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The morbidity of sexual dysfunction of 125 Chinese women following different types of radical hysterectomy for gynaecological malignancies

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Abstract

Purpose Due to early detection and effective treatment, quality of sexual life of patients with gynaecological malignancies has become an important issue. However, the morbidity of sexual dysfunction and the proportion of different kinds of sexual dysfunction after radical hysterectomy are unclear. The aim of the current study was to assess the morbidity of sexual dysfunction and to conduct multivariate logistic regression analysis of patients' sexual dysfunction.

Methods Between July 2007 and December 2012, 125 women underwent radical hysterectomy, modified radical hysterectomy, and nerve-sparing radical hysterectomy were administered a self-reported sexual function questionnaire.

Results The preoperative, and 1- and 2-year postoperative sexual dysfunction rates were 50.5% (50/99), 86.9% (93/107), and 92.3% (72/78), respectively. The incidence rates of sexual desire disorders before operation, at postoperative year 1, and at postoperative year 2 were 14.7% (14/95), 42.1% (45/107), and 51.9% (40/77), respectively. The preoperative incidence rates of sexual arousal disorders, orgasmic disorders, and sexual pain disorders were 18.4% (18/98), 51.1% (48/94), and 10.9% (11/101), respectively. At postoperative years 1 and 2, these were 38.8% (31/80), 81.0% (64/79), and 24.4% (20/82), and 49.1% (26/53), 84.6% (44/52), and 30.2% (16/53), respectively. Multivariable regression analysis revealed that age, preserved ovary, preserved posterior vaginal wall length, preoperative stage, radiotherapy, and education background were risk factors associated with sexual dysfunction.

Conclusion The patients following radical hysterectomy had a high incidence of sexual dysfunction, which plateaued in postoperative years 1 and 2.

Keywords Gynaecological malignancies · Sexuality · Sexual dysfunction · Morbidity · Radical hysterectomy

Introduction

With nearly half a million new cases being reported annually, cervical cancer is the second most common cancer among women in the world [1]. Owing to early cervical cancer screening and effective treatment, the 1- and 5-year survival rates of patients with early cervical cancer were 87 and 71%, respectively [2–6]. Owing to the long expected life expectancy and active sexual behaviour of these patients, their quality of sexual life (SQoL) should be considered one of the most relevant outcome measures in modern medicine. Radical hysterectomy was associated with significant psychological distress and a wide range of psychosocial disturbances. Pompili et al. [7] and Cano et al. [8] reported that women's mean scores for the Global Severity Index, perception of negative responses from others, and perception of pain severity were higher than those of men, which may lead women to a higher degree of disability and to be more vulnerable to sexual dysfunction than men.

The standard treatment modality for women with the early stage cervical cancer (stage IB1–IIA) is radical hysterectomy (RH, Q-M C2 type) with pelvic lymphadenectomy. RH leads to anatomical changes, including vaginal shortening and reduced vaginal wall elasticity [9–11]. When

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the parameters are removed, the nerve supply of the vaginal wall may be affected, leading to insufficient relaxation of vaginal arteriovenous smooth muscle, and incomplete vaginal congestion and lubrication during sexual arousal [12]. In an observational longitudinal study, the patients who underwent radical hysterectomy showed significantly more negative impacts on sexual function, including less lubrication, narrow and short vagina, insensible area of the labia, sexual discomfort, and sexual dissatisfaction [13]. Recently, a nerve-sparing technique [nerve-sparing radical hysterectomy (NSRH), Q-M C1 type] and a technique to reduce surgical radicality [modified radical hysterectomy (mRH), Q-M B2 type] were widely applied in clinical practice to improve the patients' quality of life. Pieterse et al. [14] monitored vaginal blood flow during objective arousal in patients following RH and NSRH, and indicated that the nerve-sparing technique leads to a better vaginal blood flow pattern owing to the less denervation of the vagina.

To date, we found limited research that focuses on the change in the morbidity of sexual dysfunction with time, and heterogeneities were found in different samples. In a prospective controlled study, the authors investigated sexual dysfunction during a period of 2 years after radical hysterectomy and found more cervical cancer patients reporting sexual dysfunctions, including sexual arousal dysfunction, dyspareunia, and reduced intensity of orgasm, than among healthy women [15]. However, no comparative analysis has been conducted on the change over time in the morbidity of sexual dysfunction. On the basis of the small number of participants, the low representativeness of the actual data detracts from the generalizability. A recent prospective study on 229 women with different treatment modalities suggested more sexual symptoms than in the pre-treatment situation [16]. However, the treatment modalities were limited with the conventional radical hysterectomy and nerve-sparing radical hysterectomy. Modified radical hysterectomy, which is also a common treatment for cervical cancer, has not been reported yet, and the research object is focused on Western women. Currently, no large-sample surveys have been conducted on the morbidity of different kinds of sexual dysfunction after RH in Asian women, who show cultural differences compared with Western women. The aims of the present study were to assess the morbidity of sexual dysfunction in women following different types of RH and to conduct multivariate logistic regression analysis of patients' sexual dysfunction.

Materials and methods

The study protocol has been approved by the Internal Review Board of our institute. From July 2007 to December 2012, we preoperatively enrolled three groups of eligible patients who underwent RH with systematic lymphadenectomy at the Department of Gynaecology of Nanfang Hospital for early stage gynaecological malignancies (cervical cancer stage IA2-IIB; endometrial cancer stage II). Based on the types of RH performed, the patients were divided into the RH, mRH, and NSRH groups. The inclusion criteria were as follows: sexually active before operation; successfully underwent the operation modality without intraoperative life-threatening complications; and completed our questionnaire independently or with others' help. All the eligible women were provided with a consent form that included the operation modality. The form was written in plain language explaining the surgical technique, possible benefits (reduced urological and rectal dysfunctions), and possible side effects (recurrence). Data on age, marital status, educational background, menopausal status, sexual status before diagnosis, time at diagnosis and treatment, histological type, International Federation of Gynecology and Obstetrics stage, surgical technique, and follow-up outcomes of the patients were collected. To avoid possible bias, the exclusion criteria were as follows: patients who did not have a stable sexual life 1 year before the surgery, patients with psychological or psychiatric problems or mental retardation wherein they cannot complete the questionnaire, women with continuous treatment after surgery due to relapse or death within 2 years of life without sex, and those who refused our interview regarding their sexual life for any reason. The choice of the modalities of hysterectomy was based on objective preoperative and intraoperative findings. Classical RH surgical procedures were performed using Q-M C2 type standard. Type C2 is the cross section of the uterosacral and vesicouterine ligament at the level of the rectum and bladder, respectively. The ureters are fully mobilized, and the 15–20 mm of vaginal tissue from the tumour or cervix and the related paracolpos are removed. On the basis of classical RH, the NSRH procedure reserved the pelvic autonomic nerves in the cardinal ligament, hypogastric nerve in the uterosacral ligament, and pelvic plexus nerves in the vesicocervical–vaginal ligaments (i.e., Q-M C1 type standards). MRH surgical procedures were performed according to Q-M B2 type. The standard part of this category is partial excision of the uterosacral and vesicouterine ligaments. The ureter is topless and horizontally rolled, allowing the transversal resection of the paracervix at the ureteral tunnel level. At least 10 mm of vaginal tissue from the tumour or cervix is resected. All surgical procedures were performed by two fixed gynaecological oncologists. Patients with positive pelvic lymph nodes, parametrical involvement, tumour size of > 4 cm, positive margins, and/or deep myometrium invasion of the cervix after surgical procedure were administered chemoradiotherapy. The patients did not receive counselling or education with dilator therapy post radiation.

All patients were required to have regular follow-up visits postoperatively: every 3 months in the first year and every 6 months thereafter. Follow-up assessments included pelvic examinations, pelvic ultrasonography, vaginal cytology, and serum oncologic marker check. Every time, the patients were instructed to finish the self-reported sexual function questionnaire. The questionnaire is based on the Brief Index of Sexual Function for Women Scale (BISF-W), which is an instrument for evaluating and quantifying sexual dysfunction. BISF-W had been translated into Chinese. Han et al. [17] have validated the Chinese version of BISF-W with a new scoring algorithm. The Internal Consistency (Cronbach's alpha) of the questionnaire was 0.852, and the Kaiser–Meyer–Olkin (KMO) coefficient was 0.837. We reserve dimensions that represent female sexual response cycles, including sexual desire (thoughts/aversion), arousal, orgasm, sexual pain (dyspareunia, vaginismus), and problems affecting sexual function (decreased vaginal elasticity, difficulty of intercourse, feeling of shortness of the vagina, and decreased vaginal perception), and sexual frequency per month. The questionnaire includes 11 questions. Each dysfunction is scored ranging from not or doubtfully present to extremely present, except sexual desire and sexual aversion which have only yes or no two options. During follow-up visits, the participants were interviewed by a well-trained staff face to face in a quiet and individual clinic room. They were thoroughly informed regarding the aim and details of the study, and written informed consent was obtained. If patients cannot come back to participate in the follow-up visits, they were followed up over telephone. Requirements were the same with face-to-face follow-up. Data on age, marital status, relationship with their sexual partner, parity, education, economy, pathologic type, and adjuvant therapy were collected for all patients.

The data analysis was performed by SPSS version 19.0. One-way analysis of variance analysis, Chi-square test, and Mann–Whitney *U* test were used for comparison among groups. Statistical significance was set at $P < .05$.

Results

From July 2007 to December 2014, 174 patients who met the criteria were identified, and 49 patients were excluded. Among them, 17 patients died within 2 years after surgery, who continued treatment after surgery relapsed within 2 years of life without sex, 5 refused our interview regarding their sexual lives for any reason, and 20 were lost to follow up. The remaining 125 patients were interviewed, with an overall response rate of 71.8%. Among them, 120 cases of cervical cancer (96.0%) were included. The clinical stage was as follows: stage IA2, 5 cases (4.2%); stage IB1, 55 cases (45.8%); stage IB2, 17 cases (14.2%); stage IIA1, 21 cases (17.5%); stage IIA2, 10 cases (8.3%); and stage IIB, 12 cases (9.9%). The remaining five cases of endometrial cancer were stage II. Of all the patients, 25 and 30 patients were included in the RH and NSRH groups, respectively. The remaining 70 patients were in the mRH group. The patients' age ranged from 25 to 65 years, with a median age of 45 years. The follow-up time ranged from 24 to 78 months, with a median follow-up time of 24 months.

Table 1 presents the demographic and clinical characteristics of the patients in three groups. No significant difference was found in age, educational background, economic status, preoperative stage, pathological type, ovarian treatment, chemotherapy, and radiotherapy. Of the patients, 72.0% (77/107) resumed regular sexual activity at postoperative year 1, whereas 63.6% (49/77) had regular sexual activity at postoperative year 2. No statistical difference was found between postoperative years 1 and 2 in all patients ($P = .23$), and no significant difference was found between postoperative year 1 and 2 in three different types of RH ($P = .33$ and .44, respectively).

Table 2 presents the questionnaire results. The overall rate of preoperative sexual dysfunction was 50.5% (50/99), whereas the rates at postoperative years 1 and 2 were 86.9% (93/107) and 92.3% (72/78), respectively. The incidence rates of sexual dysfunction at postoperative years 1 and 2 were significantly higher than that before operation ($P < .001$), although no significant differences were found between postoperative years 1 and 2 ($P = .24$). The sexual desire disorder rates before operation, at postoperative year 1, and at postoperative year 2 were 14.7% (14/95), 42.1 (45/107), and 51.9% (40/77), respectively. Before operation, the rates of sexual arousal, orgasmic, and sexual pain disorders were 18.4% (18/98), 51.1% (48/94), and 10.9% (11/101), respectively. At postoperative years 1 and 2, the rates were 38.8% (31/80), 81.0% (64/79), and 24.4% (20/82), and 49.1% (26/53), 84.6% (44/52), and 30.2% (16/53), respectively. The four kinds of sexual dysfunction that change over time are shown in Fig. 1. The postoperative incidence of sexual desire, sexual arousal, orgasmic, and sexual pain disorders was significantly higher than that before operation ($P = .00$, .04, .00, and .00), whereas no significant differences in the four kinds of sexual dysfunction were found between postoperative years 1 and 2 ($P = .08$, .59, .74, and .46). No significant difference in sexual dysfunction morbidity was found before operation, at postoperative year 1, and at postoperative year 2 among the three different types of RH ($P = .19$, .84, and .64, respectively). There was no statistically significant difference in sexual dysfunction morbidity at postoperative year 2 in patients who received chemotherapy versus those who only underwent operation. The morbidity of sexual desire disorder and sexual pain disorder at postoperative year 2 in patients with

Table 1 Demographic and clinical characteristics of the patients in three groups

Characteristics	RH group	NSRH group	mRH group	*P* value
Number of each group	25	30	70	
Age	45.6 ± 7.2 year	42.7 ± 6.9 year	44.8 ± 7.6 year	.30
Education background				.10
Illiterate	2 (9.1%)	1 (3.6%)	8 (14.8%)	
Primary school	5 (22.7%)	6 (21.4%)	19 (35.2%)	
Junior high school	13 (59.1%)	13 (46.4%)	17 (31.5%)	
High school	2 (9.1%)	6 (21.4%)	5 (9.3%)	
College or above	0 (0.0%)	2 (7.1%)	5 (9.3%)	
Economic conditions				.58
Poor	1 (4.3%)	2 (6.6%)	6 (11.4%)	
General	19 (82.6%)	20 (66.7%)	37 (69.8%)	
Good	3 (13.0%)	8 (26.7%)	10 (18.8%)	
Preoperative stage				.26
IA2	1 (4.0%)	1 (3.3%)	4 (5.7%)	
IB1	7 (28.0%)	17 (56.7%)	32 (45.7%)	
IB2	6 (24.0%)	3 (10.0%)	8 (11.4%)	
IIA1	6 (24.0%)	6 (20.0%)	11 (15.7%)	
IIA2	2 (8.0%)	1 (3.3%)	7 (10.0%)	
IIB	3 (12.0%)	2 (6.7%)	8 (11.4%)	
Preoperative pathological type (cases)				.25
Squamous carcinoma	22 (88.0%)	26 (86.7%)	67 (95.7%)	
Adenocarcinoma	3 (12.0%)	3 (10.0%)	2 (2.9%)	
Adeno-squamous carcinoma	0 (0.0%)	1 (3.3%)	1 (1.4%)	
Ovarian conservation (cases)				.92
Yes	9 (36.0%)	11 (36.7%)	28 (40.0%)	
No	16 (64.0%)	19 (63.3%)	42 (60.0%)	
Chemotherapy (cases)				.11
Yes	20 (80.0%)	16 (53.3%)	43 (61.4%)	
No	5 (20.0%)	14 (46.7%)	27 (38.6%)	
Radiotherapy (cases)				.87
Yes	3 (12.5%)	4 (13.3%)	7 (10.0%)	
No	21 (87.5%)	26 (86.7%)	63 (90.0%)	

RH radical hysterectomy, *NSRH* nerve-sparing radical hysterectomy, *mRH* modified radical hysterectomy

radiotherapy was significantly higher than those without radiotherapy ($P = .008$ and .002).

The mean sexual frequencies of the patients were 3.90 ± 3.91 times per month before operation, 2.0 ± 1.78 times per month at postoperative year 1, and 1.90 ± 1.86 times per month at postoperative year 2. The preoperative sex frequency was significantly higher than the postoperative sex frequency ($P = .02$), but no significant difference in sexual frequency was found between postoperative years 1 and 2 ($P = .25$).

In the multivariate analysis, sexual desire, sexual arousal, orgasmic, and sexual pain disorders at postoperative year 1 were selected as dependent variables. The variables included the type of surgery, age, educational level, economic status, health insurance, history of gestation, preoperative stage, preserved anterior vaginal wall length, preserved posterior vaginal wall length, ovary handling mode, surgical complications, time of stable sexual life, husbands' age, husband–wife affection, chemotherapy, and radiotherapy. The multivariate logistic regression analysis revealed that age [odds ratio (OR) 1.077; 95% confidence interval (CI) 1.005–1.155; $P = .04$] and ovary preservation (OR 0.277; 95% CI 0.091–0.840; $P = .02$) were significantly associated with sexual desire disorders. Ovary preservation (OR 0.429; 95% CI 0.246–0.748; $P = .00$) and preserved posterior vaginal wall length (OR 0.603; 95% CI 0.374–0.972; $P = .04$) were significantly associated with sexual arousal disorders. Age (OR 1.329; 95% CI 1.053–1.677; $P = .02$) and preoperative stage (OR 57.737; 95% CI 1.594–2.092; $P = .03$) were significantly associated with orgasmic disorders. Radiotherapy (OR 7.763; 95% CI 1.447–41.634; $P = .02$) and educational background (OR 0.148; 95% CI

Table 2 Self-reported sexual function questionnaire results

	Preoperation	Postoperative year 2
Sexual desire		
Yes	82 (86.3%)	37 (48.1%)
No	13 (13.7%)	40 (51.9%)
Sexual aversion		
Yes	7 (7.4%)	4 (7.7%)
No	87 (92.6%)	48 (92.3%)
Sexual arousal		
Easy	80 (81.6%)	27 (50.9%)
Hard or difficult	18 (18.4%)	26 (49.1%)
Orgasm		
Frequently	46 (48.9%)	8 (15.4%)
Rarely or no	48 (51.1%)	44 (84.6%)
Dyspareunia		
Frequently	11 (10.9%)	16 (30.2%)
Rarely or no	90 (89.1%)	37 (69.8%)
Vaginismus		
Frequently	10 (11.1%)	7 (13.7%)
Rarely or no	90 (88.9%)	44 (86.3%)
Decreased vaginal elasticity		
Yes	3 (3.1%)	6 (11.5%)
Occasional or no	93 (96.9%)	46 (88.5%)
Difficulty of intercourse		
Frequently	0 (0.0%)	3 (5.8%)
Rarely or no	94 (100.0%)	49 (94.2%)
Feeling shortness of vagina		
Yes	0 (0.0%)	6 (11.5%)
Occasional or no	94 (100.0%)	46 (88.5%)
Decreased vaginal perception		
Yes	1 (1.1%)	4 (7.7%)
Occasional or no	94 (98.9%)	48 (92.3%)
Sexual frequence per month	3.90 ± 3.91	1.90 ± 1.86

0.024–0.920; $P = .040$) were significantly associated with sexual pain disorders. The results of the multivariate analyses are shown in Table 3.

Discussion

There are no gold standard or objective indicators in the diagnosis of female sexual dysfunction, and the diagnosis mainly relies on clinical judgment. A National Health Survey showed that 43% of 1749 women aged 18–59 years had sexual dysfunction [18]. The American population census data show that approximately 10 million American women, accounting for 3% of the total population between 50 and 74 years of age, self-reported some form of sexual dysfunction [19]. In our study, the preoperative sexual dysfunction rate was 53.2%, and the main sexual dysfunction was orgasmic dysfunction. As the mean age of our selected patients was 45 years, perimenopausal women are suggested to be more vulnerable to sexual dysfunction, and age was the factor closely associated with orgasmic dysfunction.

Although all kinds of discomfortableness existed in postoperative sexual life, 72.0% (77/107) resumed regular sexual activities at postoperative year 1, and 63.6% (49/77) in year 2. Tangjitgamol et al. [20] reported that 8 of 105 women (7.6%) never resumed their sexual intercourse after RH, and 97 women resumed their sexual intercourse 1–36 months post \operation (median, 4 months). Butler-Manuel et al. [19] found that 54.8% of people reported deterioration of SQoL, and 12.9% of women ceased sexual activities. The ratio of Chinese women who did not resume their sexual life was higher than the reported data; thereby the conservative attitudes of Chinese women towards sex could be speculated. A cross-sectional survey of a convenience sample of 601 women in 12 European countries showed that the social psychology and the frequency of sexual life in different nationalities were significant different ($P < 0.05$) [21]. In China,

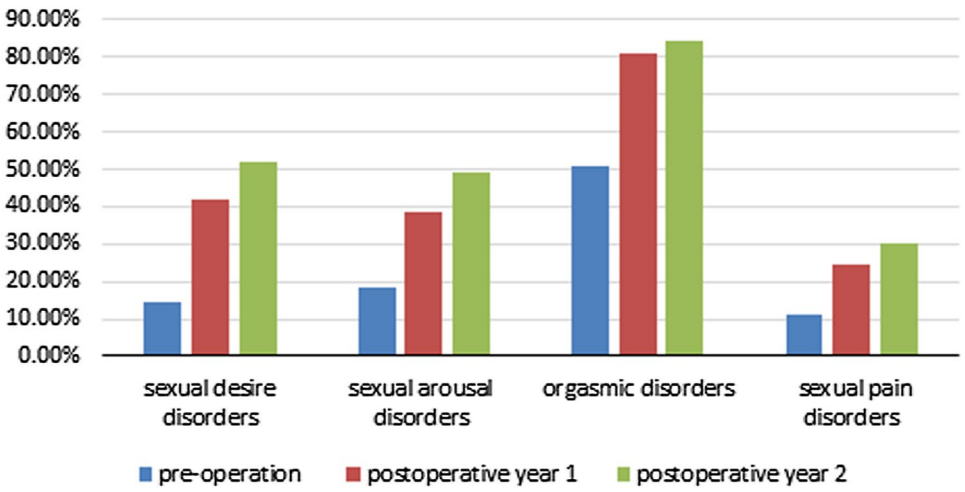

Fig. 1 Four kinds of sexual dysfunction that change over time

Table 3 Multivariable regression analysis of factors influencing sexual dysfunction

Four kinds of sexual dysfunction	Variable	*B*	OR	95% CI	*P* value
Sexual desire disorders	Age	0.074	1.077	1.005–1.155	.04
	Preserving ovary	− 1.283	0.277	0.091–0.840	.02
Sexual arousal disorders	Preserved posterior vaginal wall length	− 0.506	0.603	0.374–0.972	.04
	Preserving ovary	− 0.846	0.429	0.246–0.748	.00
Orgasmic disorders	Age	0.284	1.329	1.053–1.677	.02
	preoperative stage	4.056	57.737	1.594–2.092E3	.03
Sexual pain disorders	Radiation therapy	2.049	7.763	1.447–41.634	.02
	Education background	− 1.908	0.148	0.024–0.920	.04

female sexuality is usually passively accepted, and the initiative to pursue sexual pleasure is sensuality behaviour. This traditional culture has seriously affected people's awareness of sexual knowledge. Owing to the lack of knowledge and cognitive errors without medical personnel and guidance, they often avoid sexual life.

Our study results showed that the incidence of postoperative sexual dysfunction, including sexual desire, arousal, orgasmic, and sexual pain disorders was significantly higher than that preoperatively, whereas no statistically significant differences were found between postoperative years 1 and 2. A 2-year prospective study that assessed the emotional and sexual lives of women after RH revealed that the Impact of Event Scale or Subscale (avoidance and intrusion) scores at 12 postoperative months were not significantly different from those observed at 24 postoperative months. Their results suggested that patients showed improvement in their mood, distress, and sexual functioning postoperatively, while the rate of improvement levelled off between postoperative years 1 and 2 [22]. Our data confirmed that the incidence of sexual dysfunction after RH plateaued at postoperative years 1 and 2.

The multivariate logistic regression analysis revealed significantly less sexual desire disorder in those with ovary preservation, and significantly more disorders of sexual desire in those with increasing age. Estrogen is the main female sex hormone which helps to keep the integrity of the vaginal mucosal epithelium, and regulate vaginal vasoprotective and vasodilatory effects in sexual function [23]. More sexual disorders existed in those with shortened vagina. The longer the length of the vagina removed, the more serious the disturbed vaginal blood flow was. Age has a protective effect on orgasm, while preoperative staging increases the risk of orgasmic disorders. The latter the preoperative staging, the greater the chance of patients having chemoradiotherapy, which cause vulnerable to orgasm disorders. Radiation therapy was associated with a significant increase in sexual pain disorders. The educational background has a protective effect on sexual pain disorders. This may be related to women's higher education-oriented awareness and sexual rights. They have more courage to express their own demands and relieve discomfort through more channels. A study of the prevalence of female sexual dysfunction (FSD) showed that the risk of FSD at junior high school education level was 2.9 times of those at college degree [24]. Laumann's and other survey also suggest that less educated people were prone to FSD [18]. Our study recommends that measures, including preservation of the ovaries, hormone replacement therapy, usage of lubricants or extension of the vagina, and guidance for patients' sexual life are useful interventions to improve patients' postoperative sexual function.

Due to the reduced damage to pelvic autonomic nerve, mRH and NSRH as treatment modalities theoretically have a protective effect on sexual function. A prospective study reported significant differences in receptivity to sexual life as compared with groups following NSRH and RH type C or D. However, only minimal changes in sexual function were observed [25]. Plotti et al. [26] reported no significant difference regarding lymphedema, peripheral neuropathy, and sexual worry between the RH group and mRH group. However, our data showed that the morbidity of sexual dysfunction in three surgical procedures was not significantly different owing to the interplay of many factors affecting sexual life. The relatively limited number of patients in the NSRH and RH groups was also a contributing factor.

Thus, it is important to understand how to improve the quality of sexual life of patients who undergo RH. A retrospective cohort study suggested that creating a well-structured sexual health program in a cancer environment can achieve a 63% compliance rate and a 70% subjective improvement of sexual health complaints [27]. Health-care professionals are obliged to initiate discussing these issues and take actions to improve the sexual function of patients after RH.

The limitations of this study include the following: First, the overall incidence of sexual dysfunction at postoperative year 2 was high (92.3%), which may be caused by the variability in sampling patients. In the study of the survey of cervical cancer survivors regarding quality of life and sexual function, the prevalence of sexual dysfunction was 78%

[28]. However, in our logistic regression analysis, sexual desire, sexual arousal, orgasmic, and sexual pain disorders were analysed as dependent variables. With the exception of orgasmic disorders (84.6%), the prevalence of sexual desire, sexual arousal, and sexual pain disorders was not extremely high. Second, the questionnaire we used to assess sexual function did not contain items on patients' psychological parameters. We could not thoroughly analyse the causes of sexual dysfunction. Sexual dysfunctions are commonly linked to psychological distress, pain, and psychiatric conditions; thus, using one psychometric tool to assess the psychological aspects of this sample would be highly important. Third, although the questionnaire was modified on the basis of the Brief Index of Sexual Function for Women (BISF-W), the questionnaire needs further verification.

Conclusion

The present report highlighted the incidence of sexual dysfunction of patients following RH was significantly higher than that before operation, accompanied by reduced sexual frequency, which was contributed by many risk factors. Psychological factors have a close relationship with sexual dysfunction. Our results point to the need to better assess and handle sexual dysfunction. Obviously, more studies are needed to explore this important issue with psychiatric conditions.

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Author contributions CC: project development and manuscript editing. XW: data collection, data analysis, and manuscript writing. PL: project development and data collection. WL: data management and data analysis. YL: data collection. LW: data collection.

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Compliance with ethical standards

Conflict of interest Xueqin Wang declares that she has no conflict of interest. Chunlin Chen declares that he has no conflict of interest. Ping Liu declares that she has no conflict of interest. Weili Li declares that he has no conflict of interest. Liling Wang declares that he has no conflict of interest. Yunlu Liu declares that she has no conflict of interest.

Ethical approval All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Informed consent Informed consent was obtained from all individual participants included in the study.

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