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Original article

# Comparison of female sexual function in women who underwent abdominal or vaginal hysterectomy with or without bilateral salpingo-oophorectomy

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ABSTRACT

*Objective:* To compare the effect of abdominal and vaginal hysterectomy with or without bilateral salpingo-oophorectomy on female sexuality.
*Methods:* Perimenopausal, sexually active, aged 45–50 years women who underwent abdominal or vaginal hysterectomy with or without bilateral salpingo-oophorectomy due to benign indications were included in this retrospective study. For the assessment of preoperative and postoperative female sexual function, Turkish validated Female Sexual Function Index form was used.
*Results:* Of the study population, 82 women (Group A) underwent hysterectomy + bilateral salpingo-oophorectomy and 78 women (Group B) underwent hysterectomy-only operations. The groups were statistically similar in terms of mean age, number of gravida and parity, body mass index, duration of postoperative evaluation, type of hysterectomy and presence of preoperative female sexual dysfunction. Both in Group A and B, postoperative total Female Sexual Function Index scores increased significantly compared to preoperative total scores. And there were no differences between the groups regarding the total preoperative and postoperative Female Sexual Function Index scores. However, postoperative arousal and orgasm scores were higher while pain score was lower in Group B than in Group A.
*Conclusion:* Abdominal and vaginal hysterectomy with or without bilateral salpingo-oophorectomy for benign causes positively affect female sexuality in general. But, premenopausal bilateral oophorectomy may cause more pain during intercourse, decreased libido and orgasm than ovary conservation.
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## Introduction

Hysterectomy is the most commonly performed operation in gynaecology practice [1]. It is estimated that 40% of women will undergo this operation before they reach age 64, and 90% of these surgeries are due to benign reasons [2,3]. Most of the women who have this surgery are concerned about how it will affect their sexuality, and, unfortunately, there is still no consensus about the effects of the surgery on women's sexuality. It has been postulated that a significant minority of women who underwent hysterectomy had deterioration in their sexual function [4]. Conversely, other reports have suggested that hysterectomy can improve female sexual function [5].

In the United States, oophorectomy is performed at a rate of 40–50% during hysterectomy [6]. Additionally, to reduce the risk of future malignancy, prophylactic bilateral salpingo-oophorectomy (BSO) is included as part of 37% of hysterectomies performed in women under 45 years of age and in 68% of hysterectomies performed in women over 45 years of age [7]. However, ovarian conservation even in postmenopausal women at the time of hysterectomy is beneficial for bone health, cardiovascular health and cognitive functioning [6,8]. With BSO, women are deprived of ovarian sex steroids. And the role of reduced endogenous ovarian sex steroids due to BSO on female sexuality during premenopausal and menopausal transition periods has been assessed by various studies, but the results are still unclear [9–12]. Therefore, further studies regarding the effects of concomitant BSO at hysterectomy on female sexual function are needed.

In this study, we aimed to compare the effects of abdominal and vaginal hysterectomy, with or without bilateral salpingo-oophorectomy, on female sexuality.

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## Material and methods

This retrospective study included perimenopausal, sexually active women (i.e., at least one episode of intercourse in the three months prior to surgery) whose last menstruation had occurred less than 12 months prior to surgery, who were aged 45–50 years, and who had undergone hysterectomy, with or without BSO, due to benign uterine or ovarian diseases including uterine myoma, uterine prolapse, abnormal uterine bleeding, or ovarian cyst between December 2013 and January 2015. Women who were smokers, who had mental, psychiatric, systemic, or neurological diseases, who had undergone a previous or concomitant anterior and/or posterior colporrhaphy, apical support procedures except for McCall culdoplasty or anti-incontinence surgery, or who had postoperative malignant pathology were excluded from the study.

The participants were divided into two groups. Group A included women who had undergone hysterectomy with BSO. Group B consisted of women who had undergone hysterectomy only. All operations had been performed by the specialist gynaecologists who were also the authors of this study (MD, MKK, SC, OA) and their senior residents. After all of the hysterectomies were completed, the vaginal cuff was closed vertically. A McCall culdoplasty or modified version was performed as part of each hysterectomy to prevent postoperative vaginal cuff prolapse. During culdoplasty, the uterosacral ligaments were incorporated into the peritoneal surface in the midline and reattached to the vaginal apices [13,14].

The baseline demographic and operation-related data were reviewed based on hospital records. For the assessment of preoperative and postoperative female sexual function, the Turkish validated Female Sexual Function Index (FSFI) form was used. The FSFI, a 19-item questionnaire, has been widely used as an objective assessment tool for sexual function in women. It provides scores for six domains of sexual function (desire, arousal, lubrication, orgasm, satisfaction, and pain) as well as a total score. Lower scores indicate decreased sexual function, and a total score of $\leq$ 26 is classified as female sexual dysfunction (FSD). For each patient, the FSFI form was completed via telephone or face-to-face interview by one author (DK) who did not know which operation had been performed.

The present study was approved by the Institutional Review Board of Zekai Tahir Burak Woman's Health Education and Research Hospital and conducted in accordance with the Declaration of Helsinki. All participants enrolled in the study gave verbal informed consent before being interviewed.

Statistical analyses were performed using the Statistical Package for the Social Sciences (SPSS) version 17.0 (Chicago, IL, USA). All numerical variables were normally distributed. Continuous variables were expressed as mean ± standard deviation, and a paired *t*-test was used to compare group differences between these variables. The categorical variables were expressed as a number (percentage), and comparison of these variables between the groups was performed using a chi square test. Multivariate logistic regression analysis was performed to identify potential risk factors independently associated with postoperative FSD. A p value $< 0.05$ was considered statistically significant.

## Results

Data for 452 patients were examined. Hysterectomy with BSO had been performed on 250 of these patients, while hysterectomy without BSO had been performed on 202. After the exclusion criteria were applied, the hysterectomy plus BSO group (Group A) consisted of 82 patients, and the hysterectomy only group (Group B) consisted of 78 patients.

The demographic characteristics of the two groups are listed in Table 1. The groups were statistically similar in terms of mean age, number of gravida and parity, body mass index, duration of postoperative evaluation, type of hysterectomy, and presence of preoperative FSD. However, there was a significant difference between the groups in terms of the frequency of hysterectomy indications (p = 0.014). The frequencies of indications in Group A were uterine myoma (41.5%), uterine prolapse (34.1%), abnormal uterine bleeding (AUB, 13.4%), and ovarian cyst (11.0%). In Group B, these frequencies were uterine myoma (46.2%), uterine prolapse (44.9%), AUB (9.0%), and ovarian cyst (0.0%).

The FSFI scores for both groups are listed in Table 2. When the pre- and postoperative scores of the groups were compared, some significant differences were detected. In both Group A and Group B, the postoperative total FSFI scores (25.8 ± 2.1 and 26.0 ± 2.2, respectively) increased significantly as compared to the preoperative total scores (22.6 ± 2.0 and 22.2 ± 1.9, respectively). Additionally, evaluation of the components that composed these scores revealed that postoperative desire, arousal, orgasm, satisfaction, and pain scores were significantly increased in Group A, while the lubrication scores were similar for the postoperative period. In

**Table 1**
Demographic characteristics of the groups.

| | Group A (Hysterectomy + BSO) N = 82 | Group B (Hysterctomy-only) N = 78 | p |
|---|---|---|---|
| Age (years) | 48.6 ± 1.2 | 47.2 ± 1.1 | 0.356 |
| Gravidity (number) | 3.8 ± 1.8 | 3.9 ± 1.7 | 0.689 |
| Parity (number) | 3.2 ± 1.5 | 3.3 ± 1.4 | 0.711 |
| BMI (kg/m$^2$) | 28.2 ± 2.1 | 28.5 ± 2.4 | 0.267 |
| Postoperative interval (month) | 10.2 ± 2.1 | 9.4 ± 1.9 | 0.198 |
| Hysterectomy type | 50 (61.0) | 40 (51.3) | 0.217 |
| Abdominal | 32 (39.0) | 38 (48.7) | |
| Vaginal | | | |
| Indications | 34 (41.5) | 36 (46.2) | 0.014 |
| Uterine myoma | 11 (13.4) | 7 (9.0) | |
| AUB | 28 (34.1) | 35 (44.9) | |
| Uterine prolapse | 9 (11.0) | 0 (0.0) | |
| Ovarian cyst | | | |
| Preop. FSD | 32 (39.0) | 39 (50.0) | 0.162 |

Variables were presented as mean ± standard deviation and number (%).
BSO: Bilateral salpingo-oopherectomy; BMI: Body mass index; AUB: Abdormal uterine bleeding; FSD: Female sexual dysfunction.
p < 0.05 was considered statistically significant.

**Table 2**
Scores of Female Sexual Function Index components in groups.

| | Group A (Hysterectomy + BSO) | | $P_1$ | Group B (Hysterctomy-only) | | $P_2$ | $P_3$ | $P_4$ |
|---|---|---|---|---|---|---|---|---|
| | Preop. | Postop. | | Preop. | Postop. | | | |
| Desire | 3.1 ± 0.9 | 4.1 ± 0.6 | <0.001 | 3.0 ± 0.7 | 4.2 ± 0.6 | <0.001 | 0.686 | 0.878 |
| Arousal | 3.5 ± 0.8 | 3.9 ± 0.8 | <0.001 | 3.2 ± 0.8 | 3.7 ± 0.8 | <0.001 | <0.001 | <0.001 |
| Lubrication | 3.9 ± 0.3 | 3.5 ± 0.7 | <0.001 | 3.6 ± 0.4 | 4.2 ± 0.7 | <0.001 | <0.001 | <0.001 |
| Orgasm | 4.1 ± 0.9 | 4.1 ± 0.5 | 0.423 | 4.2 ± 0.8 | 4.7 ± 0.5 | <0.001 | 0.462 | <0.001 |
| Satisfaction | 4.5 ± 0.4 | 5.2 ± 0.4 | <0.001 | 4.1 ± 0.5 | 5.0 ± 0.3 | <0.001 | <0.001 | 0.001 |
| Pain | 3.5 ± 0.7 | 4.1 ± 0.6 | <0.001 | 4.2 ± 1.0 | 4.2 ± 0.4 | 0.817 | <0.001 | 0.362 |
| Total | 22.6 ± 2.0 | 25.8 ± 2.1 | <0.001 | 22.2 ± 1.9 | 26.0 ± 2.2 | <0.001 | 0.567 | 0.181 |

Variables were presented as mean ± standard.
$P_1$ Probability value for pre. and postop data of group A.
$P_2$ Probability value for pre. and postop data of group B.
$P_3$ Probability value for preop. data of group A and B.
$P_4$ Probability value for postop. data of group A and B.
$p < 0.05$ was considered statistically significant.

Group B, comparison of the pre- and postoperative scores of the FSFI components revealed significant improvements in the postoperative desire, arousal, orgasm, and satisfaction scores, with no difference in the lubrication and pain scores. The postoperative arousal and orgasm scores were higher, whilst the pain score was lower in Group B than in Group A. There was no difference between the groups regarding the total pre- and postoperative FSFI scores.

In the multivariate logistic regression analysis, the presence of preoperative FSD was the only significant independent risk factor for postoperative FSD. Hysterectomy type (abdominal or vaginal), concomitant BSO procedure, and hysterectomy indications were not found to be significant risk factors independently associated with postoperative FSD (Table 3).

## Discussion

Historically, for a woman, the uterus has been accepted as the regulator and controller of important physiological functions, a sexual organ, a source of energy and vitality, and a maintainer of youth and attractiveness [15]. Literaturely, however, the effect of hysterectomy on female sexual function is controversial. Some previous studies have suggested that hysterectomy may cause impaired sexual function, because scarring during healing of the vagina might prevent full ballooning of the upper vagina or disruption of blood supply with removed tissue may reduce the capacity of vasocongestion, additionally with or without nerve damage, this condition could result in dyspareunia or decreased arousal. Moreover, shortening of vaginal length after hysterectomy could result in dyspareunia. And also, some experimental studies showed that hysterectomy caused sensory loss in the vagina, without affecting sexual function. Finally, the belief that uterus is important for sexual function could increase the hysterectomy related anxiety and cause deterioration of sexual function following the operation [2,16–18]. On the other hand, in many recent reviews, it has been reported that in short and long term, hysterectomy operations performed to alleviate symptoms related to benign somatic conditions have beneficial effects on quality of life and sexual function in general, regardless of the applied surgical technique and whether the cervix is removed or not [19–24]. Similar to the recent literature, we have found that total FSFI scores of perimenopausal women who underwent abdominal or vaginal hysterectomy improve during the postoperative short term. This is probably the result of hysterectomy eliminating complaints such as bleeding problems, coital pain, reluctance related to prolapse, contraception fear which adversely affect the quality of life and female sexual function and indicating the positive effect of hysterectomy with or without oophorectomy on sexual well-being.

Bilateral oophorectomy is still frequently performed during hysterectomy in women before the age of natural menopause. Surgical operations in most of these cases are performed for benign indications. In addition, most of these premenopausal oophorectomies are performed without any specific ovarian pathology. Unfortunately, recent evidence has suggested that early menopause, be it surgical or physiologic, is associated with worsened long-term health outcomes including an increased risk of coronary artery disease, osteoporosis, and increased all-cause mortality [25]. However, the potential benefits and harms of premenopausal oophorectomy on female sexuality during the hysterectomy are controversial and have been investigated in many studies. Some have reported that premenopausal oophorectomy has improved sexual life, while others have stated that premenopausal oophorectomy has no effect or is associated with a deterioration [9–12,26]. In evaluating FSFI components separately, we have found that postoperative arousal and orgasm scores were lower and pain scores were higher in hysterectomy + BSO group than in hysterectomy-only. This might be due to hormonal changes that occur in the body as a result of surgical menopause, which is caused by oophorectomy. During menopause, blood flow in the genitourinary system decreases with decreasing estrogen, which causes atrophy of the vagina, muscle and connective tissue. Along with vaginal spasms, the mucosa gets thinner, wrinkles disappear, elasticity decreases and vaginal fornix is shortened. As a result, pain and dryness occur that interfere with sexual intercourse.

**Table 3**
Multivariate logistic regression analysis of potential factors for postoperative FSD.

| | Postop. FSD (n = 21) | Postop no FSD (n = 139) | OR (% 95 CI) | p |
|---|---|---|---|---|
| Hysterectomy | 7 (33.0) | 83 (59.7) | Reference | 0.058 |
| Abdominal | 14 (66.0) | 56 (40.3) | 2.67 (0.97-7.36) | |
| Vaginal | | | | |
| BSO | 11 (52.4) | 72 (51.8) | Reference | 0.271 |
| Yes | 10 (47.6) | 67 (48.2) | 1.96 (0.59-6.51) | |
| No | | | | |
| Indications | 2 (9.5) | 9 (6.5) | Reference | 0.508 |
| Ovarian cyst | 10 (47.6) | 70 (50.4) | 0.51 (0.07-3.70) | 0.993 |
| Myoma | 4 (19.0) | 16 (11.5) | 1.01 (0.13-7.69) | 0.490 |
| AUB | 5 (23.8) | 44 (31.7) | 0.51 (0.77-3.42) | |
| Prolapse | | | | |
| Preop FSD | 19 (90.5) | 76 (54.7) | Reference | 0.008 |
| Yes | 2 (9.5) | 63 (45.3) | 0.12 (0.03-0.57) | |
| No | | | | |

FSD: Female sexual dysfunction; OR: Odds ratio; CI: Confidence interval.
BSO: Bilateral salpingoopherectemy; AUB: Abnormal uterine bleeding.
$p < 0.05$ was considered statistically significant.

On the other hand, throughout natural menapouse, climacteric ovary looses estrogen production but continues to secrete a substantial quantity of androgens such that circulating testosterone levels change very little during the menopausal period. But in surgical menopause, bilateral oophorectomy results in a substantial decline in testosterone levels. Androgens are thought to be necessary for libido, sexual arousability, and pleasure, and to play a role in vaginal and clitoral function during genital sexual arousal [9,26]. Hence, dramatically decreasing androgen levels after premenopausal bilateral oophorectomy may lead to decreased sexual libido and orgasm.

FSD is a multifactorial health problem and various pre and postoperative factors has been reported to influence sexuality after hysterectomy Psychological problems such as depression or anxiety, conflict within the relationship, fatigue, stress, issues relating to prior physical or sexual abuse, medications (selective serotonin reuptake inhibitors, anticholinergics etc.) or physical and medical problems that make sexual activity uncomfortable, such as endometriosis, urinary incontinence or malignancy may adversely affect female sexual function [27]. In our study, we excluded women who had psychiatric or systemic disease, those who had a previous or concomitant anterior and/or posterior colporrhaphy, apical support procedures except for McCall culdoplasty and anti-incontinence surgery and postoperative malignant pathology and found that only presence of preoperative FSD was a significant risk factor for postoperative FSD. Neither type of hysterectomy nor presence of oophorectomy was found as a risk factor. We think that this finding has a clinical significance. Namely, before a hysterectomy planned to perform due to benign causes, treatment of a detected FSD with appropriate and planned approaches will reduce the possibility of developing postoperative FSD. In addition, informing patients in this way will be helpful in eliminating concerns of patients regarding the sexuality about the operation.

Our study has some limitations. Because of retrospective design we could not assess several factors related to female sexual funtion such as presence of anxiety, quality of life and partner relationship. Relatively small sample size is another drawback in our study. It also has findings of a short postoperative follow-up period and does not include any changes that may be in the long-term follow-up sexual function.

In conclusion, abdominal and vaginal hysterectomy with or without BSO for benign causes positively affect female sexual functions in general. But, the premenopausal bilateral oophorectomy may cause more pain during intercourse, decreased libido and orgasm than ovary conservation. Apart from these, there is no effect of abdominal or vaginal hysterectomy type and oophorectomy presence for FSD following hysterectomy. Clinicians who inform women about scheduled hysterectomy with or without oophorectomy due to benign indications may reassure women that they will have better sexual life.

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## Competing interest

The authors declare no conflict of interest.

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