Research Square

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Sexual Health–Related Quality of Life and Associated Factors in Cervical Cancer Survivors: A CC-PRO137–Based Study

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Abstract

Background

Cervical cancer surgery has been associated with poorer sexual health–related quality of life (SHRQoL), yet the specific aspects affected remain insufficiently characterized. This study aimed to evaluate postoperative SHRQoL and identify factors associated with its variation among cervical cancer survivors.

Methods

304 women with primary cervical cancer, who underwent surgery at the Obstetrics & Gynecology Hospital of Fudan University between Oct 2018 and Jun 2021 were enrolled. Participants completed the Cervical Cancer-Patient Reported Outcome 137 (CC-PRO137) scale within 6 months and more than 1 year after surgery. Analyses focused on the sexual health dimension and were restricted to survivors who reported being sexually active. Factors associated with SHRQoL were examined using univariate and multivariable statistical analyses.

Results

Postoperative adjuvant therapy and time since treatment were the main factors related to SHRQoL. Concurrent chemoradiotherapy (CCRT) was linked to lower SHRQoL scores, whereas longer interval after treatment corresponded to gradual improvement. The impact of surgical approach (open vs. minimally invasive) became evident after 1 year in multivariable analyses. Age and tumor stage showed no significant correlation with SHRQoL.

Conclusions

Factors associated with SHRQoL change over the postoperative course. Continued follow-up after surgery is therefore important to enable early identification of potential sexual health problems in patients with cervical cancer.

Trial registration:

Not applicable. This was a questionnaire-based observational study and did not involve any clinical intervention.

Background

Cervical cancer represents a major global health burden, ranking as the fourth most common cancer among women worldwide [1, 2]. It typically arises from cervical intraepithelial neoplasia followed by invasion of the subepithelial basement membrane and is strongly associated with persistent infection by high-risk human papillomaviruses (HPV). The viral oncoproteins E6 and E7 interact with host genome and result in an imbalance between oncogenes and tumor- suppressor genes, thereby driving carcinogenesis[3–5]. In addition to viral etiology, environmental factors and lifestyle habits—including tobacco use, multiparity, high-risk sexual behaviors, an early age at first intercourse, and multiple induced abortions—have also been identified as contributors to the development and progression of the disease [3].

Cervical cancer can be prevented through HPV vaccination and treatment of dysplasia detected during screening (HPV testing or/and Papanicolaou test) [3]. The standard management of cervical cancer encompasses surgery, radiotherapy, platinum-based chemotherapy, immunotherapy and targeted therapy, either alone or in combination [1, 3]. Thanks to revolutionized treatment methods and early detection, survival rates in cervical cancer patients have substantially improved. However, the subsequent organ-/system-specific toxicities of varying severity following treatment can threaten patients' quality of life (QoL) [6]. Major sequelae include sexual dysfunction, lymphedema, menopausal symptoms, osteoporosis, urogenital and gastrointestinal disorders, chronic pain, and persistent fatigue [7]. As survivorship now dominates the cervical cancer agenda, systematic measurement of QoL is no longer optional but a clinical imperative [8]. Within the spectrum of patient-reported well-being, sexual health is often overlooked. Symptoms such as loss of sexual desire, dyspareunia, and sexual performance concerns, are frequently reported and have been linked to impairments in emotional, social, and role functioning, even in the absence of active disease. These findings underscore the importance of incorporating sexual health into QoL assessments [9].

Current QoL assessment tools present limitations. The widely applied Functional Assessment of Cancer Therapy (FACT) scale provides a broad evaluation of postoperative QoL across multiple cancer types [10], but lacks specificity for cervical cancer. Similarly, the Female Sexual Function Index (FSFI) validly evaluates sexual function—such as vaginal lubrication, dyspareunia, sexual satisfaction [11]—but fails to cover other critical dimensions relevant to sexual health. To address these gaps, the Cervical Cancer-Patient Reported Outcome 137 (CC-PRO137) scale, designed in accordance with the European Organisation for Research and Treatment of Cancer Quality of Life Questionnaire (EORTC QLQ) and the Patient-Reported Outcome (PRO) questionnaire assessment system, provides a comprehensive framework for evaluating physical, psychological, and social well-being across 13 distinct modules [12]. Furthermore, the CC-PRO137 scale eliminates the requirement for patients to complete more than one independent questionnaire and improves patient compliance.

This study employs the CC-PRO137 scale to analyze factors associated with sexual quality of life in cervical cancer patients after surgery and aims to offer clinically relevant insights that may help inform sexual-health surveillance and supportive care considerations in routine follow-up.

Methods

Sampling

A total of 330 patients with primary cervical cancer, who underwent initial surgery at the Obstetrics & Gynecology Hospital of Fudan University between Oct 2018 and Jun 2021, were selected using simple random sampling. Written informed consent was obtained from all participants prior to their inclusion. The inclusion criteria of participants were as follows: histopathological diagnosis of cervical cancer; ability to communicate normally and understand the questionnaire items; ability to cooperate with the investigators to complete the survey. The exclusion criteria were as follows: presence of severe medical or surgical comorbidities; expected survival of less than 6 months; tumor recurrence or distant metastasis; undergoing active anticancer treatment; inability to comprehend the questionnaire items. Seven women declined to participate, and 19 returned questionnaires with more than one-third of items missing. Complete, analyzable data were ultimately available for 304 cervical cancer survivors.

Evaluation

Assessments were conducted at two postoperative time points: within 6 months and more than 1 year. Participants attending on-site follow-up completed paper questionnaires, while those unable to visit the hospital finished online versions. Participants with limited education were assisted by family members under researcher supervision. Those incapable of independent completion and lacking family support received assistance from the researcher.

The questionnaire included 28 reverse-coded items to evaluate response reliability. The sexual life dimension of the CC-PRO137 scale consists of 18 items, categorized into four distinct domains: psychosexual response (SEX50, 53, 55, 64, 67, 69, 72), physiological sexual response (SEX56-58, 61, 62, 66), vaginal health (SEX59, 60, 63), and sexual satisfaction (SEX65, 73). Each item is rated on a 5-point scale from 1 (most severe) to 5 (asymptomatic), with the exception of item SEX55 (1 = asymptomatic, 5 = most severe). For all items except SEX55, a higher score represents better sexual health, while for SEX55, a higher score reflects more problems. Patients who were sexually inactive after surgical treatment were instructed to skip this dimension.

Statistical analysis

All data underwent dual verification and were entered by trained researchers. Statistical analyses were performed using SPSS version 21.0. Normality and homogeneity of variance were assessed before group comparisons. Continuous variables are expressed as mean ± standard deviation (SD). Comparisons between two groups were conducted using Student's t-test, while three or more groups were compared by one-way analysis of variance (ANOVA) with Scheffé's post-hoc test. Multivariable linear regression analysis was used to identify factors independently associated with SHRQoL. Statistical significance was set at $P < 0.05$ ($\alpha = 0.05$, two-tailed).

Baseline characteristics

Table 1 summarizes the clinical and sociodemographic characteristics of the 304 cervical cancer patients included in the study, all of whom provided written informed consent for surgical treatment. The FIGO stage presented in the table was classified based on postoperative pathological findings according to FIGO 2018 criteria, while surgical eligibility was determined based on preoperative multidisciplinary discussion using the FIGO 2009. Adjuvant treatment was tailored following surgical pathological risk stratification. Patients with high-risk features—namely, positive lymph nodes, positive surgical margins, or parametrial involvement—were offered adjuvant CCRT [3]. In patients without high-risk factors, extensive lymphovascular space invasion on pathology signaled an elevated distant-metastasis risk, and adjuvant chemotherapy was considered under the Sedlis intermediate-risk criteria. When neither high-risk nor intermediate-risk factors were present, follow-up surveillance was the default management strategy. During the study period, immunotherapy was not administered to any patients in this cohort. The cohort is representative of contemporary clinical practice: 57.9% (n = 176) were younger than 50 years, 63.2% (n = 192) were premenopausal, 91.4% (n = 278) were married and 92.1% (n = 280) had at least one prior delivery. Disease was predominantly early-stage, with 65.1% (n = 198) having FIGO stage I disease. Minimally invasive radical hysterectomy was the primary surgical approach (72.4%, n = 220), and postoperative CCRT was administered to 52.0% (n = 158) of the women.

Table 1
Baseline Characteristics of the Participants

Characteristic	N[a]	%*	Characteristic	N[a]	%*
Age at diagnosis(years)			Type of surgical approach		
< 35	43	14.10	Laparotomy	84	27.60
35–50	133	43.80	Minimal invasive surgery	220	72.40
51–70	126	41.40	Adjuvant Treatments		
≥ 70	2	0.70	Follow-up	102	33.50
BMI[b] (kg/m²)			Concurrent Chemoradiotherapy	158	52.00
< 18.5	14	4.60	Chemotherapy	44	14.50
18.5–24	177	58.20	Histologic type		
≥ 24	113	37.20	Squamous cell carcinoma / Adenocarcinoma / Adenosquamous carcinoma	265	87.20
ECOG[c]			Other types	39	12.80
0	217	71.40	Tumor size		
1	80	26.30	≤ 2cm	148	48.70
2	7	2.30	2cm < d[e] ≤ 4cm	96	31.60
Menopausal status			> 4cm	60	19.70
Premenopausal	192	63.20	Education		
Postmenopausal	112	36.80	Primary School	63	20.70
Marital status			Junior High School	78	25.70
Unmarried	16	5.30	Senior High School / Technical Secondary School	73	24.00
Married	278	91.40	Undergraduate / Junior College	79	26.00
Divorced	10	3.30	Graduated	9	3.00
Procreation status			Lack of Information	2	0.60
Yes	280	92.10	Annual Family Income		
No	24	7.90	< 30,000	53	17.40
FIGO stage[d]			30,000–80,000	109	35.90
I	198	65.10	80,000–300,000	111	36.50
IIA	51	16.80	> 300,000	28	9.20
IIIC	55	18.10	Lack of Information	3	1.00

* Percentages may not total 100 because of rounding.

Characteristic	N[a]	%*	Characteristic	N[a]	%*

[a] N, number of participants.

[b] BMI, Body Mass Index.

[c] ECOG, Eastern Cooperative Oncology Group performance status.

[d] Higher FIGO stages indicate more advanced disease. FIGO, International Federation of Gynecology and Obstetrics.

[e] d, tumor diameter.

Results

Regarding the sexual life module of the CC-PRO137, 188 of 304 patients (61.8%) completed the questionnaire within 6 months postoperatively, and 195 (64.1%) completed it beyond 1 year. Specifically, 20 women transitioned from being sexually active to sexually inactive and therefore did not complete the sexual life domain at the second assessment, while 27 women resumed sexual activity and completed the questionnaire at the second time after not finishing it initially.

Score Comparison Between Two Age Groups After Cervical Cancer Treatment

SHRQoL scores between women ≤ 45 and > 45 years of age were evaluated by independent-samples t-tests at two postoperative time-points: ≤ 6 months and > 1 year. At neither interval did age show significant correlation with SHRQoL (t_1 = -0.653, P_1 = 0.515; t_2 = 0.194, P_2 = 0.847) (both P ≥ 0.05) (Table 2).

Table 2
Score Comparison Between Two Different Age Groups

Item	Age(y)	Time1					Time2				
		n	Mean	SD	t	P	n	Mean	SD	t	P
SEX	≤ 45	104	3.433	0.921	-0.653	0.515	109	3.561	0.892	0.194	0.847
	> 45	84	3.531	1.085			86	3.533	1.064		

Table 2. Scores are presented as mean ± standard deviation (SD). Time1, ≤ 6 months postoperatively; Time2, > 1 year postoperatively.

Score Comparison Across FIGO Stages After Cervical Cancer Treatment

One-way ANOVA was performed to compare SHRQoL scores across different FIGO stages. No significant differences in SHRQoL were found among stages at either ≤ 6 months (F_1 = 0.148, P_1 = 0.863) or > 1 year after surgery (F_2 = 0.267, P_2 = 0.766) (both P ≥ 0.05) (Table 3).

Table 3
Time1, ≤ 6 months postoperatively; Time2, > 1 year postoperatively.

Table 3 Score Comparison Across FIGO Stages								
Item	**Time1**				**Time2**			
	df	**F**	**P**	**Post-hoc Test**	**df**	**F**	**P**	**Post-hoc Test**
SEX	2, 185	0.148	0.863	No Difference	2, 192	0.267	0.766	No Difference

Score Comparison Between Two Surgical Approaches After Cervical Cancer Treatment

SHRQoL scores were compared between open abdominal and laparoscopic hysterectomy groups using independent-samples t-tests. The results demonstrated no statistically significant disparity between the two surgical groups at either ≤ 6 months (t_1 = -0.927, P_1 = 0.355) or > 1 year (t_2 = -0.056, P_2 = 0.956) postoperatively (both P ≥ 0.05) (Table 4).

Table 4
Score Comparison Between Laparotomy and Laparoscopy

Item	Surgical Approach	Time1					Time2				
		n	Mean	SD	t	P	n	Mean	SD	t	P
SEX	Laparotomy	49	3.358	1.081	-0.927	0.355	54	3.542	0.986	-0.056	0.956
	Laparoscopy	139	3.512	0.964			141	3.551	0.961		

Table 4. Time1, ≤ 6 months postoperatively; Time2, > 1 year postoperatively.

Score Comparison Across Adjuvant Therapies After Cervical Cancer Treatment

One-way ANOVA followed by Post-hoc comparisons indicated that follow-up-only patients had higher SHRQoL scores than CCRT patients at both ≤ 6 months (F_1 = 5.711, P_1 = 0.004) and > 1 year (F_2 = 7.013, P_2 = 0.001) postoperatively, whereas the chemotherapy group did not differ significantly in SHRQoL from the other two groups. (Table 5).

Table 5
Time1, ≤ 6 months postoperatively; Time2, > 1 year postoperatively; FU, follow-up-only; C, chemotherapy; CCRT, concurrent chemoradiotherapy. “FU > CCRT” indicates higher scores in the FU group than in the CCRT group.

Table 5 Score Comparison Across Adjuvant Therapies								
Item	**Time1**				**Time2**			
	df	**F**	**P**	**Post-hoc Test**	**df**	**F**	**P**	**Post-hoc Test**
SEX	2, 185	5.711	0.004	FU>CCRT	2, 192	7.013	0.001	FU>CCRT

Score Comparison Between Two Time Points After Cervical Cancer Treatment

According to a paired t-test, the mean score increased from 3.460 ± 0.978 within 6 months postoperatively to 3.600 ± 0.915 beyond 1 year. This statistically significant improvement (t = -2.338, P = 0.021) demonstrated a time-dependent pattern in SHRQoL after surgery (Table 6). Item-level analyses showed that the improvement was particularly evident in the following seven items: fear, aversion or embarrassment towards sexual activity (SEX53, P = 0.035); reduced vaginal lubrication during intercourse (SEX59, P = 0.013); shortened intercourse duration (SEX62, P = 0.030); perceived vaginal shortening (SEX63, P = 0.012); diminished sexual satisfaction (SEX65, P = 0.008); fear of the impact of treatment on sexual activity (SEX67, P = 0.034); worry about sexual partner's rejection (SEX72, P = 0.011); The remaining items exhibited no significant change (P ≥ 0.05) (Table 7).

Table 6
Score Comparison Between Two Postoperative Time Points

Item	Time	Mean	n	SD	t	P
SEX	T1	3.460	168	0.978	-2.338	0.021
	T2	3.600	168	0.915		

Table 6. T1, ≤ 6 months postoperatively; T2, > 1 year postoperatively.

Table 7
Item-level Analysis Results

Item	Time	Mean	n	SD	t	P
SEX50	T1	3.172	192	1.547	-0.935	0.351
	T2	3.266		1.551		
SEX53	T1	3.557	194	1.399	-2.126	**0.035**
	T2	3.742		1.398		
SEX55	T1	1.849	186	1.110	-0.918	0.360
	T2	1.930		1.204		
SEX56	T1	3.392	181	1.515	-0.283	0.778
	T2	3.425		1.495		
SEX57	T1	3.253	182	1.513	-1.349	0.179
	T2	3.390		1.496		
SEX58	T1	3.309	181	1.536	-1.326	0.186
	T2	3.453		1.496		
SEX59	T1	3.078	179	1.567	-2.509	**0.013**
	T2	3.335		1.476		
SEX60	T1	3.977	174	1.377	-1.180	0.240
	T2	4.092		1.260		
SEX61	T1	3.925	173	1.502	-1.198	0.233
	T2	4.052		1.361		
SEX62	T1	3.543	175	1.469	-2.194	**0.030**
	T2	3.766		1.425		
SEX63	T1	3.545	187	1.514	-2.545	**0.012**
	T2	3.797		1.353		
SEX64	T1	4.280	182	1.289	-0.109	0.913
	T2	4.291		1.216		
SEX65	T1	3.270	178	1.553	-2.703	**0.008**
	T2	3.534		1.530		
SEX66	T1	3.174	178	1.521	-1.766	0.079
	T2	3.343		1.481		
SEX67	T1	3.396	187	1.493	-2.132	**0.034**
	T2	3.615		1.434		

Item	Time	Mean	n	SD	t	P
SEX69	T1	3.439	189	1.702	0.321	0.748
	T2	3.402		1.780		
SEX72	T1	4.005	192	1.320	-2.565	**0.011**
	T2	4.219		1.141		
SEX73	T1	3.978	180	1.273	-0.126	0.900
	T2	3.989		1.219		

Table 7. SEX53, SEX59, SEX62, SEX63, SEX65, SEX67 and SEX72 are mentioned above. SEX50, diminished sexual interest; SEX55, confidence in sexual arousal; SEX56, decreased frequency of sexual excitement; SEX57, reduced degree of sexual excitement; SEX58, declined orgasm frequency; SEX60, vaginal dryness with bleeding; SEX61, intercourse interruption; SEX64, avoidance of sexual activity due to incontinence; SEX66, intercourse frequency; SEX69, reduced sexual pleasure; SEX73, decreased partner's satisfaction with sexual life. Bold P values (<0.05) denote significant difference.

Multivariable Linear Regression Analyses of Scores at Two Postoperative Time Points

In multivariable regression (Table 8), adjuvant treatment modality was the only factor independently associated with sexual-life scores at ≤ 6 months postoperatively, with CCRT linked to lower scores compared with follow-up alone (β = −0.506, P = 0.001). At > 1 year after surgery, sexual-life scores were significantly higher than those within 6 months (β = 0.599, P < 0.001), and surgical approach emerged as an independent factor (β = −0.272, P = 0.022), while the association with CCRT was attenuated and no longer statistically significant (P = 0.069). Chemotherapy alone showed no significant association at either time point.

Table 8
Multivariable Linear Regression Analyses at Two Postoperative Time Points

Variable	β (SE)	t	P
≤ 6 months postoperatively			
Intercept	3.729 (0.110)	33.914	< 0.001
CCRT vs follow-up	−0.506 (0.151)	−3.354	0.001
Chemotherapy vs follow-up	−0.176 (0.234)	−0.752	0.453
> 1 year postoperatively			
Intercept	2.103 (0.295)	7.142	< 0.001
Time (> 1 year vs ≤ 6 months)	0.599 (0.055)	10.808	< 0.001
Surgical approach	−0.272 (0.118)	−2.307	0.022
CCRT vs follow-up	−0.212 (0.115)	−1.832	0.069
Chemotherapy vs follow-up	−0.094 (0.168)	−0.562	0.575

Table 8. β, regression coefficient. Positive values indicate a favorable association with SHRQoL, whereas negative values reflect an unfavorable association. Multivariable models were adjusted for clinical and demographic covariates. Follow-up alone served as the reference group for adjuvant therapy.

Discussion

Gynecologic cancers, which occur exclusively in women, can profoundly compromise female sexual health and reproductive capacity [13–15]. Primary treatment options for cervical cancer include hysterectomy (with or without lymphadenectomy), or CCRT [2]. And as surgical procedures, both laparotomy and laparoscopy are invasive and may lead to complications such as hemorrhage, infection, thromboembolism, intra-abdominal adhesions, and organ injury [14].

While diagnostic and therapeutic advances have substantially improved survival rates in cervical cancer, a significant proportion of survivors experience persistent sequelae after treatment, particularly sexual dysfunction and vaginal morbidity, which may adversely affect general health and well-being [16]. For instance, chemotherapy may cause hormonal depletion and peripheral neuropathy, leading to vaginal dryness. Following side effects such as nausea and fatigue can further impair sexual function. Radiotherapy can reduce vaginal blood flow and increase the risk of pelvic fibrosis, resulting in dyspareunia and diminished sexual pleasure [9].

This study identified undesirable impacts of adjuvant therapy on SHRQoL. In crude analyses, patients undergoing CCRT reported markedly poorer outcomes compared with those under follow-up only at both assessments (both $P < 0.05$). This is in line with the findings of Bjelic-Radisic *et al.* (2012), which indicated that patients receiving multiple treatment modalities are more likely to experience impairments in QoL than those receiving a single modality [17]. The disparity may be attributed to cumulative treatment-related toxicities. Importantly, multivariable analyses indicated that the adverse association between CCRT and SHRQoL was most pronounced in the early postoperative period (≤ 6 months), but diminished over time, suggesting a limited long-term impact on sexual health during survivorship. Additionally, longitudinal analyses showed a statistically significant improvement in SHRQoL from ≤ 6 months to > 1 year after surgery ($P = 0.021$), particularly with respect to psychological and physiological responses during sexual activity. Time since treatment therefore acts as a moderating factor between treatment exposure and SHRQoL. The observed temporal changes may be explained by a transition from the initial six-month phase of psychological adaptation and identity reconstruction into a subsequent period where patients developed more effective coping strategies for sexual issues, intimate relationships, and social integration. Notably, in the adjusted analyses, surgical approach emerged as an independent determinant at > 1 year post-treatment, whereas age and FIGO stage were not significantly associated with SHRQoL. This finding suggests that long-term sexual health is largely driven by persistent anatomical and neurogenic changes resulting from surgery rather than by baseline demographic or disease-related factors.

Sexual function is shaped by a dynamic and multifaceted biopsychosocial interplay, wherein a disorder in one domain may trigger cascading effects across others. For instance, cancer-specific psychosocial challenges—such as diminished self-image, exacerbated anxiety, and reduced socioeconomic attainment—can negatively influence sexual functioning. Conversely, adverse vaginal changes and compromised sexual function may in turn contribute to clinically significant psychological distress and social maladaptation, ultimately jeopardizing personal well-being and marital stability [18, 19]. Consequently, to enhance women's SHRQoL through developing interdisciplinary collaboration and implementing cognitive and behavioral interventions, it is essential to implement patient-centered communication strategies that enable open discussion on sexual concerns, encourage active reporting of treatment-related side effects, and ensure timely recognition of unmet needs [13, 15, 20]. In addition, standardized follow-up

protocols should incorporate periodic, multidimensional monitoring and evaluation of patients' sexual health to capture dynamic changes over time. Such measures pave the foundation for delivering tailored interventions, ranging from medical management of physical symptoms to psychosocial counseling and partner-inclusive therapy [7, 20, 21].

This study has several strengths. It reflects real-world clinical practice in a surgically treated cervical cancer cohort and addresses an underexplored aspect of survivorship by focusing on postoperative sexual quality of life. Moreover, the validated CC-PRO137 instrument enabled sexual health to be characterized within a biopsychosocial framework, yielding a systematic overview of patient-reported outcomes.

However, several limitations should also be acknowledged. First, this study focused on the trajectory of postoperative sexual quality of life over time by comparing two time points after surgery; the inclusion of preoperative sexual quality-of-life information would have allowed a more comprehensive evaluation of changes relative to patients' pre-treatment status. Second, although the majority of the data were collected prospectively, a small proportion of cases were retrospectively assessed, which may have introduced recall bias. Third, owing to the follow-up survey design of this study, the optimal timing for potential supportive or rehabilitative interventions aimed at improving SHRQoL could not be determined. Finally, age was dichotomized at 45 years, which limited our ability to distinguish treatment-related changes in sexual function from those attributable to the perimenopausal transition; future studies employing finer age stratification or hormonal status assessment are warranted.

Conclusions

Our findings suggest that SHRQoL among women treated for cervical cancer changes over time and that the associated factors vary across different postoperative stages. These findings highlight the importance of continued follow-up after surgery to enable early identification of sexual health problems and to guide timely biopsychosocial interventions. Greater attention should be paid to symptom management and multidisciplinary care. Such a holistic approach may help patients alleviate anxiety and depression, better adapt to social reintegration, and achieve long-term benefits [8, 18]. Effective communication and shared decision-making between doctors and patients also play a crucial role in addressing detrimental sequelae [13]. Overall, this study advances understanding of SHRQoL among women after cervical cancer treatment and provides practical insights for clinical assessment and management.

Abbreviations

ANOVA
Analysis of Variance
CC
PRO137–Cervical Cancer–Patient Reported Outcome 137
CCRT
Concurrent Chemoradiotherapy
EORTC QLQ
European Organisation for Research and Treatment of Cancer Quality of Life Questionnaire
HPV
Human Papillomaviruses
PRO
Patient–Reported Outcome
QoL

Quality of Life
SD
Standard Deviation
SHRQoL
Sexual Health–Related Quality of Life

Declarations

Ethics approval and consent to participate

The study was performed in accordance with the principles of the Declaration of Helsinki. Approval was granted by the Ethics Committee of the Obstetrics & Gynecology Hospital of Fudan University (Approval No. 2018-85). All participants must sign an informed consent form before being included.

Consent for publication

Not applicable.

Competing Interests

The authors have no competing interests to declare that are relevant to the content of this article.

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Author Contribution

Ting Zhou performed the literature search, wrote the first draft and revised the manuscript. Data collection was conducted by Yue Yin, Jiayu Wang and Beili Wang. Yan Ning provided guidance on pathology. Material preparation and data analysis were performed by Shen Luo, Ling Qiu and Hui Wang. Hua Jiang and Xin Wu contributed to the study conception and design. All authors read and approved the final manuscript.

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Not applicable.

Data Availability

The data that support the findings of this study are available from the corresponding author on reasonable request.

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