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Investigation of the effect of surgical menopause on physical, psychosocial and cognitive functions in women

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Abstract

Aim: This study was planned to examine the effects of surgical menopause on physical, psychosocial and cognitive functions.

Material and Methods: The study included 25 women aged 40-54 years. The participants consisted of healthy individuals who have not yet entered menopause, who have been diagnosed with surgical menopause and who were literate. Before surgical menopause, all participants were assessed using a form including demographic information for demographic data; 5 times sit to stand test, sit and reach test, half squat test, hand grip strength measurement test, Visual Analogue Scale for physical functions; Perceived Stress Scale, Center for Epidemiological Study Depression Scale, Hamilton Anxiety Rating Scale, Women's Health Initiative Insomnia Scale for psychosocial functions; and Montreal Cognitive Assessment Scale for cognitive functions. All participants were reevaluated after 3 months of surgical menopause.

Results: The mean age of the participants was 45.96±4.26 years and the mean body mass index was 30.57±4.50 kg/cm^2. In physical function tests, psychosocial functions, cognitive functions there was no statistically significant difference between the pre- and postoperative test results of the participants ($p>0.05$). The decrease in spinal pain intensity of the participants was statistically significant compared to the preoperative period ($p<0.05$). After surgery, the participants' scores on the CES-Depression Scale were decreased and the difference was statistically significant ($p<0.05$).

Discussion: After surgical menopause, participants' depression levels and spinal pain improved. Surgical menopause did not affect the participants' other physical, psychosocial and cognitive functions of.

Keywords

Pain, Cognitive dysfunction, Menopause

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Introduction

Menopause is defined as the permanent cessation of the menstrual period and occurs after the cessation of ovarian function. The main change in menopause is a decrease in the level of estrogen, the female hormone secreted by the ovaries over time. This process can take 5 to 8 years if there is no radiotherapy, chemotherapy or surgical removal of the ovaries. Surgical removal of the ovaries is called bilateral oophorectomy. Bilateral oophorectomy is an operation for menopausal women who have not yet entered menopause. Surgeons usually opt for bilateral oophorectomy during a hysterectomy (surgical removal of the uterus). Surgical menopause; is applied for reasons such as abnormal bleeding, chronic pelvic pain or symptomatic leiomyoma or ovarian cancer [1].

In this process, a woman experiences hormonal changes, loses her fertility and begins to age. During this period, due to hormonal changes, many mental (concentration difficulties, irritability and depression), physical (sexual problems, genitourinary atrophy, vasomotor symptoms, insomnia, cardiovascular system problems and osteoporosis) and cognitive problems arise [2]. While hormones such as estrogen and progesterone are beneficial for muscle performance, changes in the levels of hormones can affect the decline in physical function [3]. Additional factors related to surgical menopause can affect physical function. For example, events and conditions that lead to surgical menopause, physical recovery after surgery, or sudden or early changes in hormone levels may result in lower levels of physical function among women who have undergone surgical menopause compared to women entering natural menopause [4]. The biological link between menopause and mood focuses on how low estrogen levels are associated with a negative mood. In this case, as the ovarian estrogen production is very low and stable in post menopause, it is expected to be associated with increased psychological symptoms. A study investigating depression in middle-aged women concluded that these symptoms are not associated with natural menopause, but with stress, family problems, other menopausal symptoms, or a previous history of depression [5]. In the literature, it is thought that a decrease in estrogen levels is the cause of are responsible for cognitive and physical dysfunction in this period of life. However, the findings of studies investigating the effect of estrogen replacement therapy on cognitive function are contradictory [6]. For this reason, the problem is thought to be more complex than just estrogen deficiency.

Studies have addressed one or more of these problems, but their effects on physical, psychosocial, and cognitive functions before and after surgical menopause have not been examined from such a wide perspective. It is of great importance for women to identify the relevant problems during this period and to help the healthcare personnel to solve the problems. Therefore, this study was planned to examine the effects of surgical menopause on physical, psychosocial and cognitive functions in women.

Material and Methods

Participants

This study was conducted with a total of 70 healthy participants from XXX Hospital, XXX Hospital and XXX Private Health Obstetrics and Gynecology Polyclinics between January 2017 and September 2017. The participants received a surgical indication for menopause (total abdominal hysterectomy and bilateral-salpingo oophorectomy) by a specialist. The population of the study was accepted as the sample. It was approved at the board meeting of XXX University Non-Interventional Clinical Research Ethics Committee dated 03.08.2016 and numbered 60116787-020 / 47564 that there was no ethical obstacle in conducting the study. The research was conducted according to the Helsinki Declaration and written informed consent was obtained from all participants before the study.

Forty-five participants who met the inclusion criteria were included in the study. Fifteen participants who did not wish to participate in the study were excluded and the study was started with 30 participants. The study was completed with 25 participants, excluding 5 participants who did not come to the second evaluation 3 months after the surgical operation (Figure 1). Inclusion criteria were as follows: age range of 40-54, not yet in menopause, being diagnosed with surgical menopause and being literate. Those with diabetes mellitus, stroke and physical disabilities, pace maker users, MI history, cardiovascular surgery history, breast cancer, etc., those who use drugs for reasons such as cooperative organizations and those with advanced psychiatric problems were excluded from the study. Age, height, weight, body mass index, education, marital status, disease, smoking, drug use, employment status were assessed among the groups.

Spinal pain areas of the participants were determined by marking them on the body chart. Pain intensity was evaluated with the Visual Analogue Scale (VAS).

Cardiovascular endurance and functional mobility of the participants were evaluated with 5 sit-and-go tests. The participants were asked to stand up and sit down again as quickly as possible without any support while sitting on a chair with back support. The time they repeat this movement 5 times measured with a stopwatch and the result was recorded in seconds.

The sit and reach test was used to evaluate trunk flexion and hamstring muscle group flexibility. Participants were asked to lean forward on the test bench and were told to stop for at least 2 seconds at the last point reached. The distance that can be reached is recorded in cm. The test was repeated 3 times and the best score was recorded.

Muscular endurance of the lower extremities was evaluated by the semi-squat test. In this test, participants were asked to kneel and stand up halfway on a hard surface without shoes. The test began with the "start" command from the physiotherapist, and the crouching movements of the participants in 1 minute were counted. During the test, the participants were asked to squat so that the knee would not pass in front of the foot, not to lift their heels from the ground, and to keep their torso upright. Upper extremity muscular endurance was evaluated with the Hand Grip Strength Measurement Test (HGSMT). The gripping strength was measured with a JAMAR brand hydraulic hand dynamometer. Measurements were made by the same physiotherapist as recommended by the American Hand Therapists Association, while the participants were in the unsupported sitting position, the dominant upper extremity was

flexed, the forearm was supported by the body in the middle position, and the average value was recorded as kg / F [7].

The Perceived Stress Inventory (PSI), whose Turkish validity and reliability study was conducted by Bilge et al., was used to determine the stress levels of the participants. Feelings and thoughts experienced by the participants in the last month were evaluated. The total score ranges from 0 to -32 points on the scale. The scale was evaluated on the basis of the total score and subscale scores (perceived stress and perceived coping). Higher total scores and scores from subscales indicate that perceived stress level is high [8].

The Hamilton Anxiety Rating Scale (HAR-S) was used to determine the anxiety levels of the participants. This scale, developed by Hamilton [9] in 1959, was prepared to determine the level of anxiety and symptom distribution in individuals, and to measure the change in severity. It consists of 14 items that question mental and physical symptoms. Validity and reliability studies in our country were carried out by Yazıcı et al. [10].

The CES-Depression Scale was used to determine the depressive symptoms of the participants. The CES Depression Scale was developed by the American National Institute of Public Health. The CES-Depression Scale is used in epidemiological studies not to diagnose, but to detect the presence of depression [11]. The scale consists of 20 items. The scale is evaluated by four responses that the participants felt during the last week. The total score range is between 0 and 60. In this study, the scale, whose Turkish validity and reliability study was conducted by Tatar et al. was used [12].

The Women's Health Initiative Insomnia Scale (WHIIS) was used to evaluate the insomnia levels that could affect the emotional states of the participants. The Turkish validity and reliability study of this scale was conducted by Timur and Şahin in 2009 [13]. It is a valid and reliable scale that can be used to evaluate insomnia especially during menopause [14]. The highest score on the scale shows the greatest degree of insomnia symptoms. The lowest score that can be obtained on the scale is 0, the highest score is 20.

The Montreal Cognitive Assessment Scale (MBRS) was used to evaluate the cognitive functions of the participants. Montreal Cognitive Assessment Scale is a screening scale developed by Nasreddine et al. to distinguish healthy individuals from individuals with mild cognitive impairment [15]. In this study, the scale, whose Turkish validity and reliability study was conducted by Özdilek and Kenangil [16] in 2014, was used. In the Montreal Cognitive Assessment Scale, there are items that evaluate the dimensions of attention and concentration, executive functions, memory, language, visual-spatial skills, abstract thinking, calculation and orientation. The lowest score that can be obtained on the scale is 0, the highest score is 30. As a result of the standardization study conducted in our country, the cut-off score for distinguishing healthy individuals from individuals with mild cognitive impairment was determined as 21 [17].

Statistical analysis

The data were analyzed using the program SPSS 20.0 (IBM SPSS Statistics 20 software (Armonk, NY: IBM Corp.)). Continuous variables are given as mean ± standard deviation and categorical variables as numbers and percentages. The Shapiro Wilk test was used for the normal distribution of the evaluation data of all participants. In the dependent group comparisons, the significance test of the difference between the two spouses was used because parametric test assumptions were provided for comparing the physical, psychosocial and cognitive functions of the participants before and after surgery since the parametric test assumptions were not provided in the data obtained from the Perceived Stress Scale, Wilcoxon two-sample paired tests were used. P <0.05 was considered statistically significant in all analyzes.

Results

The mean age of the participants was 45.96 ± 4.26 years, and their mean body mass index was 30.57 ± 4.50 kg / cm². Twelve participants were housewives (48%), 22 were married (88%), 23 (92%) gave birth. While 76% of the participants had spine pain, they reported that they had the most back pain (47.40%) (Figure 1). In physical function tests, there was no statistically significant difference between the pre- and postoperative test results of the participants (p> 0.05). The decrease in spinal pain severity of the participants after surgery compared to the pre-surgery was found to be statistically significant (p <0.05) (Table 1). In physical function tests, there was no statistically significant difference between the pre- and postoperative test results of the participants (p> 0.05). The decrease in spinal pain severity of the participants after surgery compared to the pre-surgery was found to be statistically significant (p <0.05) (Table 2). No statistically significant difference was found in the psychosocial functions of the participants before and after surgical menopause in Hamilton Anxiety Rating Scale, Women's Health Initiative Insomnia Scale, Perceived Stress Scale and its sub-parameters (p> 0.05). After surgery, a decrease in the scores of the participants on the CES-Depression Scale was detected, and the difference was found to be statistically significant (p <0.05) (Table 3). No significant difference was found in the cognitive functions of the participants before and after surgery (p> 0.05) (Table 3).

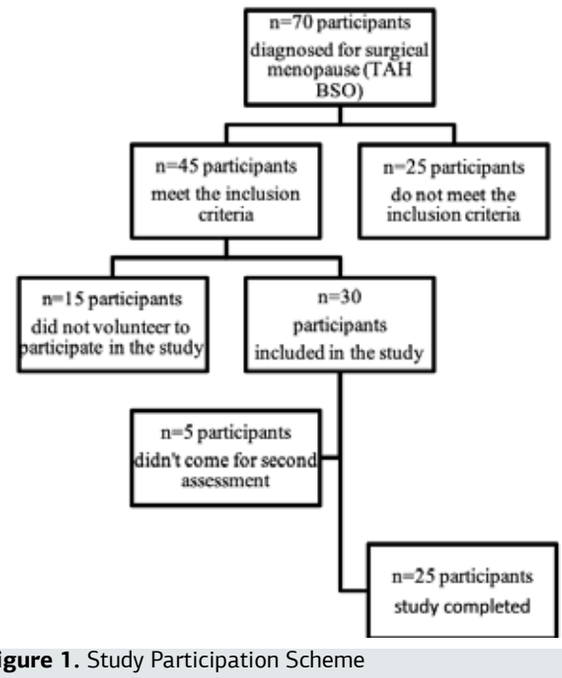

Figure 1. Study Participation Scheme

TAHBSO: Total abdominal hysterectomy, bileteral salpingooferectomy

Table 1. Demographic characteristics of the participants.

Variables	Min-Max	mean±SD
Age (years)	40-54	45.96±4.26
BMI (kg/cm²)	43-70	30.57±4.50
First menstrual age (years)	10-16	13.16±1.52
First birth age (years)	16-29	21.48±3.91
First birth age (years)	1-6	3.17±1.15
Number of live births	1-3	2.26±0.62
Number of miscarriages	1-3	1.47±0.74
Variables	**N**	**%**
Occupation		
Housewife	12	48
Working	10	40
Pensioner	3	12
Education Level		
Primary school	16	64
Middle School	4	16
High School and equivalent	3	12
License	2	8
Marital Status		
Married	22	88
Single	3	12
Type of birth		
Normal	17	74
Cesarean	1	4
Normal+cesarean	5	22
Presence of osteoporosis		
Yes	3	12
No	22	88
Exercise		
Yes	1	4
No	24	96
Pain in the spine		
No	6	24
Yes	19	76
The location of the pain		
Neck	8	42
Back	2	11
Low back pain	9	47

MİN: minimum, MAX: maximum, SD: Standart deviation, BMI: Body Mass Index.

Table 2. Comparison of participants' spinal pain severity and physical function evaluation data before and 3 months after surgical menopause

Variables	Before Surgical Menopause mean±SD	3 Months After Surgical Menopause mean±SD	p
Spinal pain			
VAS (cm)	5.68±2.38	3.68±3.20	0.014*
Physical functions			
5 sit-and-go test	12.48±3.63	11.96±2.73	0.403
Sit and reach test	21.11±10.13	19.70±7.85	0.449
HGSMT dominant	47.20±14.73	49.58±11.71	0.152
Semi squat test	34.52±9.95	37.76±10.83	0.095

The significance test of the difference between two partners, * p <0.05, SD: Standard Deviation, VAS: Visual Analogue Scale, HGSMT: Hand Grip Strength Measurement Test.

Table 3. Comparison of the psychosocial and cognitive function evaluation data of the participants before surgical menopause and 3 months after the operation.

Variables	Before Surgical Menopause mean±SD	3 Months After Surgical Menopause mean±SD	p
Psychosocial functions			
PSS (total) [a]	17.00±5.44	14.84±7.35	0.111
PSS stress[a]	11.84±4.30	9.92±5.42	0.053
PSS coping[a]	5.16±2.30	4.76±2.85	0.465
HARS[b]	17.48±8.11	16.32±9.64	0.426
CES-Depression[b]	26.12±14.92	20.28±13.68	0.046*
WHIIS[b]	9.8±5.12	10.84±4.96	0.233
Cognitive functions			
MoCA[b]	22.36±3.00	23.52±3.92	0.062

[a] Wilcoxon paired two sample test [b] Significance test of the difference between two partners, p * <0.05, SD: Standard Deviation, PSS: Perceived Stress Scale, HARS: Hamilton Anxiety Rating Scale, CES-Depression: The Center for Epidemiologic Studies Depression Scale, WHIIS : Women's Health Initiative Insomnia Scale, MoCA: Montreal Cognitive Assessment Scale..

Discussion

The aim of this study is to examine the effects of surgical menopause on physical, psychosocial and cognitive functions in women. After surgical menopause, it was concluded that women's spinal pain and depression mood improved compared to pre-surgical menopause.

Surgical menopause is a condition that affects women in all aspects. The gradual decreases in estrogen and androgen levels during the natural transition process is responsible for most of the initial problems with menopause. Although the timing of menopause is relatively constant, the nature and severity of symptoms can vary greatly among women from different ethnicities and geographic locations for reasons not well understood [18]. Most women approaching menopause require medical assistance for vasomotor problems, urogenital atrophy, sexual dysfunction, psychological and somatic disorders, or a combination of these. In a study that examined menopausal complaints and hormonal status after menopausal surgery, the effects of surgery was high immediately after the operation (10 days), while it decreased to the premenopausal level 5-6 weeks after surgery [19]. Although there was no change in vasomotor symptoms and sleep disturbance 5-6 weeks after the operation, an improvement was observed in anxiety, depression, somatic problems and muscular and skeletal system pain. In our study, a decrease in depressive symptoms and improvement in spinal pain severity were found after surgical menopause.

In the study conducted by Rodriguez et al., the relationship between both quality of life and climacteric symptoms with physical performance was investigated. The intensity of menopausal symptoms and worsening of quality of life have been associated with poor physical performance [1]. In our study, we evaluated physical functions with the sit-to-go test, sit-lie test, semi-squat test and hand grip strength test 5 times, and we could not find a statistically significant difference 3 months after surgery. We think that the lack of change in physical functions is related to the participants' sedentary lifestyle and the unchanged environmental factors.

Depression symptoms differ in everyone and can occur in every period of our lives. According to Borkoles et al., depressive symptoms are more common in the perimenopause than in the postmenopausal period [20]. In another study, it was stated that surgical menopause affects the depression levels of the participants [21]. In this study, no statistically significant difference was found between the psychosocial functions of the participants between the Perceived Stress Scale and its sub-parameters before surgical menopause and the scores after surgical menopause on the Hamilton Anxiety Rating Scale ($p > 0.05$). We think that this result is due to the fact that the participants consisted of healthy individuals and that depression tendencies were not detected before surgery.

The results of the studies investigating the effects of surgical menopause on mood are contradictory; Gibson et al. observed in their 10-year study that the symptoms of depression were high during the premenopause period, they started to decrease during the perimenopause and continued to decrease during the postmenopausal period [22]. In our study, it was found that depressive symptoms of the participants before surgical menopause decreased 3 months after surgery. We think that this situation is related to the reasons for the surgery (such as abnormal bleeding, benign and malignant causes) and postoperative uncertainty.

There are studies in the literature arguing that a decrease in estrogen levels is responsible for cognitive and physical dysfunctions in this period of life [8]. Santoro et al. [23] argue that changes in cognitive functions are related to age, not hormones. A study investigating the effects of surgical menopause on cognitive functions found that the year of surgery was associated with cognitive functions, whereas surgery performed after natural menopause had no effect on cognitive functions [24]. Our study predicted that women's cognitive functions would be affected by surgery for menopause, but there was no change in the cognitive functions of the participants after surgery. The reason for this is that the factors affecting cognitive functions are not only related to hormones, but the patient's family life, economic status, education level, genetic factors and general health status may also affect cognitive functions.

Our study has some limitations. The absence of a control group to compare women with natural menopause makes us not fully understand the physical and psychosocial effects of surgical menopause on women. The small number of participants and the lack of long-term follow-up of the participants led us to evaluate the effects of surgical menopause only in the short term. We believe that further studies would reveal more precise and striking results by evaluating these limitations.

In conclusion, this study, found that the psychosocial functions of women before surgical menopause only affected their depressive moods, and this situation improved after surgery. It was found that women before surgical menopause mostly complained of low back pain, and after surgical menopause, the severity of pain in the waist region decreased. According to our study, surgical menopause did not effect the physical and cognitive functions of women.

As a result of this study, we think that it is important to plan treatments with a multidisciplinary approach by healthcare professionals before menopause surgery. In this way, the health problems experienced by women specific to this period can be minimized and the menopause period can be passed more easily.

Scientific Responsibility Statement

The authors declare that they are responsible for the article's scientific content including study design, data collection, analysis and interpretation, writing, some of the main line, or all of the preparation and scientific review of the contents and approval of the final version of the article.

Animal and human rights statement

All procedures performed in this study were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. No animal or human studies were carried out by the authors for this article.

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Conflict of interest

None of the authors received any type of financial support that could be considered potential conflict of interest regarding the manuscript or its submission.

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