
Regular cycle	30 (51.7)	35 (60.3)		
Irregular cycle	28 (48.3)	23 (39.7)		
Menstrual flow (%) <sup>‡</sup>			0.929	0.629
Light	12 (20.7)	15 (25.9)		
Moderate	28 (48.3)	23 (39.7)		
Heavy	18 (31)	20 (34.5)		
Length of cycle (%) <sup>‡</sup>			0.586 <sup>§</sup>	0.238
< 21 days	38 (65.5)	34 (58.6)		
≥ 21 days	20 (34.5)	24 (41.4)		
Duration of menstruation (%) <sup>‡</sup>			0.841 <sup>§</sup>	0.246
< 3 days	14 (24.1)	10 (17.2)		
≥ 3 days	44 (75.9)	48 (82.8)		
Family history of dysmenorrhea (%) <sup>‡</sup>			0.035 <sup>§</sup>	0.5
Yes	27 (46.6)	26 (44.8)		
No	31 (53.4)	32 (55.2)		

<sup>†</sup>Variables expressed as Mean ± Standard Deviation, independent t-test.

<sup>‡</sup>Absolute number and (%), Pearson's chi-square test and Fisher's exact test.

<sup>§</sup>Fisher's exact test.

**Table 2.** Comparison of effects of primary dysmenorrhea on the participants pre and post the intervention

Variables	Pre the intervention				Post the intervention			
	Intervention Arm(CBT) (n=58)	Non-Intervention Arm (n=58)	Test of Significance	P	Intervention Arm(CBT) (n=58)	Non-Intervention Arm (n=58)	Test of Significance	P
<b>Pain intensity (%)<sup>‡</sup></b>								
Mild	10 (17.2)	7 (12.1)	0.651	0.722	25 (43.1)	6 (10.3)	15.978	≤0.001***
Moderate	30 (51.7)	31 (53.4)			22 (37.9)	33 (56.9)		
Severe	18 (31)	20 (34.5)			11 (19)	19 (32.8)		
<b>Pain duration (%)<sup>‡</sup></b>								
≤3 days	27 (46.6)	24 (41.4)	0.315 <sup>§</sup>	0.354	38 (65.5)	23 (39.7)	7.779 <sup>§</sup>	0.004**
> 3days	31 (53.4)	34 (58.6)			20 (34.5)	35 (60.3)		
<b>Restriction in physical activities (%)<sup>‡</sup></b>								
Yes	25 (43.1)	22 (37.9)	0.322 <sup>§</sup>	0.353	13 (22.4)	28 (48.3)	8.488 <sup>§</sup>	0.003**
No	33 (56.9)	36 (62.1)			45 (77.6)	30 (51.7)		
<b>Absenteeism (%)<sup>‡</sup></b>								
Yes	13 (22.4)	17 (29.3)	0.719 <sup>§</sup>	0.263	7 (12.1)	19 (32.8)	7.138 <sup>§</sup>	0.007**
No	45 (77.6)	41 (70.7)			51 (87.9)	39 (67.2)		
<b>Poor concentration (%)<sup>‡</sup></b>								
Yes	19 (32.8)	24 (41.4)	0.924 <sup>§</sup>	0.221	8 (13.8)	24 (41.4)	11.048 <sup>§</sup>	0.001**
No	39 (67.2)	34 (58.6)			50 (86.2)	34 (58.6)		
<b>Poor academic achievement (%)<sup>‡</sup></b>								
Yes	18 (31)	24 (41.4)	1.344 <sup>§</sup>	0.167	10 (17.2)	20 (34.5)	4.496 <sup>§</sup>	0.028*
No	40 (69)	34 (58.6)			48 (82.8)	38 (65.5)		
<b>Social withdrawal (%)<sup>‡</sup></b>								
Yes	21 (36.2)	20 (34.5)	0.038 <sup>§</sup>	0.5	11 (19)	21 (36.2)	4.315 <sup>§</sup>	0.030*
No	37 (63.8)	38 (65.5)			47 (81)	37 (63.8)		
<b>Mood swing (%)<sup>‡</sup></b>								
Yes	36 (62.1)	34 (58.6)	0.144 <sup>§</sup>	0.425	22 (37.9)	32 (55.2)	3.465 <sup>§</sup>	0.047*
No	22 (37.9)	24 (41.4)			36 (62.1)	26 (44.8)		

<sup>‡</sup> Absolute number and (%), Pearson’s chi-square test and Fisher’s exact test.

<sup>§</sup> Fisher’s exact test.

(\* , \*\* & \*\*\*) Significant difference compared to the reference category at ≤0.05, ≤0.01 & ≤0.001; respectively.

**Table 3.** Comparison of DASS-42 scores at before and after the intervention

Variables	Pre the Intervention				Post the intervention			
	Intervention Arm (CBT) (n=58)	Non-Intervention Arm (n=58)	Test of Significance	P	Intervention Arm(CBT) (n=58)	Non-Intervention Arm (n=58)	Test of Significance	P
<b>Depression (%)<sup>‡</sup></b>								
Normal	16 (27.6)	16 (27.6)	0.088	0.993	23 (39.7)	10 (17.2)	11.465	0.009**
Mild	12 (20.7)	13 (22.4)			19 (32.8)	17 (29.3)		
Moderate	19 (32.8)	19 (32.8)			14 (24.1)	22 (37.9)		
Severe	11 (19)	10 (17.2)			2 (3.4)	9 (15.5)		
<b>Anxiety (%)<sup>‡</sup></b>								
Normal	5 (8.6)	7 (12.1)	0.713	0.87	15 (25.9)	6 (10.3)	8.093	0.044*
Mild	14 (24.1)	16 (27.6)			23 (39.7)	20 (34.5)		
Moderate	26 (44.8)	24 (41.4)			15 (25.9)	19 (32.8)		
Severe	13 (22.4)	11 (19)			5 (8.6)	13 (22.4)		
<b>Stress (%)<sup>‡</sup></b>								
Normal	6 (10.3)	6 (10.3)	0.322	0.353	17 (29.3)	4 (6.9)	15.797	0.003**
Mild	14 (24.1)	14 (24.1)			9 (15.5)	15 (25.9)		
Moderate	14 (24.1)	13 (22.4)			20 (34.5)	14 (24.1)		
Severe	12 (20.7)	14 (24.1)			8 (13.8)	13 (22.4)		
Extremely severe	12 (20.7)	11 (19)			4 (6.9)	12 (20.7)		

<sup>‡</sup> Absolute number and (%), Pearson’s chi-square test.

(\* , \*\* & \*\*\*) Significant difference compared to the reference category at ≤0.05, ≤0.01 & ≤0.001; respectively.

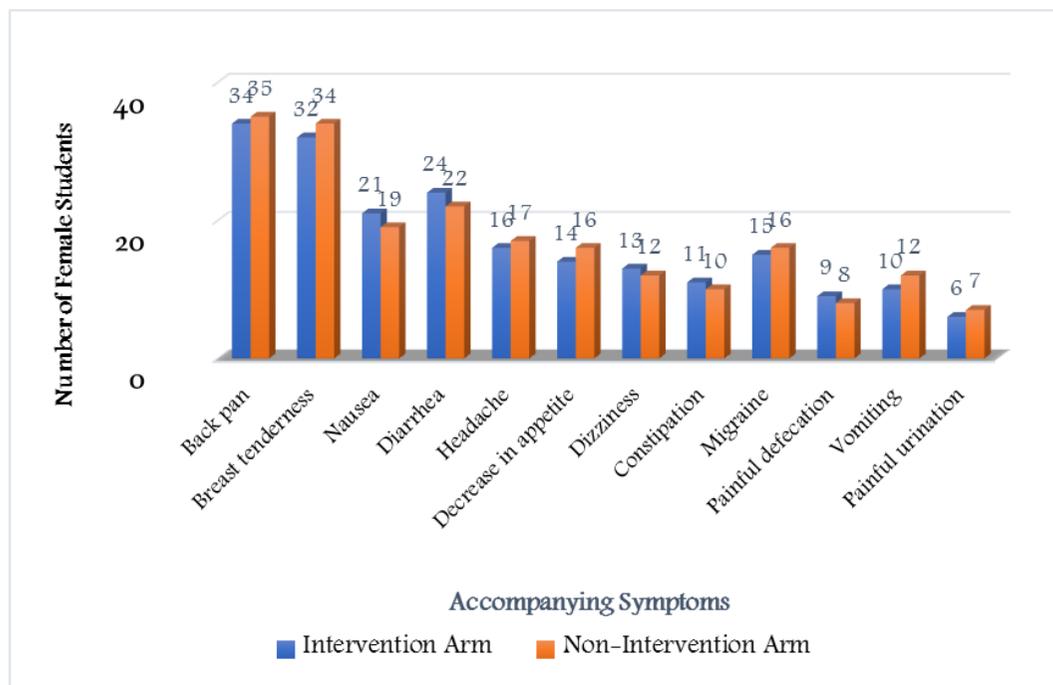


Figure 1. Accompanying symptoms of dysmenorrhea as reported by the participants pre the intervention

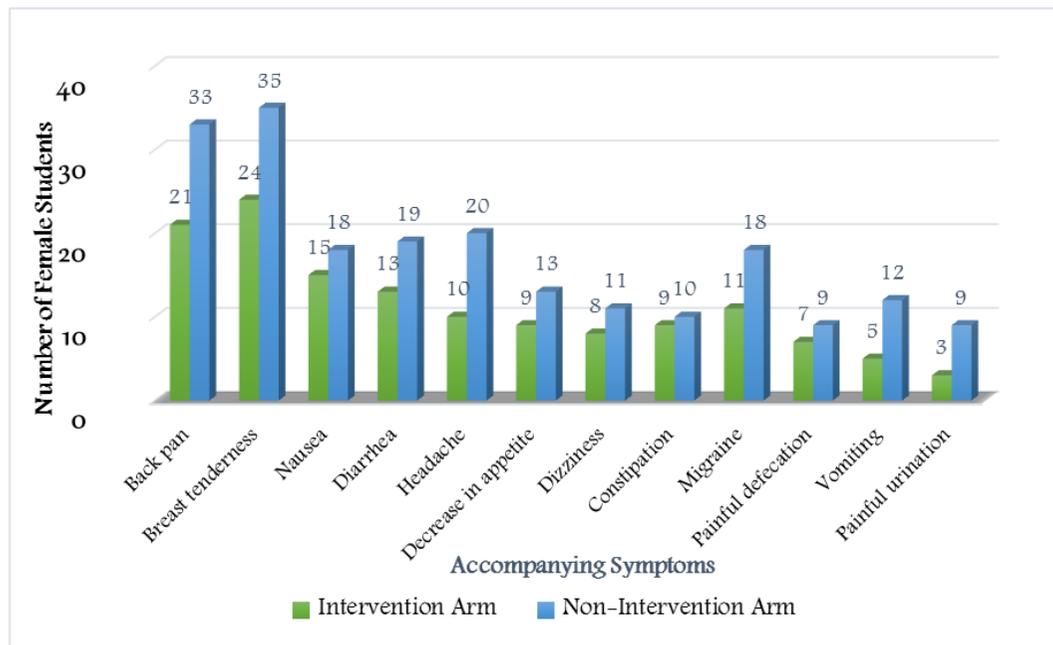


Figure 2. Accompanying symptoms of dysmenorrhea as reported by the participants post the intervention

**Table 4.** Comparison of coping strategies used by the participants pre and post the intervention

Variables	Pre the intervention			Post the intervention				
	Intervention Arm (CBT) (n=58)	Non-Intervention Arm (n=58)	Test of Significance	P	Intervention Arm (CBT) (n=58)	Non-Intervention Arm (n=58)	Test of Significance	P
<b>Ignoring pain (%)<sup>‡</sup></b>								
Yes	22 (37.9)	25 (43.1)	0.705 <sup>§</sup>	0.353	12 (20.7)	30 (51.7)	12.093 <sup>§</sup>	≤0.001***
No	36 (62.1)	33 (56.9)			46 (79.3)	28 (48.3)		
<b>Self-medication (%)<sup>‡</sup></b>								
Yes	39 (67.2)	32 (55.2)	0.253 <sup>§</sup>	0.126	38 (65.5)	31 (53.4)	1.753 <sup>§</sup>	0.128
No	19 (32.8)	26 (44.8)			20 (34.5)	27 (46.6)		
<b>Physical exercise (%)<sup>‡</sup></b>								
Yes	11 (19)	16 (27.6)	0.380 <sup>§</sup>	0.19	37 (63.8)	15 (25.9)	16.870 <sup>§</sup>	≤0.001***
No	47 (81)	42 (72.4)			21 (36.2)	43 (74.1)		
<b>Using home remedies (%)<sup>‡</sup></b>								
Yes	28 (48.3)	23 (39.7)	0.719 <sup>§</sup>	0.263	35 (60.3)	25 (43.1)	3.452 <sup>§</sup>	0.047**
No	30 (51.7)	35 (60.3)			23 (39.7)	33 (56.9)		
<b>Hot application (%)<sup>‡</sup></b>								
Yes	30 (51.7)	24 (41.4)	0.352 <sup>§</sup>	0.176	34 (58.6)	21 (36.24)	5.843 <sup>§</sup>	0.013*
No	28 (48.3)	34 (58.6)			24 (41.4)	37 (63.8)		
<b>Consult a physician (%)<sup>‡</sup></b>								
Yes	13 (22.4)	14 (24.1)	0.048 <sup>§</sup>	0.5	25 (43.1)	14 (24.1)	4.674 <sup>§</sup>	0.024*
No	45 (77.6)	44 (75.9)			33 (56.9)	44 (75.9)		
<b>Take a rest (%)<sup>‡</sup></b>								
Yes	47 (81)	43 (74.1)	0.505 <sup>§</sup>	0.252	49 (84.5)	43 (74.1)	1.891 <sup>§</sup>	0.126
No	11 (19)	15 (25.9)			9 (15.5)	15 (25.9)		
<b>Using herbs (%)<sup>‡</sup></b>								
Yes	37 (63.8)	32 (55.2)	0.450 <sup>§</sup>	0.225	46 (79.3)	35 (60.3)	4.951 <sup>§</sup>	0.021*
No	21 (36.2)	26 (44.8)			12 (20.7)	23 (39.7)		

<sup>‡</sup> Absolute number and (%), Pearson's chi-square test and Fisher's exact test.

<sup>§</sup> Fisher's exact test.

(\*, \*\* & \*\*\*) Significant difference compared to the reference category at ≤0.05, ≤0.01 & ≤0.001; respectively.

## Discussion

This study aimed to explore the effect of cognitive behavioral therapy on anxiety, stress, depression, achievement, and coping strategy among young females with (1ry) dysmenorrhea. The aim was achieved as the research hypotheses had been achieved through the current study finding.

Regarding general characteristics and health condition of the participants, the current study finding showed no statistically significant differences in the (nonintervention) control and (intervention)CBT groups. This result may be related to the similarity, same climate, socioeconomic status, and culture.

Regarding the effect of dysmenorrhea on the studied young female nursing students pre and post the intervention, the study revealed that there were highly statistically significant differences between pain intensity. This result may be related to hormonal fluctuations, which are thought to result from ovulation and hormonal fluctuations and (1ry) dysmenorrhea from increased production of prostaglandins, resulting in painful uterine contractions and

declined blood flow; however, pain has physical, emotional, or behavioral effects, which are thought to be derived from hormonal fluctuations and reflected on all aspects of student life, by the effect of CBT sessions on anxiety, depression, and stress on female nursing students, which affects the boy hormones and reflected on the pain level in the intervention group (CBT) (Sharghi et al., 2019).

Regarding poor concentration, restriction in physical activities also showed a significant difference in social withdrawal, mood swing, and poor academic achievement. These findings are in agreement with the studies of Orhan et al. (2018) & Armour et al. (2019), who reported that dysmenorrhea negatively influences academic achievement, absenteeism, class concentration, and participation in social activities. Furthermore, Abreu-Sánchez et al. (2020) reported that dysmenorrhea can have a significant impact on academic achievement. This result may be related to the effect of dysmenorrhea on quality of life, which potentially leads to negative consequences in many aspects of daily life, especially in university young female students, and also

shows that CBT sessions had a positive effect on enhancing tolerance to pain and attention, alertness, and concentration, participating in daily physical activities, decreasing withdrawal, and improving mood swing and academic achievement.

There was also an association between CBT and effect in psychological statuses (**Sahranavard et al., 2019**). This is in agreement with the present study's finding on the effect of CBT on DASS-42 scores. There was a significant and highly significant relationship in anxiety, depression, and stress between the studied groups before and after implementation of CBT sessions. This result was the main effect of CBT sessions on improving psychological status and decreasing the level of anxiety, depression, and stress.

Regarding accompanying symptoms of primary dysmenorrhea, there are various reported symptoms from the studied young female nursing students before the intervention, such as back pain, breast tenderness, diarrhea, nausea and migraine, painful urination and defecation, which were less reported from the studied sample. Moreover, most accompanying symptoms are improved after the intervention. These findings agree with those of **Bilir et al. (2020)**. This result shows that accompanying symptoms need a way to cope and manage discomfort so physical and psychological symptoms decrease in severity and their life duties are completed.

Concerning to coping mechanism regarding primary dysmenorrhea among studied young female nursing students pre and post intervention, the study revealed that there was a highly statistically significant difference about ignoring pain, hot application, using herbs, and performing physical exercise. Furthermore, the current study finding showed that more than two-fifths consulted a physician after the intervention compared to about one-fifth before the intervention in the CBT group and more than one-fifth of the control group. More than three-quarters did not ignore pain compared to the control group after the CBT sessions.

Additionally more than half of both two groups use self-medication. This finding may be because they need rapid solution and reduce

their feeling of dysmenorrhea. Approximately two-thirds can perform physical exercise compared to approximately one-quarter of the control group. The current study finding was not different from research results, which suggested that most young female nursing students with (1ry) dysmenorrhea do not consult a physician, who highlights that students frequently neglected or considered menstrual disorders as natural and do not seek a remedy but try to manage with them with temporary solutions or live with them. Conversely, the lack of consultation to a physician due to menstrual disorders also causes a delay in diagnoses for conditions underlying secondary dysmenorrhea, such as endometriosis (**Bilir, Yıldız, Yakin, and Ata, 2020**). The study finding may be due to the CBT sessions, which play a role in thinking and correct undesired behavior and reduce anxiety stress and provide some relaxation, facilitate performance of exercise that plays a role in reducing dysmenorrhea. Moreover, hot application, using herbs, and all these methods had positive effect physical, physiological, and psychological statuses. In the same line, **Osayande et al. (2014) & Acheampong et al. (2019)** reported that the epidemiological evidence suggests that dysmenorrhea occurs less often in those who exercise regularly.

Finally, the study finding diverts our attention to natural technique that helps in reducing undesired impact from primary dysmenorrhea from pain intensity, poor concentration, restriction in physical activities, social withdrawal, mood swing & decreased academic achievement and coping mechanism with primary dysmenorrhea.

### **Conclusion**

In light of the study finding, CBT had a positive effect on pain intensity, poor concentration, restriction in physical activities, social withdrawal, mood swing, and poor academic achievement. Moreover, there was significant change in depression, anxiety, stress, and coping mechanism in primary dysmenorrhea.

### **Recommendations**

- Stress about importance of CBT sessions had a positive effect on psychological status.

- Educational sessions for young female nursing students can be an efficient method to increase awareness and prevent delays in diagnosis.
- **Further Study:** Applying CBT on secondary dysmenorrhea

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