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# Sexual function in patients with endometriosis: a prospective case–control study in China

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## Abstract

**Objective:** Endometriosis is a common disease in women of childbearing age, leading to sexual dysfunction or loss of libido. We aimed to evaluated the effect of endometriosis on women's sexual function.

**Methods:** We performed a prospective case–control study to determine the effect of endometriosis on women's sexual function using a self-administered questionnaire from September 2017 to August 2018. The simplified Chinese version of the Female Sexual Function Index (FSFI) was used to assess sexual function.

**Results:** We found that sexual function of women in the endometriosis group (n=77) in all dimensions was significantly lower compared with that in the control group (n=63). The total FSFI score in patients was 25.5, which tended to be lower than that in the control group (26.7). Sexual arousal, sexual pain, and satisfaction were significantly different between the two groups. Sexual arousal and sexual pain scores were significantly lower in the endometriosis group than in the control group at the ages of 31 to 40 years.

**Conclusion:** Women with endometriosis suffer from sexual dysfunction, especially those aged 31 to 40 years. Our findings suggest that the quality of sexual life in this subpopulation needs to be improved.

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Endometriosis, Female Sexual Function Index (FSFI), sexual dysfunction, quality of sexual life, vaginal lubrication, pain

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## Introduction

Endometriosis refers to the presence of endometrial tissue (glands and stroma) outside of the uterus, most of which is located in pelvic organs and the peritoneum. This leads to dysmenorrhea, chronic pelvic pain, sexual intercourse pain, infertility, and other clinical symptoms. Endometriosis is a common and frequently occurring disease in women. Endometriosis is prevalent and affects an estimated 10% of women of reproductive age.[1]

The quality of sexual life plays an important role in the overall quality of life. Approximately 70 million adult and adolescent women worldwide suffer from endometriosis. More than 70% of patients with endometriosis have obvious pain symptoms, such as dyschezia, chronic pelvic pain, sexual intercourse pain, and fecal pain. Approximately two thirds of women with endometriosis have sexual dysfunction that is not limited to deep dyspareunia.[2] Quality of life and mental health of women are significantly negatively affected by dyspareunia.[3–6] An increasing amount of attention has been paid to female sexual dysfunction by women and clinicians in recent years. In 1998, the American Urinary Foundation defined female sexual dysfunction as women who are unable to participate in the desired sexual behavior. In female sexual dysfunction, there is difficulty in satisfaction or even a lack of satisfaction in the process of sexual behavior. These feelings include loss of libido, arousal disorder, orgasm disorder, sexual pain, and vaginal spasm. In recent years, an increasing number of studies have reported that women with endometriosis have a lower sexual quality of life, such as sexual functioning and satisfaction.[7,8]

Garry et al.[9] believed that endometriosis has a serious adverse effect on women's physical and mental health, sexual life, and other aspects. Most of the lesions of endometriosis are located in the posterior pelvic cavity.[10] These lesions form hard nodules in the uterosacral ligament, uterine rectal depression, and vaginal fornix. During sexual intercourse, these nodules are affected by an external impact force. Tension of contractile hard lesions, which lack elasticity, increases and shifts, resulting in deep sexual pain. Some patients may also experience pain after sexual intercourse. Because of pain, patients minimize the frequency of sexual life and reduce their experience of sexual life. This can lead to a series of sexual dysfunction problems, such as reduced sexual demand, reduced sexual arousal, and reduced orgasms. A study from Brazil showed that 40% of women with endometriosis-related chronic pelvic pain were unsatisfied with their overall sexual life and suffered from symptoms, such as reduced frequency of sexual life, vaginal spasm, and even sexual aversion.[11] The quality of life and sexual satisfaction in women with endometriosis and chronic pelvic pain are significantly lower than in those without endometriosis and can even affect the stability of marriage and family.[11,12] More severe deep dyspareunia

is associated with worse sexual quality of life, independent of superficial dyspareunia, psychological comorbidities, and other potential confounders.[13]

Therefore, alleviating the clinical symptoms of patients, paying attention to the sexual life of patients, and improving the overall quality of life of patients are important issues to be addressed in the field of obstetrics and gynecology at this stage.[14] There have been few reports on sexual function of women with severe endometriosis, especially focusing not only on pain during intercourse, but also on psychological and relational dimensions (e.g., the partner's sexual functioning).[2] Therefore, this study aimed to investigate the association between pain incurred by endometriosis and the quality of sexual life.

## Methods

### Study design and selection of patients

A prospective, unmatched case–control study was designed by following the EQUATOR guidelines to identify the association of pain incurred by severe pelvic endometriosis and the quality of sexual life.

Patients with stages III–IV pelvic endometriosis confirmed by laparoscopy and pathology after an operation in the gynecological ward of the Affiliated Hospital of Obstetrics and Gynecology, Medical College of Zhejiang University from September 2017 to August 2018 were included. The criteria for enrollment in the endometriosis group were women aged between 20 and 50 years, who had sexual activity within the first 4 weeks of the study, no psychological disorders and other diseases, and whose heterosexual spouses had no sexual dysfunction. We enrolled healthy women in the same period as the control group. Women with diabetes mellitus, hypertension, mental disorders, or a history of chronic kidney disease were excluded. Both groups were women who had not received hormone therapy 3 months before the operation. This study was approved by the Medical Ethics Committee of the Women's Hospital School of Medicine (No. 20150054) in 2015, and all of the participants signed informed consent forms.

The sample size was determined by

$$n = \frac{\left[\begin{array}{l} Z_\alpha\sqrt{2\bar{P}(1-\bar{P})} \\ +Z_\beta\sqrt{P_1(1-P_1)+P_0(1-P_0)} \end{array}\right]^2}{(P_1-P_0)^2}$$

$\bar{P} = \frac{P_1+P_0}{2}$.

This calculation was described by Fairbanks et al.[15] who studied endometriosis and sexual dysfunction ($P_1$=0.433 [prevalence of the case group], $P_2$=0.176 (prevalence of the control group/general population], $\alpha$=0.05, $\beta$=0.15).

### Data collection and statistical analysis

*Data from medical charts.* Detailed records, including each patient's age, level of education, marital status, fertility, infertility, course of the disease, dysmenorrhea, sexual intercourse pain, surgical methods, and postoperative diagnosis, were collected to determine the factors related to sexual function in patients with pelvic endometriosis. The Female Sexual Function Index (FSFI) was used for evaluation of sexual function. The FSFI, which was formulated by Rosen et al.[14] in 2000, is an effective tool for screening and diagnosing female sexual dysfunction. The FSFI was adopted by American psychiatrists and then translated and verified in Japan, Malaysia, Italy, and Portugal. Since 2011, a Chinese version of the FSFI Scale[16] has been widely used for evaluating female sexual function in China after translation and validation. The FSFI is considered as the gold standard for

evaluating female sexual function.[17,18] This scale was formed with six dimensions using 19 questions. The FSFI has the following questions: 2 questions (numbers 1–2) on desire, 4 questions (numbers 3–6) on arousal, 4 questions (numbers 7–10) on lubrication during sexual activity, 3 questions (numbers 11–13) on orgasms, 3 questions (numbers 14–16) on satisfaction, and 3 questions (numbers 17–19) on pain. Participants responded according to their true feelings. In this scale, 0 points represent asexual behavior in the last 4 weeks and 1 to 5 points indicate different degrees of feelings (very unsatisfied, 1 point; moderately unsatisfactory, 2 points; moderate, 3 points; moderately satisfied, 4 points; very satisfied, 5 points). Each dimension score was multiplied by the score of each question in the dimension and the coefficient of the dimension. A higher score indicated a higher quality of sexual life.

*Survey procedure.* Eighty-five inpatients who were in the gynecological ward of the Affiliated Hospital of Obstetrics and Gynecology of Zhejiang University Medical College were asked to take a survey. For each patient, the study's research aim was explained, and the survey was completely confidential until written consent was obtained. Electronic questionnaires were then filled out with an overall 91% efficiency of all responses (77/85 patients). Seventy-one volunteers who met the inclusion criteria of the control group also took the survey. The voluntary and anonymous self-administered questionnaire survey had an effective response rate of 89% (63/71 volunteers) in the control group.

*Statistical methods.* We constructed a database using Microsoft Excel® version 365 (Microsoft Corporation, Redmond, WA, USA). The chi-square test was used to compare categorical data between the two groups. Descriptive data analysis is shown by mean (± standard deviation) or median (quartile 1 to quartile 3) depending on the distribution of data. The Student's t-test or Mann–Whitney U test was used to compare FSFI scores between the two groups. Pearson correlation coefficients were calculated to present the pain of endometriosis and components of sexual dysfunction. Statistical analysis was performed using two-tailed tests and $P<0.05$ was considered a significant difference. All of the data were analyzed using IBM SPSS Statistics for Windows, version 19.0® (IBM Corp., Armonk, NY, USA).

## Results

### *Sociodemographic characteristics of the participants in the case and control groups*

There were 77 women in the endometriosis group and 63 in the control group. There was no significant difference in age, education level, marital status, or fertility between the two groups (Table 1).

### *Descriptive analysis of dimension scores of the FSFI*

FSFI dimensions and a descriptive analysis of dimension scores, including the range of scores, coefficient, and minimum and maximum scores, for each dimension are shown in Table 2. The total score ranged from 2.8 to 34.5.

### *Correlations of the dimensions of the FSFI*

Correlation coefficient analysis showed that all dimensions of the FSFI showed intercorrelation (Table 3). This finding indicated that the FSFI scale had good internal consistency. The correlation between vaginal lubrication and sexual pain was relatively high (0.787), followed by the correlation between vaginal lubrication and orgasm (0.737).

**Table 1.** Comparison of sociodemographic characteristics in the endometriosis (cases) group and control group.

| | Endometriosis group (n=77) | Control group (n=63) | $\chi^2$ | P value |
|---|---|---|---|---|
| **Age (years)** | | | 2.609 | 0.271 |
| 20–30 | 22 | 24 | | |
| 31–40 | 35 | 29 | | |
| 41–50 | 20 | 10 | | |
| **Education** | | | 4.779 | 0.084 |
| High school and below | 31 | 17 | | |
| College | 40 | 44 | | |
| Masters and above | 6 | 2 | | |
| **Marital status** | | | 0.435 | 0.509 |
| Married | 70 | 60 | | |
| Non-married | 7 | 3 | | |
| **Fertility** | | | 0.206 | 0.650 |
| Fertile | 46 | 40 | | |
| Non-fertile | 31 | 23 | | |

**Table 2.** Female Sexual Function Index scoring.

| | Question number | Score range | Coefficient | Lowest score | Highest score |
|---|---|---|---|---|---|
| Sexual desire | 1–2 | 1–5 | 0.6 | 1.2 | 5.4 |
| Sexual arousal | 3–6 | 0–5 | 0.3 | 0 | 6.0 |
| Vaginal lubrication | 7–10 | 0–5 | 0.3 | 0 | 6.0 |
| Orgasm | 11–13 | 0–5 | 0.4 | 0 | 6.0 |
| Satisfaction | 14–16 | 0 (1)–5 | 0.4 | 0.4 | 6.0 |
| Sexual pain | 17–19 | 0–5 | 0.4 | 0 | 6.0 |
| **Total score** | – | – | – | 2.8 | 34.5 |

Score=$\sum$ (score for each question $\times$ influence coefficient).

**Table 3.** Correlations among FSFI dimensions (n=140).

| Dimension | | Sexual arousal | Vaginal lubrication | Orgasm | Satisfaction | Sexual pain |
|---|---|---|---|---|---|---|
| Sexual desire | 1 | | | | | |
| Sexual arousal | 0.640 | 1 | | | | |
| Vaginal lubrication | 0.457 | 0.696 | 1 | | | |
| Orgasm | 0.458 | 0.674 | 0.737 | 1 | | |
| Satisfaction | 0.359 | 0.569 | 0.639 | 0.642 | 1 | |
| Sexual pain | 0.304 | 0.520 | 0.787 | 0.630 | 0.541 | 1 |

Values are correlation coefficients.
FSFI, Female Sexual Function Index.

**Table 4.** Comparison of FSFI dimension scores between the two groups.

| | Endometriosis group M ($P_{25}$, $P_{75}$) | Control group M ($P_{25}$, $P_{75}$) | Z value | P value |
|---|---|---|---|---|
| Sexual desire | 3.0 (2.4, 3.6) | 3.0 (2.4, 3.6) | −1.139 | 0.255 |
| Sexual arousal | 3.6 (2.4, 3.9) | 3.6 (3.3, 4.5) | −2.916 | 0.004 |
| Vaginal lubrication | 4.8 (4.2, 5.4) | 5.1 (4.5, 5.7) | −1.535 | 0.125 |
| Orgasm | 4.0 (3.2, 5.2) | 4.4 (4.0, 4.8) | −1.285 | 0.199 |
| Satisfaction | 4.8 (4.0, 5.3) | 5.2 (4.8, 5.6) | −2.045 | 0.041 |
| Sexual pain | 4.8 (3.6, 5.8) | 5.2 (4.4, 6.0) | −2.375 | 0.018 |
| **Total score** | 25.5 (21.7, 28.3) | 26.7 (23.6, 28.7) | −1.824 | 0.068 |

FSFI, Female Sexual Function Index; $P_{25}$, 25th percentile; $P_{75}$, 75th percentile.

### *Comparison of dimension scores between the two groups*

We found that endometriosis significantly affected multiple aspects of sexual function. The total FSFI score tended to be lower in the endometriosis group than in the control group (P=0.068). The median sexual arousal, satisfaction, and sexual pain scores were significantly lower in the endometriosis group than in the control group (all $P<0.05$). There was no significant difference in the scores for sexual desire and orgasm between the two groups. The mean values of six dimensions in the control group were higher than those in the endometriosis group, which indicated that the sexual function of patients with endometriosis was affected in each dimension (Table 4).

### *Comparison of sexual function between the two groups at different ages*

There were no differences in FSFI scores for the ages of 20 to 30 years and for 41 to 50 years between the endometriosis and control groups. However, participants aged 31 to 40 years in the endometriosis group had a lower sexual arousal score (P=0.002), sexual pain score (P=0.036), and vaginal lubrication score (P=0.069) during sexual activity than the control group. The total score of this age group tended to be significant between the groups (P=0.06) (Table 5).

## Discussion

Endometriosis is a common gynecological disease, which occurs in women of childbearing age. Sexual function and quality of sexual life of patients are affected by varying degrees in disease and treatment. The quality of sexual life plays an important role in the prolonged life span of the modern era. Our study used the Chinese version of the FSFI to determine sexual function of patients with endometriosis. In China, female sexual dysfunction is a sensitive topic, and women are ashamed to talk publicly about the quality of sexual life. This issue caused a barrier for acceptance of our survey.

Sexual dysfunction refers to the fact that woman cannot participate in their desired sexual life because of reasons, such as unmet sexual desire, arousal disorder, orgasm disorder, and sexual pain. Endometriosis can cause more serious sexual pain, which is due to the effect of sexual activity. This results in an increase in tension of the uterine sacral ligament, displacement, deep sexual pain, and pain after sexual intercourse. Montanari et al.[19] found that patients with deep infiltrating endometriosis had impaired sexual function and sexual pain, and vaginal ectopic lesions

**Table 5.** Comparison of the FSFI component scores between the two groups in relation to age.

| Age group (years) | Components of the FSFI | Endometriosis group M ($P_{25}$, $P_{75}$)/ mean ± SD | Control group M ($P_{25}$, $P_{75}$)/ mean ± SD | Z value | t value | P value |
|---|---|---|---|---|---|---|
| 20–30 | Sexual desire | 3.6 (2.4, 4.2) | 3.0 (2.4, 3.6) | −0.727 | | 0.467 |
| | Sexual arousal[a] | 3.8±1.1 | 3.6 (3.3, 4.5) | −0.222 | | 0.824 |
| | Vaginal lubrication[b] | 5.4 (4.8, 6.0) | 5.1±0.6 | −0.891 | | 0.373 |
| | Orgasm | 4.6 (4.0, 5.2) | 4.4 (3.6, 4.8) | −0.765 | | 0.444 |
| | Satisfaction | 5.2 (4.8, 5.7) | 5.2 (4.8, 5.9) | −0.146 | | 0.884 |
| | Sexual pain[b] | 5.2 (3.9, 5.7) | 4.9±0.9 | −0.045 | | 0.964 |
| | **Total score**[a,b] | 26.4±5.5 | 26.3±2.7 | | 0.102 | 0.919 |
| 31–40 | Sexual desire | 3.0 (2.4, 3.6) | 3.0 (2.4, 3.6) | −1.259 | | 0.208 |
| | Sexual arousal | 3.0 (2.4, 3.6) | 3.6 (3.5, 4.4) | −3.118 | | 0.002 |
| | Vaginal lubrication[b] | 4.5 (3.6, 5.4) | 5.0±0.7 | −1.818 | | 0.069 |
| | Orgasm[b] | 4.0 (3.2, 4.8) | 4.4±0.8 | −1.558 | | 0.119 |
| | Satisfaction | 4.8 (4.0, 5.4) | 4.8 (4.4, 5.6) | −1.443 | | 0.149 |
| | Sexual pain | 4.8 (3.6, 6.0) | 5.2 (4.8, 6.0) | −2.102 | | 0.036 |
| | **Total score**[b] | 25.3 (20.1, 27.5) | 26.3±3.1 | −1.882 | | 0.060 |
| 41–50 | Sexual desire | 3.0 (2.4, 3.6) | 3.6 (2.9, 3.6) | −1.549 | | 0.121 |
| | Sexual arousal[b] | 3.3 (2.4, 3.9) | 3.8±1.0 | −1.529 | | 0.126 |
| | Vaginal lubrication[b] | 4.5 (3.7, 5.3) | 4.8±0.8 | −0.797 | | 0.426 |
| | Orgasm[b] | 4.0 (3.3, 5.1) | 4.6±0.9 | −1.379 | | 0.168 |
| | Satisfaction[a,b] | 4.0±1.4 | 4.8±1.1 | | −1.543 | 0.134 |
| | Sexual pain[a] | 3.9±2.0 | 5.6 (3.6, 6.0) | −1.693 | | 0.090 |
| | **Total score**[b] | 23.1 (19.8, 28.3) | 26.6±4.3 | −1.584 | | 0.113 |

[a]Normally distributed data in the endometriosis group; [b]normally distributed data in the control group.
FSFI, Female Sexual Function Index; $P_{25}$, 25th percentile; $P_{75}$, 75th percentile, SD, standard deviation.

were related to sexual dysfunction. Ferrero et al.[3,20] found that the pain score of deep sexual pain in patients with sacral ligament lesions was significantly higher than that in patients with ectopic lesions located in other areas. The number of times of sexual intercourse per week in these patients was significantly decreased, as well as satisfaction and pleasure after sexual intercourse. Long-term illness can cause anxiety, depression, and other psychological symptoms. Women with sexual dysfunction show inferiority, a lack of self-confidence, and fear of pain caused by sexual intercourse, which affect the feelings of couples and seriously affect women's health and quality of life. Our study showed significant differences in the quality of sexual life between women with endometriosis and healthy women. The main manifestations in women with endometriosis were difficulty in subjective arousal, poor vaginal lubrication during sexual activity, sexual pain, and decreased satisfaction with sexual life. We also found that endometriosis complicated by sexual dysfunction mainly occurred in women aged 31 to 40 years. Therefore, the time of active sexual function coincides with the incidence of endometriosis in terms of age. We did not find that the education level, marital status, or reproductive status affected the quality of sexual life.

Therefore, endometriosis, which is a benign gynecological disease, can affect female sexual function to a certain extent.

This suggests that clinicians and nurses need to take active measures to improve the quality of sexual life of patients with endometriosis.[21] Radical laparoscopic excision of endometriosis offers an effective treatment option and leads to a significant improvement in dyspareunia and quality of sexual life.[22] Buggio et al.[23] discussed the importance of integrating psychological interventions (including psychotherapy) and sexual therapy in treatment of endometriosis. Therefore, in clinical practice, patients with endometriosis should be offered targeted psychological counseling, and their coping styles should be enhanced. In particular, these patients should be informed that they can return to a normal sexual life after 3 months of follow-up evaluation. Additionally, patients should understand the anatomical structure and physiological function of the female reproductive system, surgical methods, and the effect of treatment. This could reduce the unnecessary psychological burden and increase self-efficacy.[24] Doctors should actively communicate with patients and their spouses, discuss issues about sexual life, and provide them with more sexual knowledge and guidance of rehabilitation. Doctors should also not only pay attention to the patients' physical and mental health, as well quality of life, but also to their spouses.[25] These patients need to be provided with sufficient health education, and if necessary, patients should be guided in the use of vaginal lubricants to improve the quality of sexual life.[26] Patients with endometriosis need to understand the physical and mental changes after surgery and learn to cope with changes, especially psychological support.[27]

Our study has some strengths and limitations. A strength of this study is that we examined the quality of sexual life of women, which is a cultural taboo in China, and that makes this study innovative because of the social context. We compared the quality of sexual life between women with and those without endometriosis. Our study also has a few limitations. First, because of the nature of the cross-sectional study, we are unable to generate a causal reference. Second, the sample was relatively small. However, the endometriosis group mainly comprised patients with severe endometriosis. Reporting the quality of sexual life in such a special population and informing future clinical practice are important. Moreover, this study did not evaluate general quality of life. However, sexuality is an important component of health-related quality of life because progressive reduction in pain reported by women over the treatment period could have contributed to improving their quality of life and their sexual life.[28] This may have caused bias and affected the outcome.

## Conclusion

Chinese women of childbearing age with endometriosis have significantly impaired sexual function compared with women of childbearing age without endometriosis. Sexual dysfunction mainly manifests as difficulty in subjective arousal, poor vaginal lubrication during sexual activity, sexual pain, and decreased satisfaction of sexual quality of life. Additionally, Chinese women with endometriosis complicated by sexual dysfunction are most likely to aged 31 to 40 years.

## Relevance to clinical practice

Our findings on related factors of sexual dysfunction in patients with endometriosis provide a theoretical and practical basis for improving the quality of life of patients with endometriosis. Our findings will be useful for determining the effect of nursing intervention on sexual dysfunction of patients with endometriosis, and corresponding nursing measures could be

proposed in the near future. Medical facilities may consider setting up endometriosis support groups to systematically manage patients with endometriosis, strengthen education, and ensure that they receive early and reasonable treatment. Community-based social media will be useful for health education to address endometriosis and promote peer support, and eventually improve the quality of life of patients with endometriosis.

## Declaration of conflicting interest

The authors declare that there is no conflict of interest.

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