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The effect of mindfulness-based psychoeducation on automatic thinking, pain beliefs, and pain coping of nursing students with dysmenorrhea: a quasi-experimental study

Arzu Yüksel[1], Emel Bahadır-Yılmaz[2], İlknur Gökşin[3]

[1]*Department of Psychiatric Nursing, Faculty of Health Sciences, Aksaray University, Aksaray, Turkey*
[2]*Department of Psychiatric Nursing, Faculty of Health Sciences, Giresun University, Giresun, Turkey*
[3]*Department of Gynaecology & Obstetrics Nursing, Faculty of Health Sciences, Aksaray University, Aksaray, Turkey*

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Corresponding author:
Emel Bahadır-Yılmaz.
E-mail: ebahadiryilmaz@yahoo.com.
ORCID: 0000-0003-1785-3539.

Abstract

Aim: Dysmenorrhea has a high prevalence among university students and affects important aspects of daily activity, psychological health, quality of life, and academic performance. This study aimed to evaluate the effect of mindfulness-based psychoeducation program on automatic thinking, pain beliefs and coping of nursing students with dysmenorrhea.

Material and methods: This study was a quasi-experimental study using a nonrandomized control group pretest and posttest design. The study included 72 nursing students with primary dysmenorrhea. The experimental group received psychoeducation for 75 minutes per week for nine sessions. Data were collected using the Automatic Thoughts Questionnaire, Pain Beliefs Questionnaire, and Pain Coping Inventory.

Results: The automatic thinking, organic pain beliefs, and passive pain coping total scores in the experimental group significantly decreased after program compared with those in the control group ($p < 0.05$). Moreover, there was a significant increase in psychological pain beliefs and active pain coping total scores in the experimental group ($p < 0.05$).

Conclusions: These findings indicate that the program was effective in addressing automatic thinking, pain beliefs and coping of nursing students with dysmenorrhea. The mindfulness-based psychoeducation program can be easily applied to students suffering from dysmenorrhea.

Keywords: dysmenorrhea, mindfulness, psychoeducation, automatic thinking, pain beliefs, pain coping.

Introduction

Dysmenorrhea is the painful cramps of uterine origin that occur during menstruation; it is a common cause of pelvic pain and menstrual disorder [1]. It occurs as primary and secondary. Primary dysmenorrhea generally appears in women under 20 years old and is a painful uterine contraction caused by endometrial laceration. However, there is pathology in secondary dysmenorrhea, and it is a common problem among those over 20 years [2]. It usually comes with several physical symptoms such as headache, dizziness, fatigue, diarrhea, cramps, and sweating [3]. The most typical symptom is painful involuntary contraction and often accompanying symptoms such as backache, nausea, vomiting, and diarrhea [4].

Dysmenorrhea has a high prevalence (61.2%-85.1%) among university students and affects important aspects of daily activity, psychological health, quality of life, and academic performance [5-8]. Female university students in Ethiopia reported school absence, lack of interest in class, lack of attention, unwillingness to participate in an activity involving physical exertion and group activities, and loss of motivation for homework [9]. Turkish university students reported that they had difficulty attending classes, had low concentration, and did not continue their daily life activities [10].

Primary dysmenorrhea prevalence in nursing students in Turkey was 94%, and severe primary dysmenorrhea was high among students who used medication for pain, used complementary and alternative treatments, had other accompanying symptoms, and had a family history of painful menstruation [11]. In another study, 67.7% of Turkish nursing students experienced dysmenorrhea and severity of pain was 9.07 ± 3.42 [12]. Karabulutlu [13] reported that 86.4% of nursing students had dysmenorrhea, and it was associated with family history.

Nursing students experienced physical or mental features that worsen the pain severity, such as dizziness, gastrointestinal system complaints, worry, exhaustion, fatigue, distension, idleness, anorexia, musculoskeletal system pain, and recurrent throbbing headaches [14]. Al-Zahrani et al. [15] revealed that dysmenorrhea had negatively affected nursing students' academic performances, such as absenteeism from school, loss of concentration, and inability to fulfill school-related responsibilities and participate in social life. Turkish midwifery students experienced problems with family, school, and social life and problems with school attendance and exams due to dysmenorrhea [16].

Şahin et al. [17] determined that university students coping with dysmenorrhea preferred hot application to the feet, rest/sleep, analgesics, hot bath, health institution application, and physical activity. According to Karabulutlu [13], Turkish nursing students preferred resting, hot bathing, applying a heat pack to the abdomen, walking, taking analgesics, listening to music, and exercising. As can be seen, students mostly use physical methods to cope with dysmenorrhea. However, psychosocial interventions may be beneficial as pain has a psychosocial dimension. This study aimed to determine the effect of mindfulness-based psychoeducation program (MBPP) on automatic thinking, pain beliefs, and pain management of nursing students with dysmenorrhea.

Material and methods

Design

This quasi-experimental study with a nonrandomized control group was performed in February and May 2019.

Setting and Sample

The study population consisted of 243 nursing students registered in the nursing department at a state university in Turkey. Purposive sampling method was used and students with primary dysmenorrhea were included in the study. Inclusion criteria for the study were nursing students who volunteered to participate and experienced primary dysmenorrhea. The exclusion criterion was to participate previously in a mindfulness-based or psychoeducation program. It was determined that 164 students had primary dysmenorrhea. The inclusion criteria for primary dysmenorrhea were: 1) Onset of pain within 6–12 hours after menstruation, and 2) Menstrual pain accompanied by pain such as waist, leg, and abdominal pain [18].

The sample size of the study was 52, with a 0.80 effect size, 0.80 power, and 0.05 type margin of error. Of students, 72 were included in the study, and 36 students each for the experimental group (EG) and control group (CG) were selected. After the data for the study was collected, post hoc power analysis was performed in the G*Power 3.1.9.7 software. In this study, when the mean scores obtained from the Automatic Thoughts Questionnaire were entered, the alpha value was 0.05, the theoretical power was 95%, and the effect size was 0.7. Students who wanted to participate in psychoeducation were included in the experimental group. Those who did not want to participate in psychoeducation were assigned to the control group.

Instruments

Student information form (SIF)

The SIF which was developed by the researchers in line with the literature [11-16]. It consisted of ten questions including the sociodemographic characteristics of the students, such as age, residence place, perceived economic status, chronic disease presence, smoking and alcohol use, regular eating habits, social activity status, body weight, and height.

Automatic thoughts questionnaire (ATQ)

The ATQ was developed by Hollon and Hollon [19] and adapted into Turkish by Aydın and Aydın [20]. It was a five-point Likert-type scale and it consisted of 30 items. It was scored from "all the time = 5" to "not at all = 1," and scores from the scale varied between 30 and 150 [19]. A high score indicated more frequent negative thoughts. The Cronbach alpha of the scale in original study was 0.93 [20]. In this study, the Cronbach alpha values were 0.96 (pretest) and 0.98 (posttest).

Pain beliefs questionnaire (PBQ)

The PBQ was developed by Edwards et al. [21] and adapted into Turkish by Sertel-Berk [22]. It was a six-point Likert scale that was scored as "6 = always" to "1 = never," but the subscale scores were calculated from the organic belief subscale (OBS) and psychological belief subscale (PBS) [21]. There are no cut-off values for the scores, but the higher subscores indicate the high pain beliefs, respectively. The Cronbach alpha coefficients were 0.71 for the PBS and 0.64 for the OBS [22]. In this study, the Cronbach alpha coefficients were 0.81 (pretest) and 0.72 (posttest) for the PBS and 0.63 (pretest) and 0.82 (posttest) for the OBS.

Pain coping inventory (PCI)

The PCI was developed by Kraaimaat and Evers [23] and adapted into Turkish by Hocaoglu et al. [24]. It had two subscales: active coping (ACS) and passive coping (PCS) [23]. The scale consisted of 22 items and was scored from "1 = never" to "4 = frequently." The Cronbach alpha coefficient for internal consistency reliability in the original study was between 0.53 and 0.77 [24]. In this study, the Cronbach alpha coefficients were 0.85 (pretest) and 0.86 (posttest) for ACS and 0.81 (pretest) and 0.82 (posttest) for PCS.

Data Collection and Procedure

The study was conducted from February 25, 2019, to May 3, 2019. Intervention and control groups were created. A mindfulness-based psychoeducation program (MBPP) consisting of nine sessions was applied to the intervention

group. The MBPP comprised weekly sessions and each session lasted about 75 minutes. Participants practiced mindfulness exercises together with the first author. Table 1 shows the titles and contents of the sessions. Figure 1 shows the flow diagram of the data collection and procedure. First author conducted the sessions. She had a PhD in psychiatric nursing and certifications in cognitive-behavioral therapy and mindfulness.

Table 1 The content of mindfulness-based psychoeducation program

Session 1:	Providing information about the program, applying pre-tests, and discuss-ing the concept of mindfulness.
Session 2:	Explaining the cognitive model (relationship between emotion, thought and behavior).
Session 3:	Breath awareness and determining the cognitive distortions.
Session 4:	Breath anchor meditation and awareness concept.
Session 5:	Compassionate acceptance meditation, mountain meditation and pleasure treasure meditation.
Session 6:	Body scan meditation, developing new perspectives and valuing "mo-ments" in daily life.
Session 7:	Silence day (practice all meditations without speaking at all).
Session 8:	Awareness kit and self-letter writing activity.
Session 9:	Assessment, receiving feedback about the program, and applying post-tests.

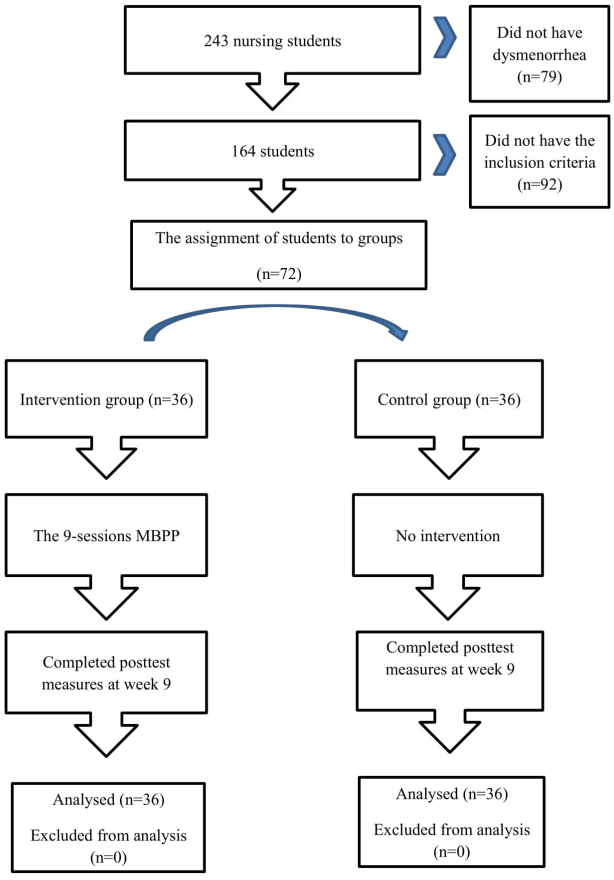

Figure 1 – The flow diagram of the data collection and procedure

Data Analysis

The study data were analyzed using the SPSS 24 package program. Descriptive statistics were used to analyze the descriptive characteristics of the students. The distribution of the data was evaluated with the Shapiro-Wilk test. The chi-square test was used to compare the descriptive characteristics of the groups, and the Mann–Whitney U test was used to compare automatic thoughts, pain beliefs and pain coping scores between the groups. Bonferroni-corrected Wilcoxon signed-rank test was used to compare the mean scores of the scales in the group. An alpha value of 0.05 was considered statistically significant.

Ethics Approval

Written approvals were obtained from the Department of Nursing and the University Human Research Ethics Committee (No: 2019/65). The students were informed about the research and their written consent for participating voluntarily was obtained. All principles of the Helsinki Declaration were followed. There is no conflict of interest with the students and that participating or not participating in the study has no positive or negative impact on course grades.

Results

The average ages for the EG and CG were 21.38 ± 1.39 and 21.38 ± 1.07 years, respectively (Table 2). When the groups were compared, there was no difference according to descriptive characteristics, such as age, residence place, perceived economic status, chronic disease presence, smoking, alcohol use, regular eating habits, social activity status, sporting status, body weight, and height ($p > 0.05$).

Table 2 The sociodemographic characteristics of the students

Characteristics		Experimental Group (n=36)		Control Group (n=36)		t/p value
		n	%	n	%	
Place of residence	City	22	61.1	22	61.2	$x^2 = 0.583$ $p = 0.747$
	Town	9	25.0	7	19.4	
	Village	5	13.9	7	19.4	
Perceived economic status	High	6	16.7	6	16.7	$x^2 = 0.480$ $p = 0.787$
	Moderate	26	72.2	24	66.6	
	Low	4	11.1	6	16.7	
Chronic disease	Yes	3	8.3	4	11.1	$x^2 = 0.158$ $p = 0.691$
	No	33	91.7	32	88.9	
Smoking	Yes	5	13.9	6	16.7	$x^2 = 0.107$ $p = 0.743$
	No	31	86.1	30	83.3	
Alcohol use	Yes	0	0.0	2	5.6	$x^2 = 2.057$ $p = 0.151$
	No	36	100.0	34	94.4	
Regular eating habits	Yes	22	61.1	17	47.2	$x^2 = 1.399$ $p = 0.237$
	No	14	38.9	19	52.8	
Social activity status	Yes	13	36.1	15	41.7	$x^2 = 0.234$ $p = 0.629$
		23	63.9	21	58.3	
Sporting status	Yes	4	11.1	9	25.0	$x^2 = 2.347$ $p = 0.126$
	No	32	88.9	27	75.0	
Body weight	42-52 kg	12	33.3	11	30.6	$x^2 = 2.735$ $p = 0.603$
	53-63 kg	20	55.6	21	58.3	
	64-74 kg	2	5.6	4	11.1	
	75-85 kg	1	2.8	0	0.0	
	≥ 86 kg	1	2.8	0	0.0	
Height	1.50-1.60 cm	15	41.7	8	22.2	$x^2 = 3.785$ $p = 0.151$
	1.61-1.71 cm	18	50.0	26	72.2	
	≥ 1.71 cm	3	8.3	2	5.6	
Age (mean ± SD)		21.38 ± 1.39		21.38 ± 1.07		$x^2 = 4.100$ $p = 0.535$

SD: Standard deviation. x^2= The chi-square test

Table 3 compares the mean pretest and posttest scores of the EG and CG in the ATQ, OBS, PBS, ACS, and PCS categories.

Table 3 The pre-test and post-test mean scores of ATQ, OBS, PBS, ACS and PCS of the experimental and control groups

Scales		Experimental Group (n=36) Mean±SD	Control Group (n=36) Mean±SD	t/p value
ATQ	Pre-test	56.25 ± 19.08	54.86 ± 18.90	z = -0.344 p = 0.731
	Post-test	41.19 ± 10.78	55.63 ± 23.72	z = -2.654 p = 0.008
	t/p value	z = -4.472 p = 0.000	z = -0.346 p = 0.729	
OBS	Pre-test	3.47 ± 0.58	3.30 ± 0.55	z = -1.101 p = 0.271
	Post-test	2.63 ± 0.66	3.53 ± 0.71	z = -4.796 p = 0.000
	t/p value	z = -4.543 p = 0.000	z = -1.525 p = 0.127	
PBS	Pre-test	4.38 ± 0.66	4.39 ± 0.92	z = -0.351 p = 0.725
	Post-test	4.85 ± 0.27	4.41 ± 0.67	z = -2.794 p = 0.005
	t/p value	z = -3.748 p = 0.000	z = -0.207 p = 0.836	
ACS	Pre-test	2.24 ± 0.60	2.43 ± 0.58	z = -1.701 p = 0.089
	Post-test	2.97 ± 0.60	2.40 ± 0.48	z = -3.878 p = 0.000
	t/p value	z = -4.700 p = 0.000	z = -0.054 p = 0.957	
PCS	Pre-test	2.57 ± 0.46	2.47 ± 0.38	z = -0.926 p = 0.355
	Post-test	2.23 ± 0.40	2.61 ± 0.47	z = -3.638 p = 0.000
	t/p value	z = -3.426 p = 0.000	z = -1.871 p = 0.061	

SD: Standard deviation. ATQ= Automatic thoughts questionnaire, OBS= organic belief subscale, PBS= psychological belief subscale, ACS= active coping subscale, and PCS= passive coping subscale.

The pretest ATQ mean score did not differ significantly between the EG (56.25 ± 19.08) and CG (54.86 ± 18.90; $p > 0.05$). However, the posttest ATQ mean score of the EG (41.19 ± 10.78) was statistically lower than that of the CG (55.63 ± 23.72; $p < 0.05$). In this study, the average ATQ scores of students were 56.25 ± 19.08 at the beginning and 41.19 ± 10.78 at the end of MBPP. The difference between the pretest and posttest score averages was significant ($p < 0.05$).

The pretest mean scores of OBS and PBS did not differ significantly between the EG and CG ($p > 0.05$). But the posttest OBS mean score of the EG (2.63 ± 0.66) was statistically lower than that of the CG (3.53 ± 0.71; $p < 0.05$). Also, the posttest PBS mean score of the EG (4.85 ± 0.27) was statistically higher than that of the CG (4.41 ± 0.67; $p < 0.05$). In the study, the OBS average scores of students were 3.47 ± 0.58 at the beginning of MBPP and 2.63 ± 0.66 at the posttest. The PBS average scores of students were 4.38 ± 0.66 for the pretest and 4.85 ± 0.27 for the posttest. The difference between the two score averages in the EG was statistically significant ($p < 0.05$).

According to Table 3, the pretest mean scores of ACS and PCS did not differ significantly between the EG and CG ($p > 0.05$). But the posttest ACS mean score of the EG (2.97 ± 0.60) was statistically higher than that of the CG (2.40 ± 0.48; $p < 0.05$). Also, the posttest PCS mean score of the EG (2.23 ± 0.40) was statistically lower than that of the CG (2.61 ± 0.47; $p < 0.05$).

In the study, the ACS average scores of students in the EG were 2.24 ± 0.60 at the beginning of MBPP and 2.97 ± 0.60 at the end. The PCS average scores of students were 2.57 ± 0.46 for the pretest and 2.23 ± 0.40 for the posttest. The difference between the two score averages was statistically significant ($p < 0.05$).

Discussion

This study aimed to determine the effect of mindfulness-based psychoeducation program (MBPP) on automatic thinking, pain beliefs, and pain management of nursing students with dysmenorrhea. Dysmenorrhea is a very common health problem in university students and affects their social life as well as their academic success [11-16]. Yılmaz and Şahin [25] applied a cognitive-behavioral approach to support students with dysmenorrhea and found that primary dysmenorrhea symptoms, pain levels, and analgesic use decreased after the program. Kırca and Sis Çelik [26] also applied a yoga program to students with dysmenorrhea and found that menstrual pain decreased after the program. Hassan et al. [27] applied cognitive-behavioral therapy to students with dysmenorrhea and found that the program was effective on depression, anxiety, stress, and coping strategies. In this study, mindfulness-based psychoeducation, including the cognitive-behavioral approach, was applied and after the program, the students' automatic thoughts decreased, and their pain beliefs and pain management improved positively.

The study found that automatic thinking in nursing students decreased after MBPP. They had a lower level of negative thoughts after than before the program. Similarly, nursing students' scores of automatic thoughts were significantly lower at the end of a 12-session cognitive-behavioral group counseling program [28]. Also, psychoeducation based on a cognitive-behavioral approach did not show significant differences between the intervention group and CG in depressive thoughts among nursing and midwifery students with premenstrual syndrome symptoms [29]. In this study, psychoeducation intervention was effective on automatic thoughts. Also, psychoeducation was based on both mindfulness and some cognitive behavioral therapy-based interventions. Like this study, another study found that mindfulness training decreased significantly automatic thoughts in female students [30].

Elvery et al. [31] found that pain catastrophizing, mindfulness, and pain acceptance were related in undergraduate students reporting chronic or intermittent pain. Considering this information, the present study found that MBPP showed significant differences between the intervention group and CG in the organic and psychological pain beliefs. After MBPP, passive pain coping in nursing students decreased and active pain coping increased. Similar to this study, Payne et al. [32] evaluated the effect of a mind–body intervention on young adult women with primary dysmenorrhea. After the intervention, participants reported significantly lower menstrual pain and pain catastrophizing improved over time. Ball et al. [33] reported the most important effect of mindfulness meditation on affective pain and sensory pain in individuals with chronic pain.

Başoğul et al. [29] carried out a 5-week psychoeducation for female nursing and midwifery students. The psychoeducation reduced fatigue and anger levels but not in pain. Asgari et al. [34] improved a protocol of 3-week psychoeducational intervention based on a self-regulation model. They aimed to cope with dysmenorrhea pain and menstrual distress but did not yet explain the outcomes of the intervention. Borji-Navan et al. [35] found that cognitive-behavioral therapy decreased premenstrual

syndrome symptoms and increased perimenstrual quality of life of university students.

As can be seen, in these studies, either mindfulness-based practice or cognitive-behavioral theory-based psychoeducation were applied. Moreover, different results were obtained. For this study, we can say that this is the first study in which MBPP was applied to nursing students with dysmenorrhea. This program was found to be effective on pain coping with both automatic thoughts and pain beliefs.

There are several strengths and limitations. The most important strength of this study is that it is one of the limited number of studies in which mindfulness-based psychoeducation was applied. It has brought a valuable application to the field by positively affecting students' automatic thoughts, pain beliefs and pain coping. The effectiveness of the MBPP was evaluated in a small sample size. The study had a lack of follow-up measurements and the lack of randomization. Data collection tools based on self-report were also used.

Conclusion

The mindfulness-based psychoeducation program was effective on the automatic thoughts, pain beliefs, and coping with pain of students with dysmenorrhea. It increased psychological pain beliefs and active pain coping in nursing students with dysmenorrhea. Nursing students' automatic thinking, organic pain beliefs, and passive pain coping levels decreased after the program.

The mindfulness-based psychoeducation program should be implemented with the goal of improving the automatic thoughts, pain beliefs and pain coping of students with primary dysmenorrhea. The mindfulness-based psychoeducation practices, such as giving information about mindfulness, understanding relationship between emotion, thought and behavior, improving breath awareness, and determining the cognitive distortions can be useful in decreasing negative pain beliefs and passive pain coping strategies. Psychiatric nurses should apply the randomized controlled mindfulness-based interventions and assess their effects on cognitive distortions and pain coping. They should monitor the effects of a longer-term MBPP on physiological and psychological symptoms of dysmenorrhea.

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