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RESEARCH / ARAŞTIRMA

Relationship between Climacteric Symptom Intensity, Physical Activity Level, Spine Mobility, Balance, and Quality of Life in Women

Kadınlarda Klimakterik Semptom Şiddetinin Fiziksel Aktivite Düzeyi, Omurga Mobilitesi, Denge ve Yaşam Kalitesi ile İlişkisi

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Abstract

Objective: The climacteric period contains more than 1/3 of a woman's life and causes various symptoms stemming from physiological and hormonal changes. Our study investigated the relationship of climacteric symptom intensity with physical activity level, spine mobility, balance, and quality of life.

Material and Methods: 64 women (49.5 ± 4.24 years) in the climacteric period were included in the study. Climacteric symptom severity was assessed with the Blatt-Kupperman Index, physical activity levels with the International Physical Activity Questionnaire, quality of life with the Menopause-Specific Quality of Life Questionnaire, and balance with the single-leg stance test. The correlations between the variables were analyzed using the Pearson and Spearman correlation analysis.

Results: Of the participants, 15.6% had minor symptoms, 59.4% had mild, 18.8% had moderate, and 6.3% had severe climacteric symptoms. The climacteric duration was correlated to spinal mobility measures and the quality of life (r= -0.26 - -0.30 and 0.26, respectively) ($p<0.05$). Symptom severity was correlated to the quality of life (r= -0.42) and body mass index (r= -0.28) ($p<0.05$); however, it was not correlated to physical activity, mobility, and balance ($p>0.05$).

Conclusion: As the severity of climacteric symptoms increased, quality of life decreased. No relationship existed between symptom severity, physical activity, mobility, and postural balance. Since a significant part of women's life cycle is in the climacteric period, guiding to reduce the severity of symptoms that will occur in this period will be important in improving women's quality of life.

Keywords: Climacteric, physical activity, spinal curvatures, postural balance, quality of life.

Öz

Amaç: Klimakterik dönem, bir kadının yaşamının 1/3'ünden fazlasını kapsamakta ve fizyolojik ve hormonal değişikliklerden kaynaklanan çeşitli semptomlara neden olmaktadır. Çalışmamızda klimakterik semptom yoğunluğunun fiziksel aktivite düzeyi, omurga hareketliliği, denge ve yaşam kalitesi ile ilişkisini araştırdık.

Gereç ve Yöntem: Klimakterik dönemdeki 64 kadın (49,5 ± 4,24 yıl) çalışmaya dahil edilmiştir. Klimakterik semptom şiddeti Blatt-Kupperman İndeksi ile, fiziksel aktivite düzeyleri Uluslararası Fiziksel Aktivite Anketi-Kısa Form ile, yaşam kalitesi Menopoza Özgü Yaşam Kalitesi Anketi ile, omurga mobilitesi flexicurve ve şerit metre ile, denge tek ayak duruş testi ile değerlendirildi. Değişkenler arasındaki korelasyonlar Pearson ve Spearman Korelasyon analizi ile analiz edildi.

Bulgular: Katılımcıların %15,6'sında minimal, %59,4'ünde hafif semptomlar, %18,8'inde orta semptomlar ve %6,3'ünde şiddetli klimakterik semptomlar vardı. Klimakterik süre spinal mobilite ölçümleri ve yaşam kalitesi (r= -0,26 - -0,30 ve -0,26) ile korelasyon göstermiştir ($p<0,05$). Semptom şiddeti yaşam kalitesi (r= -0,42) ve vücut kitle indeksi (r= -0,28) ile korelasyon gösterirken ($p<0,05$); fiziksel aktivite, mobilite ve denge ile korelasyon göstermemiştir ($p>0,05$).

Sonuç: Klimakterik semptomların şiddeti arttıkça yaşam kalitesi azalmıştır. Semptom şiddeti ile fiziksel aktivite, hareketlilik ve postüral denge arasında herhangi bir ilişki bulunmamıştır. Kadınların yaşam döngüsünün önemli bir kısmı klimakterik dönemde olduğu için bu dönemde ortaya çıkacak semptomların şiddetini azaltmaya yönelik rehberlik sağlanması kadınların yaşam kalitesinin artırılması açısından önemli olacaktır.

Anahtar Kelimeler: Klimakterik, fiziksel aktivite, omurga eğrilikleri, denge, yaşam kalitesi.

1. Introduction

The climacteric period is a transition from the reproductive to the non-reproductive phases of life, including premenopausal, perimenopause, menopause, and post-menopause periods, which contain before and after the last menstrual cycle. This period is affected by various bio-psycho-socio-cultural processes' in which complex physiological changes are experienced, accompanied by the effects of aging and social adaptation (1, 2). Hormonal changes during this period may cause climacteric, vegetative, psychosomatic symptoms, and somatotrophic and metabolic changes. The climacteric symptoms bring about secondary problems that affect women's quality and style of life (3). Considering that the average age of menopause is 51 years, and the climacteric period begins before this age, more than 1/3 of a woman's life is spent in the climacteric period (4).

The most common climacteric symptoms caused by hormonal changes in the climacteric period are the vasomotor symptoms experienced by 50.3% to 82.1% of the women. These symptoms manifest as hot flashes and night sweats. Palpitations, dizziness, nausea, headaches, and fainting can accompany them. Night sweats can wake women from sleep, and when they occur frequently, they can cause irritability, mood swings, concentration disorders, fatigue, and chronic sleep problems (5). Accompanying joint and muscle pain may also occur. Due to these destructive symptoms of this period, women's participation in daily activities and their quality of life may be decreased (6).

Vasomotor symptoms may also deteriorate the general health status of climacteric women by decreasing mobility, physical function, and physical activity (3). Increasing the vasomotor symptoms, including blood pressure and pulse during physical activity, may decrease their participation in physical activity. Also, fatigue, joint/muscle pain, palpitations, and emotional changes experienced in this process may further reduce physical activity participation and limit activities of daily living (7). Additionally, deteriorations in the musculoskeletal system due to aging and the decrease in the level of physical activity may further negatively affect spinal mobility. Postural balance control decreases with age, contributing to the decreased balance in these women (8). In addition, the vasomotor symptoms may adversely affect the integration in the balance warning center and cause additional concentration disorders, fatigue, and dizziness (9).

There are studies investigating the factors affecting climacteric symptoms (1, 2); however, studies examining how climacteric symptoms affect women's physical fitness and activities of daily living have yet to be found. Evaluating the climacteric period and the possible effects of the climacteric symptoms on different body systems may bring about problems limiting the quality of life of climacteric women. Therefore, this study aims to investigate the impact of climacteric symptoms during the climacteric period on physical activity level, quality of life, spine mobility, and balance. We hypothesize that climacteric symptom severity is associated with physical activity level, spinal mobility, balance, and quality of life in women.

2. Material and Methods

This study was planned as a cross-sectional study. Ethical approval was obtained from the local ethics committee before the study started.

2.1. Participants

The study included 64 women aged 40-60 (49.5 ± 4.24) years in the climacteric period who applied to a wellness center and agreed to participate. The G-Power 3.0.10 package program determined the minimum required sample size. At least 64 individuals were needed to achieve the effect size of 0.3, 0.05 margin of error, and 80% power. Inclusion Criteria were being between the ages of 40-60, being in the climacteric period, and being able to read and follow instructions (10). Exclusion Criteria were (11): Severe neurological diseases, orthopedic problems that may affect spinal mobility and balance, diabetic neuropathy, and cancer.

2.2. Procedures

All participants were informed about the purpose of the research and the evaluation process. Their written informed consent was obtained before the enrollment. The participants' sociodemographic characteristics, detailed medical history, and information about the menopause process were recorded. Their somatic and psychological climacteric symptoms were assessed with the Blatt-Kupperman Index, their physical activity level was evaluated with the International Physical Activity Questionnaire-Short Form, and their quality of life was measured with the Menopause-Specific Quality of Life Scale. Spinal mobility was assessed regarding trunk flexion, extension, and lateral flexion. Balance was assessed with the One-Leg Stance Test. The evaluation period of an individual lasted an average of 20 minutes. The same investigator performed all of the evaluations.

2.3. Outcome Measures

2.3.1. The Blatt-Kupperman Index (BKI)

The BKI measures 11 climacteric complaints, including hot flashes, numbness, insomnia, irritability, melancholy (depression), dizziness, fatigue, arthralgia/myalgia, headache, palpitations, and tingling, and the severity of climacteric symptoms. Each symptom is evaluated between none and severe complaints; the score obtained from each response is multiplied by the numerical transforming factor to get the total score. The index has 51 points; 1-14 points were evaluated as minor symptoms (12).

2.3.2. The International Physical Activity Questionnaire Short Form (IPAQ-Short Form)

The IPAQ determines the physical activity level and sedentary lifestyle of individuals between the ages of 15 and 69. The short form of the IPAQ questions the duration of vigorous and moderate physical activity, walking, and one-day average sitting times (13). The physical activity score is calculated by converting the questionnaire score to the Metabolic Equivalent of the Task (MET- min/week, 1 ME=3.5 ml/kg/min). The collected results for each activity determine the total score. Less than 600 METs are classified as "inactive," from 600 to 3000 METs as "minimum active," and more than 3000 METs as "very active" (14, 15).

2.3.3. The Menopause-Specific Quality of Life Questionnaire (MENQOL)

The MENQOL determines the differences and changes in women's quality of life over time in the climacteric period. It questions vasomotor, psychosocial, physical, and sexual symptoms experienced in the last month. If any symptom is encountered, the severity of the problem between 0 (not at all disturbing) and 6 (extremely disturbing) is indicated. The highest possible score is 174, and the lowest is 0 (16, 17).

2.3.4. Spine Mobility Assessment

A flexicurve and a tape measure were used for spine mobility assessment. The participant was asked to stand relaxed, feet hip-width apart and parallel to each other, arms by the trunk. The distance between the C7 and S1 spinous processes was measured. First, the person was asked to bend forward without bending the knees as much as possible. The distance between the processes' was measured again. The difference between the two measurements indicated mobility during flexion.

The participant was positioned with the pelvis and trunk entirely in contact with the wall. Then, he tilted his body backward from the waist. The distance difference between the C7 and S1 spinous processes at the last point the person could go and the beginning position indicated mobility during extension.

The test was also started in the previous position. Firstly, the distance between the distal end of the third finger of the right hand and the ground was measured with a tape measure. The subject was then asked to tilt the torso to the side by sliding the hand down the thigh line. Leaning sideways, the distance between the endpoint of the distal end of the third finger and the ground was measured again. The difference between the two measurements was recorded. During the test, care was taken to ensure that the soles of the feet were in contact with the ground, that the trunk did not go into flexion or hyperextension, and that rotation was not revealed. The same test was repeated on the left side (18).

2.3.5. The One Leg Stance Test

The One-Leg Stance Test is frequently used to evaluate postural stability. Before starting the test, the participant was asked to remove their shoes and place their hands on their hips. The participant was instructed to lift their right and left feet from the ground with open and closed eyes. The lifted foot did not receive support from the standing leg. The time was started when the foot left the floor and terminated when the hands were separated from the hips, the raised foot fell to the ground, changed direction, or lost balance by touching the ground leg. The balance score was recorded in seconds. The test was performed in three repetitions at 30-second intervals. The longest time was recorded. Longer time indicates better balance (19).

2.4. Statistical Analysis

Data were evaluated in the IBM SPSS Statistics 25.0 (IBM Corp., USA). The conformity of the variables to normal distribution was examined using visual (histograms and contingency tables) and analytical methods (Kolmogorov-Smirnov/Shapiro-Wilk tests). Descriptive statistics are given using mean and standard deviation for variables assumed to be normally distributed and median and interquartile values for non-normally distributed variables. The Pearson and Spearman correlation analyses were used to identify the associations between variables. A correlation coefficient between 0 and 0.49 was considered unacceptable, 0.50 and 0.69 was considered moderate, 0.70–0.79 was considered high, and 0.80–1.00 was considered excellent (20). The statistical significance level was accepted as $p<0.05$.

2.5. The Ethical Aspect of the Research

Ethical approval was obtained from Izmir Kâtip Çelebi University Non-Interventional Clinical Research Ethics Committee on 22.10.2020 with decision number 1019. Each participant was asked to read the Informed Consent Forum before participating in the study and sign it if he/she agreed to volunteer.

3. Results

The mean age of these 64 women was 49.5 ± 4.24 years. The demographic data of the participants are shown in Table 1. The participants' gynecological and obstetric histories are given in Table 2.

Table 1. Demographic Data of the Participants

	Participants (n=64)
Age (years)	49.5 (46.25 – 52.00)
Weight (kg)	67.38 ± 8.38
Height (cm)	162.5 (160 - 166)
BMI (kg/m^2)	25.58 ± 3.20
Age at Menopause (years)	45.14 ± 4.02
Climacteric Symptom Duration (years)	4.00 (2.00 – 6.00)

n: number, kg: kilogram, BMI: Body mass index. Data were expressed as median (interquartile range of 25/75) or mean ± standard deviation.

Table 2. Distribution of Participants' Gynecological and Obstetric Histories

	Frequency	**Percent**
Gynecological Operation		
Yes	13	20.3
No	51	79.7
Number of Pregnancy		
0-2	53	17.2
2-4	11	82.8
Miscarriage/Abortion		
Yes	19	29.7
No	45	70.3
Time Since Last Menstrual Cycle		
<1 year	15	23.5
1-3 years	14	21.9
>4 years	35	54.6
Menopause Reason		
Spontaneously	56	87.5
Surgical	8	12.5
Hormone Replacement		
Yes	10	15.6
No	54	84.4

According to the BKI scores, 15.6% of the participants experienced minor symptoms, 59.4% mild, 18.8% moderate, and 6.3% severe.

Hot flashes were the most common climacteric symptom in 96.7%. Following this, 78.1% of the participants complained of nervousness, 62.5% had arthralgia/myalgia, and 59.4% had insomnia. 54.7% of the participants were physically inactive, 39.1% were minimally active, and 6.3% were engaged.

The scores of the BKI, the MENQOL, the IPAQ, the balance test, and spinal mobility are given in Table 3.

Table 3. Data of Participants' Evaluation Parameters

	Participants (n=64)	
	Mean ± Std. Dev	**Median (IQR)**
BKI	17.89 ± 7.61	16 (14.25 - 20.50)
MENQOL	95.13 ± 29.45	90.00 (71.75 - 116.00)
IPAQ	868.88 ± 837.72	572.5 (384.00 - 866.50)
OLSrEO	58.98 ± 31.60	57.50 (32.75 - 74.75)
OLSrEK	6.66 ± 3.68	6.00 (4.00 - 8.00)
OLSrEO	42.09 ± 23.66	40.00 (22.50 - 55.00)
OLSrEOK	5.33 ± 2.85	5.00 (4.00 - 6.00)
SMTF	8.58 ± 2.25	8.25 (6.62 - 10.00)
SMTE	4.82 ± 1.60	4.00 (4.00 - 5.50)
SMTLFright	15.45 ± 3.95	15.00 (12.00 - 18.00)
SMTLFleft	15.19 ± 4.04	15.00 (12.00 - 18.25)

Std. Dev: Standard deviation, IQR: Interquartile ranges, MENQOL: Menopause-Specific Quality of Life Questionnaire; IPAQ: International Physical Activity Questionnaire; OLSrEO: The One Leg Stance Test right eye open; OLSrEK: The One Leg Stance Test right eye closed; OLSrEO: The One Leg Stance Test left eye open; OLSrEK: The One Leg Stance Test left eye closed; SMTF: Spinal mobility trunk flexion; SMTE: Spinal mobility trunk extension; SMTLFright: Spinal mobility trunk lateral flexion right; SMTLFleft: Spinal mobility trunk lateral flexion left

Age was correlated to climacteric duration (r=0.40) and correlated to the MENQOL scores (r=0.36) (p<0.01).

A correlation was found between the BKI and the MENQOL (r=0.42) (p<0.01) and BMI (r=0.28) (p<0.05) (Table 4).

A correlation was found between climacteric duration and the MENQOL (r= -0.26) (p<0.05). There was a correlation between climacteric duration and spinal mobility in extension and lateral flexion to the right and left (r= -0.26 - -0.30) (p<0.05) (Table 5).

Table 4. The Relationship of Blatt-Kuppermann Index with Age, BMI, Climacteric Symptom Duration, MENQOL, IPAQ, Balance, and Spinal Mobility

	Blatt-Kupperman Index	
	r	**p**
Age (years)	-0.15	0.238
BMI (kg/m²)	0.288	0.021*
Climacteric Symptom Duration (years)	-0.131	0.302
MENQOL	0.421	0.001**
IPAQ	0.149	0.241
OLSrEO	0.103	0.416
OLSrEK	0.026	0.84
OLSrEO	0.163	0.198
OLSrEOK	0.02	0.875
SMTF	-0.194	0.125
SMTE	-0.084	0.511
SMTLFright	0.011	0.929
SMTLFleft	0.062	0.625

BMI: Body Mass Index, MENQOL: Menopause-Specific Quality of Life Questionnaire; IPAQ: International Physical Activity Questionnaire; OLSrEO: The One Leg Stance Test right eye open; OLSrEK: The One Leg Stance Test right eye closed; OLSrEO: The One Leg Stance Test left eye open; OLSrEK: The One Leg Stance Test left eye closed; SMTF: Spinal mobility trunk flexion; SMTE: Spinal mobility trunk extension; SMTLFright: Spinal mobility trunk lateral flexion right; SMTLFleft: Spinal mobility trunk lateral flexion left, r: Spearman Correlation Analysis Coefficient, *:p<0.05, **:p<0.01

4. Discussion

In this study, we aimed to investigate the effects of climacteric symptoms on physical activity level, quality of life, spine mobility, and balance in climacteric women. The severity and duration of climacteric symptoms negatively affect the quality of life while not affecting women's physical activity, spinal mobility, and balance. Additionally, age was positively correlated to climacteric duration and negatively correlated to the quality of life.

The age of onset of climacteric symptoms can be different and reported to be below 40 years in 7%, between 41-45 years in 31%, between 46-50 years in 41%, and 51 years and above in 21% of women living in Europe (21). To be compatible with the literature, women between the ages of 40-60, when climacteric symptoms began to appear without including the geriatric phase, were included in our study. The mean age of the participants in our study was 49.50 ± 4.24 years.

Table 5. The Relationship between Age, Climacteric Symptom Duration, MENQOL, and Spinal Mobility

		Age (years)	**Climacteric Symptom Duration (years)**	**MENQOL**	**SMTF**	**SMTE**	**SMTLFright**	**SMTLFleft**
Age (years)	**r**	1	0.408	0.364	-0.032	-0.199	-0.126	-0.013
	p		0.001**	0.003**	0.803	0.115	0.323	0.917
Climacteric Symptom Duration (years)	**r**	0.408	1	0.266	-0.179	-0.263	-0.283	-0.303
	p	0.001**		0.033*	0.157	0.036*	0.023*	0.015*

MENQOL: Menopause-Specific Quality of Life Questionnaire, SMTF: Spinal mobility trunk flexion; SMTE: Spinal mobility trunk extension; SMTLFright: Spinal mobility trunk lateral flexion right; SMTLFleft: Spinal mobility trunk lateral flexion left, r: Spearman Correlation Analysis Coefficient, *:p<0.05, **:p<0.01

Obesity, BMI, and the prevalence and/or severity of climacteric symptoms are significant factors that may affect each other (22). Costa et al. (23) reported that BMI was associated with psychological and somatic climacteric symptoms. Some other authors (24) showed that some vegetative and psychological climacteric symptoms were not associated with BMI. Due to the higher fat rate of individuals with high BMI, estrogen may also be high through peripheral conversion of androstenedione, and the temperature fluctuations may decrease. However, in our study, it was observed that BMI was associated with climacteric symptom severity. The fat tissue in individuals of our study may act as insulation, causing higher internal body temperature and temperature fluctuations (22, 25).

Geographical factors, sociodemographic characteristics, and attitudes toward the climacteric process may affect the climacteric symptoms' prevalence and/or severity. For example, in Western countries, vasomotor symptoms are the most important and common symptoms of the climacteric period, while in other regions such as South America, Asia, Hong Kong, India, or Japan, joint pain, myalgia, and back pain are the main symptoms experienced (26). Palacios et al. reported that the prevalence of climacteric symptoms was 74% in Europe, 36-50% in North America, 45-69% in Latin America, and 22-63% in Asia (27). Similarly, in our study, the most common climacteric symptom was hot flashes (96.7%), experienced at moderate severity by 62.5% of the participants. The second most frequently described were nervousness (78.1%), arthralgia/myalgia (62.5%), and insomnia (59.4%). 59.4% of our participants showed mild climacteric symptoms. Physical symptoms were also more common in our study participants. Also, we can interpret that Turkish women's climacteric symptom complaints are at a level similar to Western societies.

The benefits of physical activity in treating various health problems have already been shown. Regular physical activity is essential for middle-aged women to prevent declining physical fitness with age. Also, it helps to cope with the unpleasant symptoms of the climacteric period. It reduces the number of physical, psychological, and social problems (28), which is explained by the hypothalamic β-endorphin system hypothesis: Low β-endorphin levels may be associated with increased severity and frequency of luteinizing hormone release, lead complaints such as hot flashes, palpitations, insomnia, anxiety, arthralgia, and myalgia. On the contrary, physical activity supports the production of endogenous opioids and β-endorphin levels. Additionally, lower climacteric symptom severity and regular physical activity were correlated to higher basal endorphin levels (24). Similarly, Dąbrowska-Galas et al. reported that high physical activity levels may reduce menopausal symptoms (29). Jalal et al. also found that physical activity was associated with menopausal symptoms (30). However, some studies report that the severity of climacteric symptoms is not associated with the level of physical activity (11) or, while somatic and psychological symptoms were associated, vasomotor symptoms were not associated (31). In our study, 54.7% of the women were inactive. This is similar to studies showing that physical activity is low in the climacteric period (24). However, we found that the severity of climacteric symptoms was not related to the level of physical activity. The severity of climacteric symptoms was mild in the majority (59.4%), and their severity was not at a level that could affect physical activity levels. This may be why we could not find a relationship between climacteric symptom severity and physical activity. Further studies should evaluate the effect of physical activity level according to symptom severity.

Climacteric symptoms may cause a decrease in the physical, psychological, and social quality of life in 96% of women. The daily life activities of women with frequent and severe hot flashes were more affected (32). Fait et al. reported that the quality of life decreases in middle-aged women from the premenopausal stage independent of age and psycho-social factors (2). Shepherd et al. discussed that climacteric symptoms affect approximately 80% of women worldwide at some point during the menopause transition and can cause substantial burden and distress on the quality of life (1). Our study also found that the severity and duration of climacteric symptoms were negatively correlated with quality of life. Therefore, monitoring climacteric symptoms to manage and improve climacteric women's quality of life is significant.

Muscle/joint pain affects 54.3% of clinometric women aged 40-55. Pain and decreased physical activity levels may lead to limitations in function and mobility over time (33). The decrease in estrogen hormone may adversely affect collagen-containing tissues, especially the joints (34). However, Santo et al. reported no associations between the severity of menopausal symptoms and functional mobility (8). Similarly, in our study, there was no relationship between climacteric symptoms and spinal mobility. Most participants in our study had mild climacteric symptoms, and their severity was not at a level that could affect their spinal mobility. Studies comparing spinal mobility between the groups of various symptom severity may bring about the effects of climacteric symptoms more precisely. However, we found a negative correlation between climacteric symptom duration, spine extension, and right/left lateral flexion. Even though the symptoms are not directly related to the spine's mobility, the mobility of the spine decreased as the duration of the symptoms increased. Considering that 62.5% of the women in the study experienced muscle-joint pain complaints, the pain may interfere with movement and reduce mobility.

Various non-specific somatic symptoms and their severity, such as joint and muscle pain, fatigue, and dizziness in the climacteric period, may cause balance disorders cumulatively with advancing age. With the aging process changes, a significant decrease in the sensorimotor area of the balance leads to a deteriorated balance (35). A reduction in balance has also been associated with decreased flexibility and lower physical activity levels when transitioning to the climacteric period (36). Although no other musculoskeletal problem exists, climacteric symptoms, especially dizziness and hot flashes, may decrease their balance. Bolmont et al. (37) stated that psychological parameters may also affect balance performance and that adverse changes in mood states have a high risk of negatively affecting balance through motor control and sensory organization. In climacteric women, hormonal changes may change bone, muscle structure, and the body's gravity center, causing balance disorders and falls. Cooper et al. (38) stated that there was no relationship between the phases of the climacteric period and the balance. We also could not identify a relationship between climacteric symptoms and

balance. We think that the fact that the women included in our study were predominantly mild in the severity of symptoms was a factor in our finding a relationship between climacteric symptoms and balance.

4.1. Limitations

In our study, there was no control group without climacteric symptoms. In addition, there was no equal distribution of climacteric symptom severity among the participants. The fact that most participants showed mild climacteric symptoms may affect the study results. Additionally, a computer-aided electromechanical device for balance and spinal mobility assessment may provide additional value.

5. Conclusion

As a result of our study, the increase in the severity of climacteric symptoms decreased the quality of life; it did not affect physical activity, spine mobility, and balance. However, we found that spinal mobility was associated with the duration of symptoms. Therefore, evaluating and monitoring the severity and duration of symptoms is essential in the climacteric period to manage the quality of life and spinal mobility more effectively.

6. Contribution to the Field

Our study found that increased severity of climacteric symptoms decreased quality of life but did not affect physical activity, spinal mobility, and balance. Since a significant part of women's life cycle is in the climacteric period, guiding to reduce the severity of symptoms that will occur in this period will be important in improving women's quality of life. Our study will provide a basis for appropriate preventive interventions and further studies to improve the quality of life of women with the results of our study on the somatic and psychological symptoms that may occur in the climacteric period and the parameters that these symptoms may affect.

Conflict of Interest

There is no conflict of interest regarding any person and/or institution.

Authorship Contribution

Concept: SGU, YP; **Design:** SGU, YP; **Supervision:** SGU, YP; **Funding:** None; **Materials:** None; **Data Collection/Processing:** YP, KSK; **Analysis/Interpretation:** YP, SGU, KSK; **Literature Review:** YP, SGU, KSK; **Manuscript Writing:** YP, SGU, KSK; **Critical Review:** YP, SGU, KSK.

References

1. Shepherd JA, Shiozawa A, Schild AL, Singh D, Mancuso SA. Retrospective text and qualitative analyses of patient experience and management of vasomotor symptoms due to menopause: voices from the PatientsLikeMe community. Menopause. 2024 Sep 1;31(9):789-95. DOI: 10.1097/GME.0000000000002391.

2. Fait T, Dvořáková V. Questions and questionnaires about acute climacteric syndrome. Cas Lek Cesk. 2024;162(7-8):337-43.

3. Kling JM, Stuenkel CA, Faubion SS. Management of the Vasomotor Symptoms of Menopause: Twofers in Your Clinical Toolbox. Mayo Clin Proc. 2024;99(7):1142-8. DOI: 10.1016/j.mayocp.2024.03.028.

4. Dalvi SA. Menopause: Why is Everyone Talking About it Now? J Obstet Gynaecol India. 2024;74(3):196-200. DOI: 10.1007/ s13224-024-02033-0.

5. Augoulea A, Moros M, Lykeridou A, Kaparos G, Lyberi R, Panoulis K. Psychosomatic and vasomotor symptom changes during transition to menopause. Prz Menopauzalny. 2019;18(2):110-5. DOI: 10.5114/pm.2019.86835.

6. Hamdi Kara I, Aydin S, Gemalmaz A, Aktürk Z, Yaman H, Bozdemir N, et al. Habitual tea drinking and bone mineral density in postmenopausal Turkish women: investigation of prevalence of postmenopausal osteoporosis in Turkey (IPPOT Study). Int J Vitam Nutr Res. 2007 Nov;77(6):389-97. DOI: 10.1024/0300-9831.77.6.389. Erratum in: Int J Vitam Nutr Res. 2008 May;78(3):following 166.

7. Woods NF, Coslov N, Richardson MK. Effects of bothersome symptoms during the late reproductive stage and menopausal transition: observations from the Women Living Better Survey. Menopause. 2023;30(1):45-55.

8. Espírito Santo J, Aibar-Almazán A, Martínez-Amat A, de Loureiro NEM, Brandão-Loureiro V, Lavilla-Lerma ML, et al. Menopausal Symptoms, Postural Balance, and Functional Mobility in Middle-Aged Postmenopausal Women. Diagnostics (Basel). 2021;11(12). DOI: 10.3390/diagnostics11122178.

9. Owada S, Suzuki M. The relationship between vasomotor symptoms and menopause-associated dizziness. Acta Oto-Laryngol. 2014;134(2):146-50. DOI: 10.3109/00016489.2013.841991.

10. Gözüyeşil E, Başer M. Menopozal dönemde yaşanan vazomotor yakinmalarin günlük yaşam aktiviteleri üzerine etkisi Anadolu Hemşirelik ve Sağlık Bilimleri Dergisi. 2016;19(4):261-8.

11. Aparicio VA, Borges-Cosic M, Ruiz-Cabello P, Coll-Risco I, Acosta-Manzano P, Špacírová Z, et al. Association of objectively measured physical activity and physical fitness with menopause symptoms. The Flamenco Project. Climacteric. 2017;20(5):456-61. DOI: 10.1080/13697137.2017.1329289.

12. Schneider HP, Heinemann LA, Rosemeier HP, Potthoff P, Behre HM. The Menopause Rating Scale (MRS): comparison with Kupperman index and quality-of-life scale SF-36. Climacteric. 2000;3(1):50-8. DOI: 10.3109/13697130009167599.

13. Noğay AEK, Mehmet Ö. Birinci basamak için fiziksel aktivite anketinin Türkçe uyarlamasının geçerlilik ve güvenilirliği. Konuralp Medical Journal. 2019;11(1):1-8.

14. Saglam M, Arikan H, Savci S, Inal-Ince D, Bosnak-Guclu M, Karabulut E, et al. International physical activity questionnaire: reliability and validity of the Turkish version. Percept Mot Skills. 2010;111(1):278-84. DOI: 10.2466/06.08.Pms.111.4.278-284.

15. Craig CL, Marshall AL, Sjöström M, Bauman AE, Booth ML, Ainsworth BE, et al. International physical activity questionnaire: 12-country reliability and validity. Med Sci Sports Exerc. 2003;35(8):1381-95.

16. Hilditch JR, Lewis J, Peter A, van Maris B, Ross A, Franssen E, et al. A menopause-specific quality of life questionnaire: development and psychometric properties. Maturitas. 1996;24(3):161-75. DOI: 10.1016/s0378-5122(96)82006-8.

17. Şahin NH, Kharbouch SB, Şahin NH. Menopozal dönemlerdeki yaşam kalitesinin belirlenmesi. Florence Nightingale Journal of Nursing. 2007;15(59):82-90.

18. de Oliveira TS, Candotti CT, La Torre M, Pelinson PPT, Furlanetto TS, Kutchak FM, et al. Validity and Reproducibility of the Measurements Obtained Using the Flexicurve Instrument to Evaluate the Angles of Thoracic and Lumbar Curvatures of the Spine in the Sagittal Plane. Rehabil Res Pract. 2012;2012(1):186156. DOI: 10.1155/2012/186156.

19. Jonsson E, Seiger A, Hirschfeld H. One-leg stance in healthy young and elderly adults: a measure of postural steadiness? Clin Biomech (Bristol, Avon). 2004;19(7):688-94. DOI: 10.1016/j.clinbiomech.2004.04.002.

20. Cohen J. Set Correlation and Contingency Tables. Appl Psychol Meas. 1988;12(4):425-34. DOI: 10.1177/014662168801200410.

21. Schindler AE. Climacteric symptoms and hormones. Gynecol Endocrinol. 2006;22(3):151-4. DOI: 10.1080/09513590600629134.

22. Da Fonseca AM, Bagnoli VR, Souza MA, Azevedo RS, Couto Ede B, Jr., Soares JM, Jr., et al. Impact of age and body mass on the intensity of menopausal symptoms in 5968 Brazilian women. Gynecol Endocrinol 2013;29(2):116-8. DOI:10.3109/09513590.2012.730570.

23. Costa JG, Rodrigues RM, Puga GM, Cheik NC. Does obesity aggravate climacteric symptoms in postmenopausal women? Revista Brasileira de Ginecologia e Obstetrícia. 2022;44:586-92.

24. Tan MN, Kartal M, Guldal D. The effect of physical activity and body mass index on menopausal symptoms in Turkish women: a cross-sectional study in primary care. BMC Women's Health. 2014;14(1):38. DOI: 10.1186/1472-6874-14-38.

25. Mirzaiinjmabadi K, Anderson D, Barnes M. The relationship between exercise, Body Mass Index and menopausal symptoms in midlife Australian women. Int J Nurs Pract. 2006;12(1):28-34. DOI: 10.1111/j.1440-172X.2006.00547.x

26. Islam MR, Gartoulla P, Bell RJ, Fradkin P, Davis SR. Prevalence of menopausal symptoms in Asian midlife women: a systematic review. Climacteric . 2015;18(2):157-76. DOI: 10.3109/13697137.2014.937689.

27. Palacios S, Henderson VW, Siseles N, Tan D, Villaseca P. Age of menopause and impact of climacteric symptoms by geographical region. Climacteric . 2010;13(5):419-28. DOI: 10.3109/13697137.2010.507886.

28. Dugan SA, Gabriel KP, Lange-Maia BS, Karvonen-Gutierrez C. Physical Activity and Physical Function: Moving and Aging. Obstet Gynecol Clin North Am. 2018;45(4):723-36. DOI: 10.1016/j.ogc.2018.07.009.

29. Dąbrowska-Galas M, Dąbrowska J, Ptaszkowski K, Plinta R. High Physical Activity Level May Reduce Menopausal Symptoms. Medicina (Kaunas). 2019;55(8). DOI: 10.3390/medicina55080466.

30. Jalal SM. Physical Activity, Self-Care, and Menopausal Symptoms among Women in Al-Ahsa, Saudi Arabia: Adherence to Postmenopausal Guidelines (PMGs). Healthcare (Basel). 2024;12(9). DOI: 10.3390/healthcare12090886.

31. Liu T, Chen S, Mielke GI, McCarthy AL, Bailey TG. Effects of exercise on vasomotor symptoms in menopausal women: a systematic review and meta-analysis. Climacteric. 2022;25(6):552-61. DOI: 10.1080/13697137.2022.2097865.

32. Ceylan B, Özerdoğan N. Menopoza girme yaşını etkileyen faktörler ve menopozda yaşam kalitesinin belirlenmesi. Turk Jinekoloji ve Obstet Dernegi Derg. 2015;12(1):43-9.

33. Mottram S, Peat G, Thomas E, Wilkie R, Croft P. Patterns of pain and mobility limitation in older people: cross-sectional findings from a population survey of 18,497 adults aged 50 years and over. Qual Life Res. 2008;17(4):529-39. DOI: 10.1007/s11136-008- 9324-7.

34. Chidi-Ogbolu NS. The Effects of Hormonal Manipulation on Ligament Function [dissertation]. [Mount Pleasant]: University of California, Davis; 2022. 93p.

35. Wolpe N, Ingram JN, Tsvetanov KA, Geerligs L, Kievit RA, Henson RN, et al. Ageing increases reliance on sensorimotor prediction through structural and functional differences in frontostriatal circuits. Nat Commun. 2016;7(1):13034. DOI: 10.1038/ncomms13034.

36. Vale FA, Voos MC, Brumini C, Suda EY, Silva RLd, Caromano FA. Balance as an Additional Effect of Strength and Flexibility Aquatic Training in Sedentary Lifestyle Elderly Women. Curr Gerontol Geriatr Res. 2020;2020(1):1895473. DOI: 10.1155/2020/1895473.

37. Bolmont B, Gangloff P, Vouriot A, Perrin PP. Mood states and anxiety influence abilities to maintain balance control in healthy human subjects. Neurosci. Lett. 2002;329(1):96-100. Epub 2002/08/06. DOI: 10.1016/s0304-3940(02)00578-5.

38. Cooper R, Mishra G, Clennell S, Guralnik J, Kuh D. Menopausal status and physical performance in midlife: findings from a British birth cohort study. Menopause (New York, NY). 2008;15(6):1079-85. Epub 2008/06/04. DOI: 10.1097/gme.0b013e31816f63a3.