Sociodemographic characteristics associated with indications for surgical menopause in women: a retrospective study

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SUMMARY

OBJECTIVE: The aim of this study was to evaluate the surgical menopause indications and sociodemographic characteristics of women.
METHODS: In this retrospective study, we analyzed the sociodemographic characteristics of women with indications for surgical menopause in 2010–2020. The R Version 4.1.1 (2021-08-10) software and logistic regression analysis were used to evaluate the data.
RESULTS: A total of 704 women's data were obtained in this study. Surgical menopause indications were found to stem from bleeding (46.0%), cancer (28.3%), cancer risk (18.9%), and other causes (6.8%). Surgical menopause indications originating from cancer were increased by 0.08 times (95%CI 0.01–0.68) due to smoking, 0.45 times (95%CI 0.23–0.88) due to regular drug use, and 0.36 times (95%CI 0.19–0.69) due to the presence of chronic disease (p<0.05).
CONCLUSION: More than half of the women with surgical menopause indications were between 41 and 46 years of age. Additionally, 54.9% of the women had a chronic disease. Therefore, it is recommended to plan preventive health services for morbidity and mortality risks that may develop due to surgical menopause.
KEYWORDS: Gynecologic neoplasm. Gynecological surgery. Menopause. Women's health.

INTRODUCTION

Surgical menopause (SM)/bilateral oophorectomy in women has a more adverse effect on vasomotor and cognitive symptoms, mood disorders, genitourinary atrophy[1], dyspareunia[2], loss of libido, osteoporosis and fractures, sleep problems, loss of muscle tone, infertility[3], and anxiety and depression compared to natural menopause[4]. The reason is that changes in circulating sex steroids (a sudden drop in estrogen, progesterone, and testosterone levels) occur more rapidly after SM compared to natural menopause[5]. Hormone therapy can reduce these risks, but it currently has significant limitations[6]. In women with SM who are not treated with hormone therapy, these risks are more pronounced, especially for those under the age of 45 years[7,8].

The age of menopause is an important threshold that can be an indicator of future longevity in women[9]. Although the average age of menopause of women worldwide is 51 years[10,11], the age of menopause due to SM is decreasing[1]. SM causes increased morbidity and mortality rates for both premenopausal and postmenopausal women[4,12]. As the age of menopause decreases, the risk of many chronic diseases, especially cardiovascular diseases (CVD)[7,12] and type II diabetes mellitus[9], increases. Price et al.,

stated that the obesity rate was higher in women who underwent SM compared to women who underwent natural menopause and that SM increased the risk for higher CVD compared to natural menopause (12.4 vs. 10.8% risk for CVD risk)[7]. Zhu et al., examined 10 observational studies and found that, when compared to women aged 50–54 years who were at natural menopause, women who underwent SM had an increased risk for CVD. Specifically, the risk was 2.55 times higher (CI 2.22, 2.94) for those aged <35 years, 1.91 times higher (CI 1.71, 2.14) for those between the ages of 35 and 39 years, 1.58 times higher (CI 1.44, 1.74) for those between the ages of 40 and 44 years, and 1.20 times higher (CI 1.10, 1.31) for those between the ages of 45 and 59 years[12]. In the cohort study by Zhai et al., the lung health of 1,666 women who had a habit of smoking with a mean age of 59 years was assessed. Of the women involved in the study, 646 (39%) reported early menopause (defined as occurring before the age of 45 years). Out of these, 198 (19.1%) had natural menopause, while 448 (71.3%) had SM. The study found that early menopause is a risk factor for both malignant and non-malignant lung diseases as well as mortality in women smokers[13].

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The reduction of the factors that cause SM is important for public health[14] because the risks that may cause SM in women affect the awareness of these risks and their related health service-seeking behaviors[15]. Therefore, knowing the sociodemographic characteristics of women with SM, such as age, presence of chronic diseases, and smoking may help predict morbidity and mortality risks. It can also guide health professionals (physicians, nurses, etc.) to develop preventive strategies for these morbidity and mortality risks. It would be useful to know the level of sociodemographic characteristics in women with SM to carry out interventions such as prevention of obesity, smoking cessation, and regular follow-up of chronic diseases (diabetes, etc.). Therefore, in this study, we aimed to evaluate the SM indications and sociodemographic characteristics of women.

METHODS

Study design

This retrospective study was conducted by searching past SM participant records between July and October 2021 in the gynecology outpatient clinic of a hospital. We obtained institutional permission from the hospital and received approval from the ethics committee of our institution. All the study data were anonymized before analysis. We performed a power analysis for the sample size of this study using the G-Power 3.0.10 statistical power analysis software. According to our multinominal logistic regression analysis results, the total power of the study was calculated to be 97%.

Participants

The study sample included all women who had SM indications between 2010 and 2020. We obtained the data by searching the archive file records of the participants who were coded as ICD-10, N95,3 (cases with artificial menopause code) from the outpatient clinic records, and we obtained a total of 704 participant records. The inclusion criteria for this study were as follows: age 18 years or above, no occurrence of natural menopause yet, and menopausal conditions that developed as a result of castration of both ovaries with or without the uterus due to a disease. Exclusion criteria included a lack of data on SM indications, premature ovarian insufficiency, and natural menopause processes.

Procedures

We collected research data, which included information about participants with the SM code (ICD-10, N95,3), from the gynecology polyclinic records in the Probel software (hospital information management system). Subsequently, we transferred this data to an Excel file. Then, the researchers transferred the data from the Excel file to the SPSS 24.0 software and prepared them for analysis.

Statistical analysis

We analyzed the research data using SPSS Statistics 24.0. We used multinomial logistic regression analysis and binary logistic regression analysis to evaluate the relationship between the data. We presented differences in these categorical data with an odds ratio with a 95% confidence interval (95%CI). We considered $p < 0.05$ to be statistically significant. We used the Plotly 4.10.0 library and ggplot2 3.3.5 graphs on R version 4.1.1 (2021-08-10) to visualize the data.

RESULTS

Table 1 presents data on the sociodemographic characteristics of women.

In Turkey, the average age of menopause is approximately 47 years[16], while it is 51 across the world[10,11]. However, premenopause, which is the transition period before menopause in women, can last for 2–6 years. For this reason, we found it appropriate to examine the age grouping of the sample in four categories. We categorized the groups as 23–40 years, 41–46 years, 47 years, and 48–50 years, respectively.

Figure 1 shows the distribution of women according to the age at which they received an indication for SM.

In Table 2, we performed a logistic regression analysis by grouping SM indications. The first group was "causes related to bleeding" and consisted of AUB and myoma uteri. The second group was "cancer" and consisted of endometrial hyperplasia, elective hysterectomy for breast cancer, endometrial cancer, cervical intraepithelial neoplasia, cervical cancer, and other organ metastases. The third group was "cancer risk" and consisted of adnexal malignant and benign masses. The fourth group was "other indications" and consisted of endometriosis, POP, and tubo-ovarian abscess.

According to the results of the logistic regression analysis, compared to the other SM indication groups, SM indications for cancer increased by 0.08 times due to smoking (95%CI 0.01–0.68; p<0.021), 0.45 times (95%CI 0.23–0.88) due to regular drug use, and 0.36 times (95%CI 0.19–0.69) due to chronic diseases. Regular drug use by age increased by 1.81 times (95%CI 1.14–2.89; p<0.012) in women aged 41–46 years compared to women aged 23–40 years (Table 2).

Table 1. Sociodemographic characteristics (n=704).

	n	%
Age (43.92±3.56 years)		
23–40 years	95	13.5
41–46 years	450	63.9
47 years	90	12.8
48–50 years	69	9.8
Marital status		
Married	652	92.6
Single	52	7.4
Educational status (n=29)		
Literate	4	13.8
Primary school	9	31.1
Secondary school	11	37.9
University	5	17.2
Family type		
Live alone	34	4.8
With spouse	15	2.1
Nuclear family	655	93.1
Smoking history (n=63)		
Yes	63	8.9
No	641	91.1
Presence of chronic disease (n=387)		
Hypothyroidism	86	22.2
Hypertension	66	17.1
Type II diabetes mellitus	27	7.0
Breast cancer	69	17.8
Asthma-chronic obstructive pulmonary disease	34	8.8
Hypertension and type II diabetes mellitus	41	10.6
Others	64	16.5
Regular drug use (n=284)		
Thyroid hormones	75	26.4
Anti-hypertensive drugs	79	27.9
Antidiabetic drugs	32	11.2
Tamoxifen	57	20.1
Anti-hypertensive and antidiabetic drugs	41	14.4
Mode of delivery (n=594)		
Vaginal delivery	340	57.2
Cesarean section	211	35.5
Vaginal delivery and cesarean section	43	7.3

DISCUSSION

In this study, we evaluated SM indications and sociodemographic characteristics of women between 2010 and 2020. According to the results of this study, the mean age of menopause due to early menopause caused by SM indications was 43.92±3.64 years. According to many researchers, the mean age of SM varies between 44.0 and 48.1 years[1,7]. As the age of menopause decreases, the risk of many diseases, especially CVD[12] and type II diabetes mellitus, increases[9]. Blood pressure is an important indicator of CVD. In the study by Bagnoli et al., it was determined that approximately 30% of 5,027 postmenopausal women with an average age of 51.9 years were obese. In the study, the prevalence of hypertension was higher in overweight (27.62%), obese (40.17%), and morbidly obese (54.55%) patients compared to those with a normal BMI (12.0%), and higher BMI had a significant negative effect on blood pressure[17]. Shen et al., investigated the risks of CVD, cancer, and diabetes in postmenopausal women based on their age at menopause. They found that women with a mean age of menopause of 50 years had mortality rates of 21% due to CVD, 38% due to cancer, and 7% due to diabetes[9]. The age of SM is lower in this study than in other studies, which constitutes an important risk factor for women in terms of CVD and diabetes.

In this study, the rate of indications for SM related to endometrial cancer was 6.1%. As of 2020, corpus uteri cancer is the 19th leading cause of death among women worldwide[18]. Güzel et al., stated that women with a high body mass index have a higher mortality rate from endometrial cancer compared to those with a low body mass index[19]. Zhao et al., evaluated the risk factors for endometrial cancer in patients with endometrial hyperplasia. They found that the incidence of endometrial cancer was 31.58% in a total of 228 patients with endometrial hyperplasia, of whom 72 had endometrial cancer[20]. In this study, the first two SM indications were myoma uteri and AUB, and the fifth SM indication was endometrial hyperplasia. All of these three conditions are among the most common reasons for women to present to the gynecology outpatient clinic with bleeding complaints and are risk factors for endometrial cancer. Compared to women aged 23–40 years in this study, regular drug use in women aged 41–46 years (premenopause) increased by 1.81 times. Regular medication uses increased cancer-related SM indications by 0.45 times and the presence of chronic diseases by 0.36 times (Table 2). Therefore, it is understood that many risk factors for endometrial cancer coexist in our results.

In the findings of this study, other causes of SM included adnexal malignant mass, adnexal benign mass, elective hysterectomy due to breast cancer, endometrial cancer, endometriosis,
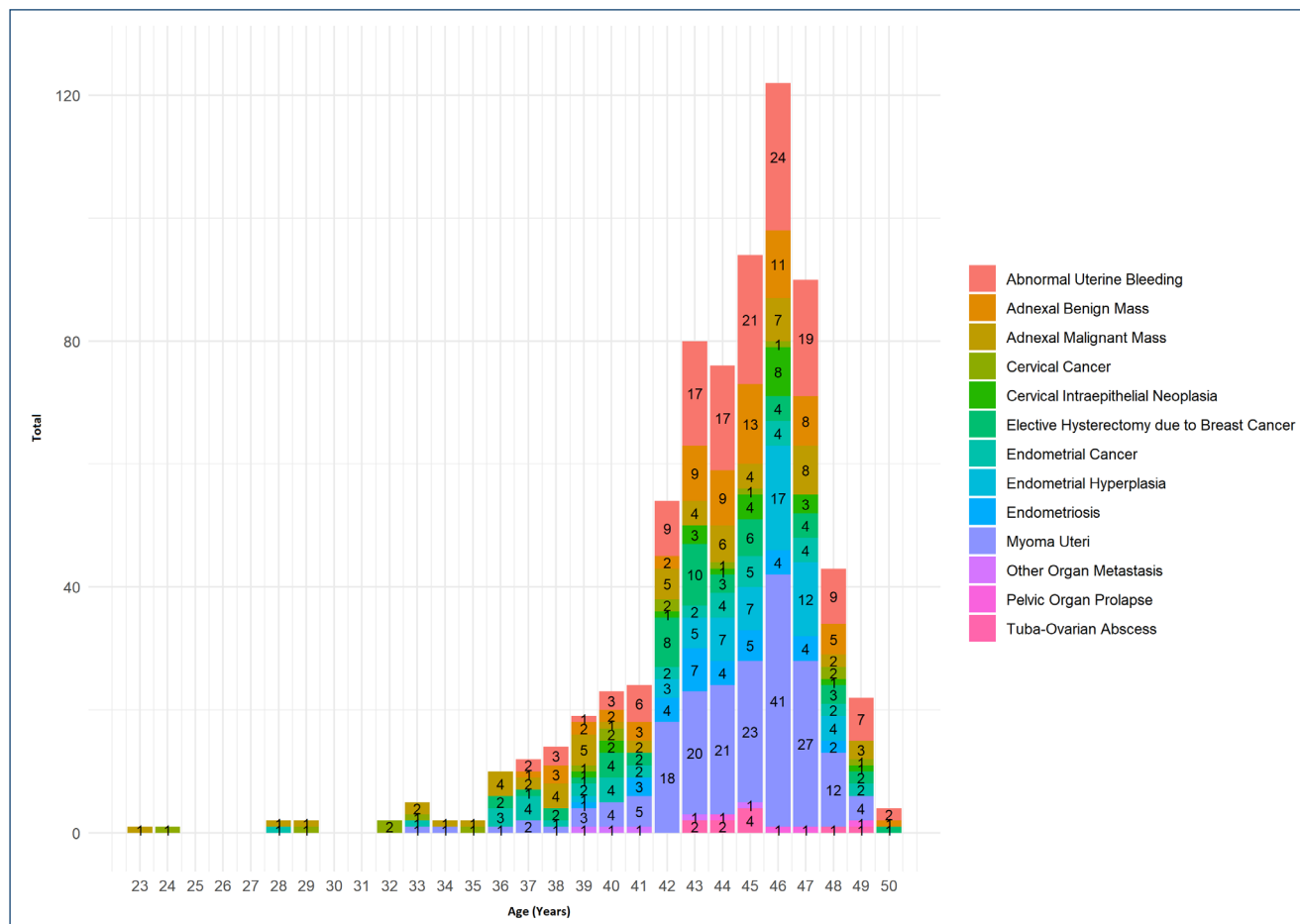
Figure 1. Distribution of women according to age at which they received surgical menopause indication.

Table 2. Associated factors for surgical menopause indication: logistic regression (n=704).

Variable	Surgical menopause indications							
	Causes of bleeding		Cancer		Cancer risk		Other indications	
	n	%	n	%	n	%	n	%
	324	46.0	199	28.3	133	18.9	48	6.8
	Odds ratio (95%CI)	p	Odds ratio (95%CI)	p	Odds ratio (95%CI)	p		
Smoking history[b]	0.17 (0.02–1.34)	0.093	0.08 (0.01–0.68)	**0.021**	0.21 (0.02–1.60)	0.216	1[a]	
Regular drug use[b]	0.76 (0.39–1.46)	0.414	0.45 (0.23–0.88)	**0.020**	0.80 (0.37–1.63)	0.547		
Presence of chronic disease[b]	0.65 (0.35–1.21)	0.177	0.36 (0.19–0.69)	**0.002**	0.72 (0.37–1.41)	0.345		
	Age							
	48–50 years		47 years		41–46 years		23–40 years	
	n	%	n	%	n	%	n	%
	69	9.8	90	12.8	450	63.9	95	13.5
	Odds ratio (95%CI)	p	Odds ratio (95%CI)	p	Odds ratio (95%CI)	p		
Regular drug use[c]	1.16 (0.60–2.25)	0.645	1.48 (0.81–2.71)	0.198	1.81 (1.14–2.89)	**0.012**	1[a]	

[a]1: Reference category, [b]Model chi-square: 83.817; p<0.000, –2 log likelihood: 1309.779, Pseudo R² (Nagelkerke): 0.180, [c]Hosmer and Lemeshow test: 0.327, Nagelkerke R square: 0.093, p: 0.003, χ^2: 32.463; df: 9. Bold values indicate data with statistical significance.

CIN, cervical cancer, TOA, other organ metastasis, and POP. Wong et al., stated that 749 of the 2,656 women in their study were applied SM, and 509 had a preoperative SM indication. They found that preoperative SM indications and their rates included malignancy (45%), endometrial hyperplasia (21%), endometriosis (10%), irregular uterine bleeding (9%), pelvic mass (9%), prophylactic bilateral salpingo-oophorectomy (8%), and other indications[21]. In the study by Jain and Somalwar, the causes of benign lesions SM were found to be dysfunctional uterine bleeding, leiomyoma, endometriosis, adenomyosis, and postmenopausal bleeding[8]. There were different rates in terms of administering SM due to the malignancy of its indications, both in these studies and in our study. The mean age of the women in the study of Wong et al., was 55.5 years[21], and it was <45 years in approximately 40% of the women in the study by Jain and Somalwar[8]. However, in this study, 60.1% of the women were under the age of 45 years. Another different result compared to other studies was that the rate of SM originating from the cervix, including 3.6%CIN and 2.4% cervical cancer, was higher in our sample group. There were other significant differences in the studies, such as the inclusion criteria of women in the sample (use of hormone therapy, etc.). Therefore, we thought that there were differences between SM indications in terms of malignancy rates.

The cases coded as malignant adnexal mass in our data were women with ovarian cancer, which accounted for 9.1%. The rate of SM due to elective hysterectomy for breast cancer was 7.5%. In the study by Li et al., SM resulted in a 45% decrease in breast cancer risk in women who had a BRCA1/2 mutation and did not have a history of breast cancer, a 57% decrease in all-cause mortality in breast cancer patients, and a 65% decrease in all-cause mortality related to SM[22]. Reducing the risk of ovarian cancer may continue to be a reasonable target for women undergoing hysterectomy, especially those aged ≥50 years. In our data, the mean age of women who underwent SM due to a benign adnexal mass was 41.7 years. For this reason, we thought that it is an important risk factor for other diseases and fertility loss in women in later life.

The study by Sorpreso et al., identified non-obstetric causes of death in climacteric women in Brazil after "The National Policy for Integral Attention to Women's Health Care (PNAISM)". The PNAISM (launched in 2004 by the Brazilian Health Department) covers a comprehensive area of women's health, including pregnancy, puerperium, prevention, detection and treatment of neoplasms, menopause, etc. The study analyzed data on 2,107,634 women aged 40–64 years between 1996 and 2016. The main causes of death in women were circulatory system diseases (22.47%), neoplasms (19.69%), respiratory system diseases (5.5%), endocrine, nutritional, and metabolic disorders (5.27%) and digestive system diseases (3.74%). After implementation of the PNAISM, the authors observed a downward trend in rates of mortality from diseases of the circulatory and digestive systems and from endocrine, nutritional, and metabolic diseases[23]. As noted in this study, health policies to protect women's health are very important. Therefore, it is important to know the sociodemographic characteristics of women with SM to evaluate women holistically for preventable or controllable risks and to guide health policies. For example, Noll et al., examined 288 postmenopausal women with an average age of 56.23 years, an average menopause duration of 8.15 years, and 48.6% of whom underwent early menopause. In the study, it was determined that 33.4% of the women were obese, 16.7% were smokers, and 54.5% did not engage in physical activity. In the study, the authors reported that obesity was associated with somatic symptoms 1.36 (CI 1.04–1.79), vasomotor symptoms 1.38 (CI 1.01–1.90), and anxiety/fear 1.84 (CI 1.05–3.21)[24]. Also, in this study, 8.8% of the women had a history of smoking, which increased the risk of SM due to cancer by 0.08 (CI 0.01–0.68) times. According to the results of the above studies, the results of this study may contribute to the management of preventable risk factors in women with SM. It is recommended that health professionals (physicians, nurses, etc.) address women's sociodemographic characteristics and perform prospective risk management such as CVD and diabetes after SM.

Limitations
In this study, we were able to obtain data on the education level and contraception methods for a small portion of the women in our study group. Therefore, we were unable to evaluate the effects of educational status and contraception methods.

CONCLUSION
In this study, the age of menopause due to SM in women was found to be below 45 years. The majority of women had chronic diseases, and the prevalence of regular drug use was high. Smoking, the presence of chronic diseases, and regular drug use for chronic diseases increase the rate of SM due to gynecologic cancer. It is recommended that these results can be used to reduce preventable health risks and improve the well-being of post-SM women.

RESEARCH ETHIC
The ethical approval was obtained from the Non-Interventional Ethics Committee of Dokuz Eylul University (date: 28/07/2021, No: 2021/22-31).

AUTHORS' CONTRIBUTIONS

HÖ: Conceptualization, Formal Analysis, Methodology, Supervision, Writing – original draft, Writing – review & editing. **SK:** Conceptualization, Data curation, Supervision, Writing – original draft, Writing – review & editing. **SÖ:** Data curation, Investigation, Writing – original draft. **CTÇ:** Data curation, Investigation, Writing – original draft. **İÖ:** Formal Analysis, Methodology, Visualization, Writing – original draft.

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