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The Effects of Diaphragmatic Breathing Exercise on Hot Flashes in Menopausal Women during the COVID-19 Pandemic Period: A Randomized Controlled Trial

COVID-19 Pandemi Sürecinde Menopozal Dönemdeki Kadınlarda Diyafram Nefes Egzersizinin Sıcak Basmasına Etkisi: Randomize Kontrollü Bir Çalışma

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ABSTRACT

Vasomotor symptoms are the most common problem during the menopausal period. This study investigated the effects of diaphragmatic breathing exercises on hot flashes in menopausal Turkish women during the COVID-19 pandemic period. The study was carried out as a randomized controlled trial with the participation of menopausal women aged 45-60 years in eastern Türkiye. A total of 68 women formed two groups, 34 in each group. A Descriptive Characteristics Form and the Hot Flash-Related Daily Interference Scale were used to collect study data.The results of the study showed that the menopause period in most women was between one and five years. The participants stated that the COVID-19 pandemic period increased the frequency of their menopausal hot flashes to a statistically significant extent. While there was a statistically significant difference ($p<0.05$) in the mean scale scores for the experimental group before and after the experiment, there was no significant difference in the control group ($p>0.05$). In this study, considering the group parameters, the standardization of the difference between the averages was calculated as 0.6976. This significant result has a medium effect size. The diaphragmatic breathing exercises in this study were found to reduce hot flashes complaints during the menopausal period.

Keywords: COVID-19, Diaphragmatic Breathing Exercise, Hot Flashes, Menopausal Period

ÖZ

Menopozal dönemdeki en yaygın problem vasomotor semptomlardır. Bu çalışmanın amacı COVID-19 pandemi sürecinde menopozal dönemdeki kadınlarda diyafram nefes egzersizinin sıcak basmasına etkisinin araştırılmasıdır. Bu çalışma Türkiye'nin doğu bölgesindeki 45-60 yaşları arasındaki menopozal dönemdeki kadınlarla randomize kontrollü olarak yürütülmüştür. Toplamda 68 kadın ile 34 kişilik 2 grup oluşturulmuştur. Tanımlayıcı Özellikler Formu ve Menopoza Özgü Sıcak Basması Ölçeği ile veri toplanmıştır. Araştırmanın sonuçlarına göre kadınlar çoğunlukla bir ile beş yıldır menopozal dönemde olduğu belirlenmiştir. Kadınlar, COVID-19 pandemi döneminde sıcak basma şikayetlerinin sıklığını istatistiksel olarak anlamlı ölçüde arttığını belirtmişlerdir. Deney grubu için nefes egzersizi öncesi ve sonrası ölçek puan ortalamaları arasında istatistiksel olarak anlamlı fark bulunurken ($p<0,05$), kontrol grubunda anlamlı bir fark saptanamamıştır ($p>0,05$). Bu çalışmada grup parametreleri dikkate alınarak ortalamalar arasındaki farkın standardizasyonu 0,6976 olarak hesaplanmıştır. Bu anlamlı sonuç orta etki büyüklüğüne sahiptir Bu çalışmada diyafragmatik solunum egzersizlerinin menopozal döneminde sıcak basması şikayetlerini azalttığı saptanmıştır.

Anahtar kelimeler: COVID-19, Diyafram Nefes Egzersizi, Menoposal Dönem, Sıcak Basması

The approval for conducting the study was obtained from the İstanbul Medipol University Ethics Committee (approval number: 10840098-772.02-E.62969), and permission was obtained from the Turkish Ministry of Health General Directorate of Health Services before the commencement of the study

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INTRODUCTION

Menopause is experienced by 1.5 million women worldwide each year, and menopausal women experience vasomotor symptoms, insomnia, decreased libido, vaginal dryness, fatigue, and joint pain. These symptoms are associated with hormonal changes during menopause. Vasomotor symptoms (hot flashes, night sweats, facial flushing) are the most frequently experienced symptoms affecting most women during the progression of the menopausal period, although their severity, frequency, and duration vary widely. It has been reported that up to 85% of women feel hot flashes. Besides, approximately 55% of women were found to experience hot flashes with the onset of menstrual irregularity. [1-3] Hot flashes can occur spontaneously in the day or night, and many common factors can trigger them, such as embarrassment, sudden change in ambient temperature, stress, alcohol, caffeine, or a hot drink. They usually last between 30 seconds and five minutes and vary in frequency between one and fifty attacks per day.[4]

There is an increasing focus on the development and evaluation of non-pharmacological and non-hormonal therapies for vasomotor symptoms.[5] One of the non-pharmacological methods of dealing with hot flashes in the menopausal period is diaphragmatic breathing exercises. Diaphragmatic breathing is performed by contracting the diaphragm, a muscle located horizontally between the thoracic and abdominal cavities.[6,7] Breathing exercises reduce anxiety and stress by causing the autonomic nervous system to relax. [8] It has been stated in the literature that breathing exercises reduce anxiety levels, help anger management, lower blood pressure, improve immunity, and decrease the severity of stress and hot flashes.[9]

The COVID-19 pandemic, which has taken hold of the whole world, affects the lives of people of all ages in all aspects. Moreover, middle-aged women have been determined to feel lonelier and more anxious than men in the pandemic period.[10-12] It has been emphasized that in the COVID-19 pandemic period, women are more vulnerable than men, their loneliness levels increase, and their levels of spiritual well-being decrease.[13] When women face a stressor, they may need more social support.[10]

Besides, stress seems to trigger menopausal symptoms, especially hot flashes.[14] In the literature review, no previous study on coping with hot flashes in menopausal women during the COVID-19 pandemic period was encountered.

In this context, this study aims to determine the effects of diaphragmatic breathing exercises on hot flashes in menopausal Turkish women during the COVID-19 pandemic period

MATERIALS AND METHODS

Setting and sample of the study

This study is a randomized controlled trial which complied with the items of the consolidated standards of reporting trials (CONSORT) checklist (Figure 1). This randomized controlled trial was carried out with the participation of Turkish-speaking menopausal women aged 45-60 with no communication problems or psychological disorders, who presented to a hospital in eastern Türkiye between November 2020 and February 2021. A power analysis was performed to determine the number of participants to be included in each group in the study. The power of the study was calculated in the G*Power 3.1.9.7 program. By accepting alpha = 0.05 and power (1-ß) = 0.80, a total of 68 participants were included in the study, with 34 participants in either group. Randomization was achieved by the random-allocation method with sealed, opaque envelopes. After informing the women who presented to the hospital's internal medicine clinic on the study and getting their voluntary approval, they were included in the

experimental group or the control group according to the random envelope allocation process.

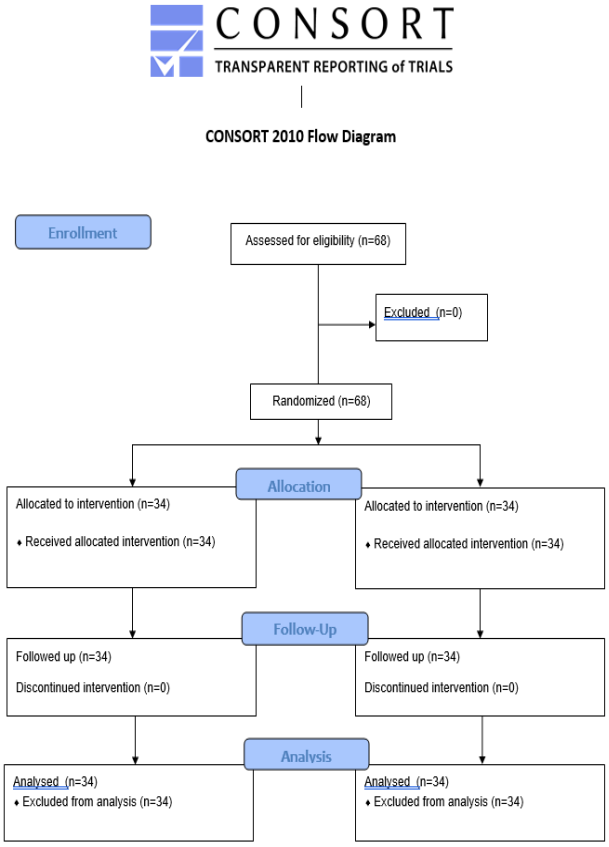

Figure 1. CONSORT Flow Diagram

Data collection

A Descriptive Characteristics Form and the Hot Flash-Related Daily Interference Scale (HFRDIS) were used to collect the data. The Descriptive Characteristics Form that was created by the authors included questions about the sociodemographic and gynecological characteristics of the participants. HFRDIS, which was developed by Carpenter in 2001, describes how hot flashes have affected certain aspects of life over the past two weeks. The scale's Cronbach's alpha value was reported as 0.902. It is a single-factor, 10-item, 11-point Likert-type scale (0 = Not at all affected, 10 = Extremely affected). The scale score is determined by adding the scores of each item. High scores indicate that hot flashes highly affect the quality of life of the person. The 10-item scale's first nine items evaluate the effects of hot flashes on nine particular life activities, and the tenth item assesses their influence on the general quality of life.[4,15] In this study, Cronbach's alpha value of the scale was found 0.830.

Procedure

First, the Descriptive Characteristics Form and HFRDIS were applied to the women in both groups. Then, the researcher (author) informed and trained the experimental group about the diaphragmatic breathing exercises and gave each participant a booklet about the method. The participants in the experimental group were instructed to exercise diaphragmatic breathing twice a day for ten minutes for four weeks whenever they felt hot flashes during the day. Every week, the participants were telephoned and conversed about the diaphragmatic breathing exercises, and developments were observed in the practices. At the end of four weeks, HFRDIS was applied again. No intervention was made in the control group, and the participants in the control group were asked to continue their daily lives. At the end of four weeks, the participants were administered HFRDIS by phone, and the booklet describing the diaphragmatic breathing exercises prepared for the experimental group was sent to them via e-mail or regular mail to their addresses.

Diaphragmatic breathing exercises

The person lies flat on their back on the floor or in bed, their knees bent, and their head supported. A pillow can be used under the knees to reinforce the legs. One hand is placed on the upper part of the chest, and the other is placed below the rib cage. This posture will allow the person to feel the diaphragmatic movement as breathing. The person slowly breathes through the nose so that the hand above the stomach moves upward. The hand on the chest should remain as still as possible. The hand on top of the stomach descends while exhaling by puckering the lips. The breath is exhaled through the pursed mouth within a time twice as long as the time of inhaling with the nose.[16,17]

Data analysis

The data were analyzed using the SPSS (Statistical Package for the Social Sciences, USA) version 23.0 program. The Shapiro–

Wilk test was used to find out whether the data were normally distributed. Other statistical analyses included Chi-squared tests, the Mann-Whitney U test, and the Wilcoxon signed-rank test.

Ethical considerations

The approval for conducting the study was obtained from the Istanbul Medipol University Ethics Committee (approval number: 10840098-772.02-E.62969), and permission was obtained from the Turkish Ministry of Health General Directorate of Health Services before the commencement of the study. After informing the women about the experiment, those who agreed to participate and read and signed the consent forms prepared specially for each group were included in the study. The study was conducted in compliance with the "ethical principles for medical research involving human participants" of the Declaration of Helsinki.

Limitations: Due to the ongoing COVID-19 pandemic, this study was conducted remotely. As some women did not use technology to the desired extent, and due to internet access limitations, online video calls with women could not be held. Another limitation of our study was that the diaphragmatic breathing exercise method was not compared to other techniques

RESULTS AND DISCUSSION

Table 1. Intergroup comparisons of the descriptive characteristics of the participants in the experimental and control groups

Descriptive Characteristics	Experimental Group (n=34)		Control Group (n=34)		Test and p-value
	n	%	n	%	
Age					
46-50 years old	10	29.4	5	14.7	χ^2=2.754
51-55 years old	15	44.1	15	44.1	p =0.252
56-60 years old	9	26.5	14	41.2	
Educational Level					
Primary Education	10	29.4	14	41.2	χ^2=3.060
Secondary Education	13	38.2	15	44.1	p=0.217
University	11	32.4	5	14.7	
Working					
Yes	9	26.5	10	51.3	χ^2=0.073
No	25	73.5	24	48.7	p=0.787
Marital Status					
Married	30	88.2	31	91.2	χ^2=0.159
Single	4	11.8	3	8.8	p=0.690
Income Status					
Income less than expenses	18	61.8	21	52.9	χ^2=0.659
Income equivalent to expenses	12	26.4	9	35.3	p=0.719
Income more than expenses	4	11.8	4	11.8	
Duration of Menopausal Period					
1-5 years	26	76.5	21	61.8	χ^2=1.722
6-10 years	8	23.5	13	38.2	p=0.189
Smoking					
Yes	4	11.8	5	14.7	χ^2=0.128
No	30	88.2	29	85.3	p=0.720
Do hot flashes affect your daily activities?					
Yes	18	52.9	13	38.2	χ^2=1.482
No	16	47.1	21	61.8	p=0.223
Did the COVID-19 pandemic period cause a change in the frequency of your menopausal hot flashes?					
Increased	18	52.9	14	41.2	χ^2=2.023
Reduced	6	17.6	11	32.4	p=0.364
No change	10	29.5	9	26.5	
Did the COVID-19 pandemic period cause a change in the intensity of your menopausal hot flashes?					
Increased	16	47.1	10	29.4	χ^2=2.274
Reduced	8	23.5	10	29.4	p=0.321
No change	10	29.4	14	41.2	
TOTAL	34	100	34	100	

Table 1. (Contiuned)

*****Chi-Squared Test*

Table 1 shows the results of the intergroup comparisons of the descriptive characteristics of the participants in the experimental and control groups. There was no significant difference between the descriptive characteristics of the groups (p>0.05).

While there was a statistically significant difference between the mean HFRDIS scores

of the experimental group before and after the application ($p<0.05$), there was no such significant difference in the control group ($p>0.05$) (Table 2). Additionally, in this study, Considering the group parameters, the standardization of the difference between the averages was calculated as 0.6976. This significant result has a medium effect size.

Table 2. Intergroup comparison of the mean pretest and posttest Hot Flash-Related Daily Interference Scale scores of the participants

	Groups	Pretest (Mean± SD)	Posttest (Mean± SD)	Test and p-value
Hot Flash-Related Daily Interference Scale	Experimental	82.88±3.60	32.73±6.75	Z=-5.090; [b]**p=0.000****
	Control	81.38±6.01	80.44±3.25	Z=-0.628; [b]p=0.530
	Test and p-value	Z=-1,134; [a]p=0.257	Z=-7.130; [a]**p=0.000****	

*Note. a: Mann-Whitney U Test b: Wilcoxon signed-rank test, *: p<0.05, **: p<0.001, SD: Standard Deviation*

According to the information in the relevant literature, the thermoregulatory mechanism of the body changes during the menopausal transition. So, the thermoregulatory area of the central nervous system becomes narrower and more sensitive to slight changes in internal body temperature. Small temperature increases lead to vasodilation, sweating, and decreased skin resistance, which mean hot flashes.[6,18] Hot flashes are an episodic sensation of warmth that starts suddenly, develops spontaneously, and is usually felt in the neck, chest, and face, followed by sweating. The emergence of hot flashes can be associated with sweating, heart palpitations, fatigue, fainting, headache, weakness, and anxiety, and it can be triggered by emotional stress. In particular, symptoms that impair the quality of life of women are the most common reasons for them to seek medical help in the perimenopausal period.[19,20] Relaxation techniques are used to relieve and prevent hot flashes. Deep breathing exercises are one of these techniques.[21]

Studies have shown that breathing practices reduce menopausal symptoms. Mohan and Almedia determined that the menopausal symptoms of the experimental group in their study decreased significantly with deep breathing exercises compared to the control group.[22] Kumari (2012) observed that the hot flash scores of women in the experimental group in their study who performed deep breathing exercises decreased significantly in the posttest, while no change was observed in the control group.[23] Sood et al. (2013) compared paced breathing (slow, deep, diaphragmatic breathing) to regular breathing and determined that hot flashes were reduced by 52% in the group that performed paced breathing twice a day, 42% in those who performed paced breathing once a day, and 46% in those who performed typical breathing.[24] Asha et al. (2020), who compared the effectiveness of soybean and diaphragmatic breathing exercises on menopausal symptoms, determined that diaphragmatic breathing exercises were more effective than soybeans in reducing symptoms. In this study, the hot flash-related complaints decreased in the experimental group in which the participants performed diaphragmatic breathing exercises, and the participants in the control group did not show any significant change.[7] A study by Deb and Gurumayum (2021) investigated the effectiveness of deep breathing and walking exercise in reducing menopause symptoms; The finding of this study revealed that breathing and walking exercise improved postmenopausal symptoms in the experimental group.[25] Accordingly, the result of this study was supported by the results in the literature.

It is known that regular deep diaphragmatic breathing practices increase parasympathetic activity, decrease sympathetic activity, improve respiratory-cardiovascular functions, reduce stress, and improve physical and mental health.[26] Menopausal women have limited knowledge of deep breathing exercises and often complain of various menopausal symptoms, such as hot flashes,

weakness, and urinary incontinence.[22] Especially before nighttime hot flashes, women may experience discomfort during habitual thoracic breathing. Therefore, slow diaphragmatic breathing helps reduce hot flashes.[27]

CONCLUSION AND RECOMMENDATIONS

In this study, which was conducted to investigate the effects of diaphragmatic breathing exercises on hot flashes in menopausal Turkish women during the COVID-19 pandemic period, the hot flash complaints of the women in the experimental group were found to decrease after the breathing exercises. No significant difference was observed in the control group.

Due to the ongoing COVID-19 pandemic, this study was conducted remotely. As some women did not use technology to the desired extent, and due to internet access limitations, online video calls with women could not be held. Another limitation of our study was that the diaphragmatic breathing exercise method was not compared to other techniques.

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