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Health-Related Quality of Life and Sexual Dysfunction in Cervical Cancer Survivors: A Cross-Sectional Hospital-Based Study

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Introduction: Cervical cancer is the second most common female cancer in India. The disease and its treatment significantly affect the survivor's quality of life and sexual health. The current study aims to determine the quality of life and sexual function after the treatment.

Methods: A cross-sectional study was performed on 100 cervical cancer survivors who were sexually active prior to the diagnosis. Quality of life and sexual functioning were assessed using three questionnaires: the European Organization for Research and Treatment of Cancer Quality of Life Questionnaire-Core 30 (EORTC QLQ-C30), cervical Cancer Module (EORTC QLQ-CX24), and the Changes in Sexual Functioning Questionnaire (CSFQ 14-F). Descriptive and inferential statistics were used for the data analysis.

Results: The overall quality of life score was 64.4 (SD 18.6). However, physical functioning was affected as compared to the functional domains of QoL. The prevalence of sexual dysfunction was 98.9% among the survivors. Sexuality, in terms of pleasure, desire, arousal, and orgasm was low among the survivors. However, sexual pleasure, desire, and orgasm were more problematic in postmenopausal patients. ($p<0.05$).

Conclusion: Overall QoL was improved after the completion of the cancer treatment and also its functional domains did not deteriorate. However, sexuality was impaired in these patients. These results highlight the critical need for comprehensive survivorship care, especially for postmenopausal patients, which involves routine evaluation and treatment of physical and sexual health issues. For cervical cancer survivors, routine follow-up that includes counseling and sexual health rehabilitation may enhance their quality of life and long-term well-being.

Introduction

Currently, cervical cancer is one of the most prevalent gynecologic malignancies worldwide, with 604,127 people diagnosed and about 341,831 deaths annually, according to the WHO [1]. In India, cervical cancer is the second most common cancer among women, and this makes India the country with the highest number of cases of cervical cancer [2].The majority of cervical cancer occurs in developing countries, where there is often inadequate healthcare infrastructure and limited access to HPV vaccination and screening programs [3, 4]. Despite these alarming figures, improvements in medical science, such as earlier detection and effective treatment modalities, have increased the survival rates of cervical cancer [5].

Radiotherapy or chemotherapy combined with surgery remains the therapeutic technique that has the highest possibility of cure [6, 7]. Nevertheless, it comes with unavoidable side effects such as

bleeding, strictures, fistulas, and bladder hypotonia [8-10]. Due to the diagnosis and treatment of cervical cancer, significant psychological and physical effects are frequently experienced. Such consequences frequently affect women's quality of life as well as their ability to have satisfying sexual relationships [11]. Previous research has found that the variables related to QoL of women with cervical cancer were stage of cancer, treatment modality, and time since diagnosis [12]. Sexual satisfaction is significantly affected by radical hysterectomy and radiotherapy, including brachytherapy [13].

Now, the research priority has been targeted towards women who are recovering from cervical cancer. These patients can experience anxiety and fear; these factors can negatively affect their quality of life and sexual satisfaction [14]. Previous research has found that depression and anxiety are closely related to the quality of life [15].

The majority of previous research has assessed the consequences of cervical cancer diagnosis and treatment on the quality of life and sexual satisfaction in women, but there is a dearth of research on women who have completed the cancer treatment specifically. Thus, the current study aimed to determine the quality of life and sexual satisfaction of women with cervical cancer who have completed the cancer treatments and to identify the associated sociodemographic and clinical variables.

Materials and Methods

Study design, setting, and participants

A cross-sectional study was conducted from 28th March to 24th May 2022 among women who completed curative treatment for cervical cancer and were sexually active at the time of diagnosis.

The study was conducted at the Radiotherapy and Oncology department after ethical approval by the Ethical Committee of National Institute of Nursing Education (EC/NINE/2022/1) of Postgraduate Institute of Medical Education & Research, India. Written informed consent was obtained from all participants before enrolment in the study. A total of 100 survivors who had completed the chemotherapy or radiotherapy with any stage of cervical cancer (FIGO stage I, II, III, and IV), were sexually active before the diagnosis, and were willing to participate in the study were included. The patients unable to speak and having recurrence were excluded.

Sample size calculation

The sample size was calculated using the formula $N=z^2p(1-p)/d^2$

As per the study done by Tsai T et al [16], the prevalence of sexual dysfunction in cervical cancer was found to be 55% with a precision of 10% and a level of significance of 5%, sample provided z=1.96; d=0.1 Using the above formula, the sample size was calculated to be 95. A total of 100 patients were recruited.

Data collection tools

Apart from collecting the demographic and disease-related variables, the following tools were used to collect the data:

1. EORTC questionnaire modules (QLQ-C30 and QLQ-CX24): The QLQ-C30 is the main

questionnaire, which is aimed at addressing the health-related QoL of cancer patients in general. It incorporates 30 items, among which nine are multi-item scales: five functional scales (Physical, Role, Cognitive, Emotional, and Social Functioning); three symptom scales (Fatigue, Pain, and Nausea or Vomiting), and a global health status/QoL. EORTC QLQ CX24, this questionnaire is used specifically for patients with cervical cancer. Like C-30 questionnaires, it includes an analysis of functional and symptomatic items. Functional items include sexual activity, sexual enjoyment, sexual/ vaginal functioning, and sexual worry of patients. However, symptomatic scales assess body image, symptoms experienced, lymph edema, peripheral neuropathy, and menopausal symptoms experienced by patients with cervical cancer. Authorization for the use of this tool was obtained via email. These questionnaires have been extensively tested and validated in various cultural settings, including India [14, 15]. A higher score in the global health score (GHS) and functional domains represents a better level of functioning, while in symptom scales, it indicates poor functioning or more problems.

2. Changes in Sexual Functioning Questionnaire (CSFQ 14-F): The CSFQ14 questionnaire is a global measure of sexual dysfunction used for both men and women. It measures the five domains of sexual functioning, i.e., sexual pleasure, desire, arousal, frequency, and orgasm. Among these three components corresponds the phase of the sexual response cycle (desire, arousal, and orgasm) [16, 17]. All 14 items should be answered on a five-point Likert scale to measure the global sexual dysfunction. A score below ≤ 47 for males and ≤41 for females indicates the presence of global dysfunction. Authorization for the use of the tool was requested via e-mail from Dr. Anita Clayton, Chair of Psychiatry and Neurobehavioral Sciences at the University of Virginia.

Data collection procedure

Data were collected through patient interviews with the participants and reviewing the medical records of the patients. Screenings of the files of the patients were carried out to check their eligibility criteria. The patients were approached when they were attending the OPD for their follow-up visits. The researcher recruited patients to participate in this study right after they consulted with the doctors. The chosen participants were informed of the study's purpose and requested to participate. Upon agreement to participate, written informed consent was obtained from them. The participants who could read the questions were given a questionnaire to fill out by themselves, which took around 15-20 minutes. The remaining patients received assistance in completing the questionnaire. A face-to-face interview was conducted in a room free from noise, and the researcher recorded their answers after reading the items to them. The interviews were conducted in the local language, and interviewers were instructed to avoid leading questions or providing additional explanations beyond the standardized instructions. During the data collection period, if any data was missing, the concerned physician was contacted and the data was completed. Moreover, incomplete questionnaires were excluded from the analysis. Only participants who provided complete responses to both the quality of life and sexual function items were included in the final dataset. Data confidentiality was maintained.

Statistical analysis

Data were entered into Microsoft Excel 2007, and then the entries were transferred to SPSS (Statistical Package for the Social Sciences) version 25.0. The Kolmogorov-Smirnov test was employed to test the normality of the data. It was found that the data of the QoL scale was skewed. Thus, non-parametric tests, including the Mann-Whitney U test and the Kruskal-Wallis test, were used to examine the difference in QoL domains between sociodemographic and clinical variables. The EORTC QLQ-30 and QLQ-CX24 domain scores were later dichotomized; individuals with functional domain or overall QoL score below 33 were considered affected by disease or treatment (66 and more indicated "good functioning), whereas, on symptom scale, a score of 66 and above

were deemed affected or problematic (below 33 indicated “good functioning”) [18, 19]. However, data collected through CSFQ were normally distributed; hence, parametric tests such as One-Way ANOVA and Independent sample t-test were applied to see the association of sexual dysfunction score with selected socio-demographic and clinical variables. A two-tailed p value <0.05 was considered statistically significant with a 95% confidence interval.

Results

Socio-demographic and clinical characteristics

The mean age of the survivors was 53.8 years (SD=8.75). Nearly half of the survivors were illiterate. The majority of them were from an urban community. The majority of them were treated with chemo-radiotherapy with both external beam and brachytherapy (82%) or external beam only (18%) as described in Table 1.

Variables	%
Age (yrs)	
30-40	6
41-50	34
51- 60	53
≥61	7
Mean age ± SD (Range) 26-70	53.8±8.75(26-70)
Number of children	
1	11
2	44
>2	45
Education status	
Illiterate	46
Primary and secondary	16
Higher secondary	30
University level	8
Occupation	
Housewife	62
Working	38
Family annual income (INR)	
< 20000	47
>20000	53
Habitant	
Urban	72
Rural	28
Menstrual status	
Premenopausal	25
Post menopausal	75
Stage of Cancer	
Stage I	9
Stage II	59
Stage III	30
Stage IV	2
Chemotherapy (n=81)	
Neo adjuvant	4
Adjuvant	8

Concurrent	69
Radiotherapy method	
External beam	18
External beam + Brachytherapy	82
Time since diagnosis	
≤1yrs	29
1-5yrs	49
>5 year	22
Co-morbidity (multiple response)	
Diabetes	12
Hypertension	16
None	39

Table 1. Socio-demographic and Clinical Characteristics of the Survivors N= 100.

The overall QoL score was 64.4 (SD=18.6), with 62% reporting moderately good QoL. Although the majority (62.0-98.0%) of the QoL domains on the EORTC QLQ-C30 functioning scales were unaffected, about 17% and 10% of the subjects had impairment in physical and role functioning. On the EORTC QLQ-C30 symptom scale, about 15% of the survivors perceived that their sleep was affected and experienced constipation. Additionally, on the cervical cancer-specific scale, EORTC QLQ- CX24, the majority of the survivors reported poor functioning with regards to body image (98.0%), sexual activity (85.0%), sexual enjoyment (91.0%), and sexual functioning (92.0%). Furthermore, 18% of the survivors had peripheral neuropathy after the treatment of cancer. Around 10% indicated that their sexual activity was disturbed (Table 2).

Variables	Mean (SD)	95% C.I.	Scoring	
QLQ -C30 Functional scales			<33 (%)	>66 (%)
Global health status/ QoL	64 (18.6)	60.2–67.7	6	62
Physical functioning	82.5 (15.8)	79.3–85.6	2	17
Role functioning	92.3 (12.6)	89.3–94.8	1	10
Emotional functioning	88.7 (16.5)	85.4–92.0	2	93
Cognitive functioning	91.1 (14.1)	88.3–93.9	1	97
Social functioning	94.1 (14.2)	91.3–97.0	1	98
QLQ-C30 Symptom scales				
Fatigue	31.3 (19.0)	27.5–35.1	71	3
Nausea & vomiting	13.6 (16.9)	10.0–17.0	17	2
Pain	21.3 (25.7)	17.1–25.1	83	3
Dyspnoea	12.0 (19.2)	8.1–15.8	26	5
Insomnia	22.0 (26.8)	16.6–27.3	30	15
Appetite loss	13.0 (21.1)	8.8–17.1	23	8
Constipation	22.0 (28.1)	16.4–27.5	27	15
Diarrhoea	16.3 (23.4)	11.6–20.9	28	9
Financial difficulties	5.3 (19.3)	1.4–9.1	7	3
QLQ-CX24 Functional scales				
Body image	2.7 (8.8)	1.0–4.5	98	0
Sexual activity	15.6 (24.8)	10.7–20.5	85	15
Sexual enjoyment	14.6 (24.7)	9.7–19.5	91	9
Sexual/vaginal	8.7 (16.3)	5.4–12.0	92	2

functioning				
QLQ-CX24 Symptom scales				
Symptom experience	13.9 (11.7)	11.6–16.2	93	0
Lymphoedema	12.0 (22.9)	7.4–16.5	92	8
Peripheral neuropathy	21.3 (25.7)	16.2–26.4	82	18
Menopausal symptoms	8.6 (20.4)	4.6–12.7	93	7
Sexual worry	11.0 (22.2)	6.5–15.4	91	9

Table 2. EORTC QLQ-C30 and QLQ-CX24 of among Cervical Cancer Survivors after Treatment (N = 100).

In functional scales*, mean scores < 33 have problems, while mean scores > 66 (higher scores) have good functioning. In symptom scales, higher scores > 66 indicate poor functioning

Factors Associated with Quality of Life among Cervical Cancer Survivors

Age

Patients less than 45 years had a significantly better quality of life, role, and cognitive functioning than those 46 years and above (P < 0.05). In addition, insomnia and pain were significant problems among patients aged 46 years and above, while symptom experience and sexual worry among those 45 years and below (P < 0.05) According to post hoc analysis with the Bonferroni correction, a significant difference in fatigue, dyspnea and insomnia with clinical stage was observed clinical stage I and IV (p<0.05) (Table 3).

QLQ Items	Age		PValue	Education		PValue	Income		PValue		Clinical Stage			PValue
	≤45	>46		Illiterate	Literate		<20000	>20000		I	II	III	IV	
C 30 Functional scales	n=35	n=65		n=46	n=54		n=47	n=53		n=9	n=59	n=30	n=2	
Global health status/ QoL	65.5±19.6	60.0±18.3	0.02	64.3±17.7	63.7±19.5	0.9	56.3±18.5	66.3±18.5	0.01	69.4±17.6	64.9±18.3	60.2±20.0	66.6±10.6	0.23
Physical functioning	78.2±20.9	83.8±13.9	0.36	84.2±13.5	81.1±17.6	0.15	80.5±16.8	84.2±14.9	0.3	81.1±7.4	81.2±16.2	82.4±16.5	83.3±23.5	0.35
Role functioning	93.1±17.1	89.2±10.9	0.04	93.4±10.2	91.3±14.3	0.71	91.8±11.9	92.7±13.2	0.52	98.1±5.5	90.9±13.6	93.8±11.1	83.3±23.5	0.67
Emotional functioning	83.3±23.8	90.3±13.5	0.44	92.0±12.5	80.9±19.0	0.02	88.1±17.1	89.3±16.2	0.8	91.6±9.3	80.2±18.4	75.1±15.0	83.3±11.7	0.03*
Cognitive functioning	92.9±18.7	81.4±12.2	0.01	93.8±10.7	88.8±16.1	0.13	91.8±12.4	90.5±15.5	0.85	92.5±12.1	89.2±16.0	95.0±8.9	83.3±23.5	0.53
Social functioning	89.1±23.3	95.6±9.8	0.18	97.4±7.8	91.3±17.6	0.02	92.1±18.3	95.9±9.1	0.47	98.1±5.5	92.3±17.0	97.2±7.6	83.3±23.5	0.74
Symptom scales														

Fatigue	33.3±20.1	30.7±18.8	0.61	32.3±19.9	30.4±8.3	0.73	30.7±18.4	31.8±19.7	0.84	12.3±11.7	16.3±17.3	12.9±21.7	33.3±11.7	0.02*
Nausea & vomiting	18.8±19.0	12.1±16.1	0.09	12.6±16.5	14.5±17.4	0.58	13.4±15.0	13.8±18.7	69	5.5±11.7	12.7±15.8	16.6±19.0	13.3±23.5	0.13
Pain	18.6±18.5	29.7±23.5	0.03	20.2±18.8	21.9±21.4	0.81	23.4±18.9	19.1±21.2	0.16	11.1±14.4	22.8±20.7	20.5±20.8	25.0±11.7	0.52
Dyspnoea	13.0±19.4	11.6±19.3	0.69	10.8±18.6	12.9±19.8	0.58	13.4±15.0	10.6±17.0	0.69	3.7±11.1	13.5±19.6	11.1±20.2	16.6±23.5	0.03*
Insomnia	12.6±8.8	31.1±12.4	0.02	21.9±28.2	22.2±25.9	0.76	24.1±25.7	20.1±27.9	0.3	11.1±23.5	13.1±26.4	11.3±29.2	26.6±23.5	0.02*
Appetite loss	17.3±22.1	11.6±20.7	0.17	13.0±21.6	12.9±20.8	0.95	11.3±19.9	14.4±22.1	0.47	3.7±11.1	12.4±22.2	16.6±20.9	16.6±23.5	0.11
Constipation	20.2±31.3	22.5±27.2	0.49	23.9±27.5	20.3±28.5	0.38	17.0±23.9	26.4±30.9	0.15	14.8±24.2	22.0±27.4	22.2±30.7	50.0±23.5	0.66
Diarrhoea	11.5±19.0	17.7±24.5	0.32	21.7±27.4	11.7±18.4	0.07	17.7±22.2	15.0±24.0	0.42	22.2±23.5	17.5±25.0	12.2±20.4	16.6±23.5	0.11
Financial difficulties	10.1±25.4	3.8±17.0	0.16	6.5±22.9	4.3±15.9	0.76	4.9±18.3	5.6±20.3	0.67	3.7±11.1	6.7±23.7	2.2±8.4	16.6±23.5	0.74
CX24 Functional scales														
Body image	24.3±10.9	12.3±8.1	0.02	11.4±2.3	13.9±3.1	0.13	2.3±6.9	3.1±10.3	0.93	2.4±4.8	3.0±8.4	2.5±10.7	0	0.13
Sexual activity	21.7±27.7	13.8±23.7	0.17	12.3±23.6	18.5±25.6	0.14	17.7±26.7	33.8±23.0	0.04	25.9±32.3	15.8±25.0	12.2±22.2	16.6±23.5	0.9
Sexual enjoyment	17.3±26.3	13.8±24.3	0.45	17.3±29.5	12.3±19.7	0.82	14.8±23.8	14.4±25.7	0.74	18.5±17.5	13.5±24.8	16.6±27.3	0	0.09
Sexual/ vaginal functioning	9.4±14.0	8.5±17.0	0.32	8.3±17.1	9.1±15.8	0.63	9.3±14.3	8.1±18.0	0.19	7.4±14.0	9.1±15.7	8.6±19.0	4.1±5.8	0.17
Symptom scales														
Symptom experience	19.4±15.2	12.3±9.9	0.04	13.6±10.1	14.2±13.0	0.84	15.9±12.7	12.1±10.5	0.13	8.8±10.0	14.0±12.0	15.1±11.2	21.2±12.8	0.97
Lymphoedema	17.3±28.1	10.3±21.1	0.24	11.5±20.1	12.3±25.3	0.74	14.8±24.8	9.4±21.0	0.19	7.4±14.6	14.1±12.0	8.8±21.3	16.6±23.5	0.14
Peripheral neuropathy	20.2±21.8	21.6±26.9	0.93	18.8±25.9	23.4±25.5	0.29	23.4±26.8	19.4±24.8	0.48	11.1±23.5	22.5±25.8	20.0±25.6	50.0±23.5	0.74
Menopausal symptoms	10.1±21.1	8.2±20.3	0.6	6.5±16.6	10.4±23.1	0.46	4.9±15.5	11.9±23.6	0.07	7.4±22.2	9.0±22.1	8.8±17.3	0	0.53
Sexual worry	17.3±24.3	9.0±21.3	0.04	8.6±19.1	12.9±24.5	0.41	12.0±23.4	10.0±21.2	0.8	18.5±29.3	11.2±23.6	7.7±16.8	16.6±23.5	0.47

Table 3. Association of EORTC QLQ-C30 and QLQ-CX24 Scores with Sociodemographic and Clinical Variables.

Bonferroni correction – Emotional functioning with clinical stage (CS) -(CS I vs CS III P=0.04), (CS I vs CS II, CS I vs CS IV, CS II vs CS III, CS II vs CS IV, CS III vs CS IV P>0.05). Fatigue with clinical stage (CS) (CS I vs CS IV P=0.03), (CS I vs CS II, CS I vs CS III, CS II vs CS III, CS II vs CS IV, CS III vs CS IV P>0.05), Dyspnea (-(CS I vs CS IV P=0.04), (CS I vs CS II, CS I vs CS III, CS II

vs CS III, CS II vs CS IV, CS III vs CS IV P>0.05), Insomnia (CS I vs CS IV P=0.04), (CS I vs CS II, CS I vs CS III, CS II vs CS III, CS II vs CS IV, CS III vs CS IV P>0.05),

Education

Interestingly, lower educational status was associated with better emotional and social functioning (P < 0.05) (Table 3).

Income

Patients with a monthly income less than twenty thousand experienced worse QoL and sexual activity (P<0.05) (Table 3).

Stage of cancer

A better emotional functioning was observed in patients diagnosed with stage I (P< 0.05), while more problems were experienced in patients with stage IV (P < 0.05). According to post hoc analysis with the Bonferroni correction, a significant difference in emotional with clinical stage was observed clinical stage I and III (p=0.03) (Table 3).

Association of EORTC QLQ-C30 and QLQ-CX24 scores with time since diagnosis

Patients with 5 to 10 years of survival reported good global QoL, physical, role, social and sexual, and vaginal functioning (p < 0.05). However, pain (p = 0.006, clinically relevant), nausea/vomiting (p = 0.003, clinically relevant), and appetite loss (p = 0.015, clinically relevant) were experienced within 12 months of diagnosis. Patients who were diagnosed more than ten years ago reported fatigue (p = 0.045, clinically relevant) and constipation (p = 0.041, clinically relevant) symptoms (Figure 1, 2, and 3).

Figure 1. EORTC-C30 Quality of Life Score and Functional Scale According to the Time Since Diagnosis.

Figure 2. EORTC-C30 Symptoms Scale According to the Time Since Diagnosis.

Figure 3. EORTC-CX24 Symptoms Score According to Time Since Diagnosis.

Prevalence of Sexual dysfunction among cervical cancer survivors according to the CSFQ-14 questionnaire

The prevalence of global sexual dysfunction among the survivors was 98.9%. The most prevalent sexual dysfunction was sexual arousal (97.8%), followed by sexual orgasm and sexual desire (96.7%) (Figure 4).

Figure 4. Prevalence of Sexual Dysfunction among the Survivors.

Association of CSFQ-14 mean score with socio-demo- graphic and clinical variables

Table 4 depicts the association of CSFQ mean score with selected socio-demographic and clinical variables.

Variables	n	Pleasure	Desire/ Frequency	Desire/Interest	Arousal/ Excitement	Orgasm/Completion	Total CSFQ score
		Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD
Age at time of survey (yrs)							
≤40	6	1.3 ± 0.57	4.3 ±1.08	5.6 ±2.30	5.0 ± 1.73	5.6 ±2.51	22 ± 8.71
41-50	34	1.5 ± 0.87	3.1 ± 1.69	4.0 ± 1.96	5.1 ±2.73	4.9 ±2.49	18 ± 8.74
51-60	53	1.4 ± 0.76	2.8 ± 1.40	3.7 ±1.87	4.5 ±2.39	4.1 ±2.18	16 ± 7.80
≥60	7	1.4 ± 0.94	2.5 ± 1.41	3.5 ±1.94	4.0 ±2.43	4.2 ±2.54	15 ± 8.23
p value		0.92	0.18	0.32	0.49	0.35	0.4
Marital status							
Married	94	1.4±0.78	3.0 ± 1.49	3.9 ±1.83	4.8 ±2.44	4.6 ±2.27	18±7.81
Divorced/separate/widow	6	0.8 ± 1.16	1.3 ± 1.63	2.1 ± 2.78	2.1±2.48	2.6 ±3.32	9.1 ±11.1
p value		0.05	0	0.02	0.01	0.05	0.01
Menstrual status							
Premenopausal	25	1.7±0.84	3.6 ± 1.60	4.6 ±2.06	5.3 ±2.79	5.6 ± 2.69	20 ±9.15
Postmenopausal	75	1.3±0.79	2.7 ± 1.48	3.6 ±1.84	4.4 ±2.39	4.1 ±2.15	16 ±7.66
p value		0.05	0.01	0.03	0.12	0	0.01
Parity							
Primipara	9	1.1±0.64	3.2 ±2.18	3.8 ±2.29	4.2 ± 2.49	4.2 ±2.43	16 ±9.49
Multipara	91	1.4 ±0.83	2.9 ± 1.49	3.8 ±1.91	4.7 ±2.49	4.5 ±2.38	17 ±8.19
p value		0.24	0.57	0.99	0.6	0.75	0.79
Histology							
Squamous cell keratinized	47	1.1±0.73	2.7 ± 1.40	3.8 ±1.99	4.3 ±2.38	4.2 ± 2.20	16 ± 7.99
Squamous cell non-keratinized	34	1.1± 0.71	2.7 ± 1.60	3.6 ±1.88	4.5 ±2.60	4.2 ±2.39	16 ±8.39
Others (adeno carcinoma and clear cell)	19	1.8 ± 1.04	3.7 ± 1.48	4.3 ±1.89	5.8 ±2.45	5.5 ±2.59	21 ±7.91
p value		0.02*	0.04*	0.44	0.07	0.11	0.07
Clinical stage							
I	9	2.0 ± 1.00	3.7 ± 1.71	4.8 ± 2.57	6.5 ± 3.32	6.1 ± 9.72	23 ± 9.72
II	59	1.3 ± 0.76	2.8 ± 1.53	3.7 ± 1.79	4.4 ± 2.28	4.3 ± 2.32	16 ± 7.85
III	30	1.4 ± 0.85	2.8 ± 1.51	3.7 ± 1.95	4.6 ± 2.59	4.3 ± 2.45	16 ± 8.22
IV	2	1.5 ± 0.70	3.5 ± 2.12	5.0 ± 2.82	4.5 ± 2.12	4.5 ± 2.12	19 ± 9.89
p value		0.2	0.37	0.32	0.13	0.2	0.16
Radiotherapy							
External beam radiation	42	1.4 ± 0.72	3.1 ± 1.52	4.0 ± 1.80	5.1 ± 2.55	4.8 ± 2.40	18 ± 8.13
Brachytherapy	43	1.4 ± 0.82	2.8 ± 1.43	3.6 ± 1.69	4.5 ± 2.39	4.5 ± 2.41	16 ± 7.60

Both	15	1.6 ± 0.98	3.2 ± 1.78	4.4 ± 2.38	4.6 ± 2.46	4.2 ± 1.89	18 ± 8.87
p value		0.33	0.2	0.2	0.16	0.2	0.17
Chemotherapy							
Neo adjuvant	4	2.0 ± 1.00	3.6 ± 1.52	5.0 ± 2.64	5.6 ± 2.51	4.6 ± 2.88	21 ± 9.53
Adjuvant	8	1.7 ± 0.88	3.8 ± 1.45	3.7 ± 1.03	6.1 ± 2.74	6.8 ± 2.99	22 ± 8.27
Concurrent	69	1.4 ± 0.81	2.8 ± 1.52	3.9 ± 1.94	4.5 ± 2.44	4.2 ± 2.08	17 ± 7.93
p value		0.38	0.26	0.59	0.3	0.03*	0.26

Table 4. Association of CSFQ Mean Scores with Socio-demographic and Clinical Variables, N=100.

*Bonferroni correction – Desire, pleasure with histology (Squamous cell keratinized Vs others p=0.03) (Squamous cell Keratinized Vs Squamous cell non-keratinized, Squamous cell non-keratinized vs others p=0.05) Orgasm/ completion with chemotherapy (Concurrent vs adjuvant p=0.04) (Adjuvant vs Neo-Adjuvant p=0.05)

According to age, there is no statistically significant difference seen among the components of sexual dysfunction. Regarding the marital status, married participants had significantly higher mean scores for sexual desire, sexual interest, arousal, orgasm, and total CSFQ score ($p<0.05$). As per menstrual status, premenopausal participants had significantly higher scores for sexual desire, orgasm, sexual interest, and total score ($p<0.05$). According to the type of tumor, sexual pleasure was statistically higher for participants who had an adenocarcinoma type of tumor ($p<0.02$). There are no statistically significant differences observed in parity, clinical stage, or cancer treatment with respect to CSFQ-14 sub-domains.

Discussion

To investigate the post-treatment quality of life and sexual dysfunction among cervical cancer survivors is novel in India. Although assessment of quality of life is an important outcome of the cancer treatment, often overlooked by the gynecologic oncologist. Instead, emphasis is mainly focused on the survival of these patients. Quality of life provides vital information about the patient’s perception of the disease and its treatment.

Quality of life and its associated factors

The study showed that more than half of the survivors had good QoL, in line with an earlier report. Our result of total QoL score of 64.4 ± 18.6 is comparable to the many studies conducted in Ethiopia, Iran, India, and China, which reported the total QoL to be 48.3, 46.9, 59.52, and 65.3, respectively [12, 17-19]. However, we observe a noticeable improvement in overall QoL after completion of treatment. This might be because our patients have completed their treatment a long time ago, and after the completion of treatment, Patients may gradually adapt to their post-treatment circumstances over time. Patients had greater acceptance and positive reframing at their follow-up.

A good functioning of 82.5± 15.8, 92.3 ± 12.6, 88.7 ± 2.6, 85.8 ± 16.5, 91.1±14.1and 94.1 ± 14.2 was reported in physical, role, emotional, cognitive, and social functioning, respectively, and poor functioning in body image, sexual activity, and sexual enjoyment. Similar findings were echoed in the earlier report [12]. Our results showed good functioning in all domains of QoL after the treatment completion, which can be explained by the fact that the patients were able to interact to society (social), had decreased fear of disease (emotional), we’re able to perform day to day activities (physical) and were able to pursue their hobbies (role) [19].

In line with a previous study [20] fatigue, pain, and insomnia were concerning issues in the present study. This might be due to the side effects of different treatment modalities used for these patients. The reasons could be the changes occurring in normal protein and hormonal levels that are linked to inflammatory processes, thus leading to fatigue. Radiotherapy and chemotherapy destroy both normal and malignant cells, resulting in the accumulation of cell waste, which requires additional energy to clean up, resulting in fatigue [19]. Another common symptom reported by patients is pain. It can be explained by tumor growth leading to the production of inflammatory mediators causing tissue damage [18].

When analyzing the factors associated with survivors' QoL, it was found that age and income were the factors related to QoL, cognitive, and role functioning. Those with younger age and high household income had significantly better functioning, which is congruent with studies [20, 21].

that show the younger patients were actively performing day-to-day activities and also could concentrate and remember things as compared to older patients. Similar to the result from Ethiopia, [22] duration of diagnosis has shown a significant association with QoL components. This difference could be explained by the fact that earlier diagnosis helps to manage the cancer effectively and has fewer negative repercussions of treatment.

Sexual dysfunction and its associated factors

Sexuality is an important aspect of QoL. The findings of the study showed that the prevalence of sexual dysfunction was highest in these patients, based on their CSFQ-14 scores. This is similar to the previous report in which 70% of the patients had sexual dysfunction [23]. Therefore, sexual dysfunction is a common side effect caused by cervical cancer treatment. The main treatment for these patients involves surgery, which can be combined with radiation therapy and chemotherapy that often have direct effects on sexual organs. Hence, it is important to note that sexual dysfunction may be due to the type of treatment. Furthermore, all components of the sexual activity, such as pleasure, desire, arousal, and orgasm were affected in the present study. Thus, 80% of our participants had received both teletherapy with brachytherapy and 70% had undergone concurrent chemotherapy. To support these findings, one study has indicated that combined treatment (radiotherapy and chemotherapy) causes more sexual dysfunction [24].

While comparing the sexual dysfunction with different variables it has been seen that sexual desire, sexual interest, and sexual arousal were good in married patients as compared to separated/widowed/divorced patients. This might be due to majority of our participants were married and they have better sex lives with their husbands and reported less sexual dysfunction, which is congruent with a study that found more intimacy results in better sexual life [19].

Another factor that was associated with sexual life is menstrual status. Findings of the study suggest that sexual activity in postmenopausal patients is disturbed. This may be explained as postmenopausal women have a decreased level of estrogen leading to a decrease in libido, fatigue, temporary or permanent menopause whereas after medical and surgical menopause the patient has low or no sexual interest, vaginal dryness, and dyspareunia. Similarly, findings were also observed in a previous study, which showed that treatment of gynecological cancer is very often associated with poor sexual functioning [26]. Moreover, methods of treatment with less duration and complementary medicine interventions, such as mind–body practices, herbal supplements, and acupuncture, may play a supportive role in improving quality of life and enhancing sexual function among cancer patients [25-27].

Limitations and recommendations

It is important to recognize the limitations of this study. The lack of a control group limits our

ability to compare results with those of women without cervical cancer or those receiving alternative treatments. As a result, causal inferences should be drawn carefully.

To strengthen future research, longitudinal studies are recommended to assess changes in quality of life and sexual function over time, and to better capture long-term effects of treatment. Additionally, multicentred studies with larger and more diverse samples could improve the generalizability of results and allow for subgroup analyses. Including a matched control group in future designs would also enhance the ability to isolate treatment effects and provide stronger evidence for clinical recommendations. In conclusion, the study demonstrates that while overall quality of life and its functional domains show improvement following curative treatment for cervical cancer, significant impairments persist in the area of sexual health. A notably high prevalence of sexual dysfunction, particularly among postmenopausal women, highlights an often-overlooked aspect of survivorship. These findings underscore the importance of a comprehensive, multidisciplinary approach to post-treatment care one that prioritizes not only physical recovery but also sexual rehabilitation and psychosocial support. Integrating routine sexual health assessments and counseling into follow-up care protocols can contribute to enhancing the overall well-being and quality of life of cervical cancer survivors.

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Statement of Transparency and Principles

• The authors declare no conflict of interest.

• The study was approved by the Research Ethics Committee of the authors' affiliated institution.

• The study data are available upon reasonable request.

• All authors contributed to the implementation of this research.

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