ORIGINAL RESEARCH ARTICLE

Evaluating Post-Treatment Quality of Life in Cervical Cancer Patients in Tripura, India

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ABSTRACT

Background: In India, cervical cancer (CC) is the most common gynecological cancer. This harms the patient's physical and psychological health, lowering their quality of life (QOL). The study aimed to compare QOL of healthy women and cervical cancer survivors in Tripura, India.

Materials and Methods: With a propensity score matching system, this cross-sectional study compared 384 healthy women with 384 cervical cancer survivors. In order to assess sexual functioning and quality of life, we administered three questionnaires: the EORTC QLQ-C30, the EORTC QLQ-CX24 (the cervical cancer module), and the sociodemographic and clinical record form.

Result: Cervical cancer patients had a 64.67±2.68 overall quality of life and global health status. We discovered no statistically significant differences in age, education, economic position, marital status, first pregnancy, or residency between cervical cancer survivors and controls (p 0.05). Cervical cancer survivors reported higher lymphoedema scores than healthy women (p = 0.04). The EORTC QLQ-C30 and CX24 showed significant differences in cognitive ability (p = 0.01) and constipation (p = 0.03) between the two groups.

Conclusion: Research indicates that many cervical cancer survivors can maintain an acceptable quality of life despite their condition. Chemoradiotherapy significantly impaired the sexual functioning of cc survivors in comparison to a healthy control group.

Keywords: Quality of life, Cervical cancer, Sexual function, Tripura

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INTRODUCTION

Among women, cervical cancer ranks as the second most prevalent gynecological malignancy. In India, an annual total of 67,477 women succumb to cervical cancer following diagnosis, out of a larger pool of 122,844 newly reported cases each year. Both the cancer itself and the treatment methods have a significant impact on survivors' well-being, influencing their overall quality of life (QOL). The disease's characteristics and the therapy measures employed to address it can have a dramatic impact on both patients and their family members.[1] In Tripura, the female population has the highest prevalence of this particular form of cancer. According to the 2021 report by the Indian Council of Medical Research (ICMR), the Northeast region exhibits the highest incidence rate of cancer.[2] It is important, however, to acknowledge that certain impediments impede this rate's upward trajectory. Surviving patients lack awareness regarding their lifestyle, and no suitable protocol has been examined to enhance their quality-of-life following chemoradiotherapy.[3] Cervical cancer survivors may encounter a range of enduring side effects that persist for an extended duration without showing signs of resolution. Reports have indicated symptoms like sexual difficulties, discomfort, premature menopause, tiredness, and reduced physical function. The side effects of cancer treatment have the potential to negatively impact the quality of life for individuals who have survived cancer.[4,5]

The impact on a patient's sexual health varies depending on the sort of therapy techniques administered. Patients' quality of life significantly improves with the combination of surgical intervention and chemo-radiotherapy.[6,7]

This study aims to investigate the challenges encountered by women in relation to their cognitive processes. A key component of cancer survivorship is maintaining sexual wellness.

The patients' reported experiences with treatment-related side effects are consistent with existing literature in this domain. Some of the observed adverse effects included fatigue, lesions, urgency and urine leakage, diarrhea, decreased appetite, nausea, and the development of fistulas.[1,8] We also observed a significant issue with the olfactory perception of the liquid discharge from vagina associated with the condition.[9] The symptoms experienced by women and the subsequent consequences of the condition had a notable influence on their capacity for social interaction. Furthermore, the illness had a significant impact on their interpersonal relationships with their spouses or partners. It is imperative for women to engage in various therapeutic interventions that may potentially exert adverse effects on their sexual and reproductive well-being.[10,11,12] The survival rate for people diagnosed with cervical cancer is progressively improving over time, leading to a growing emphasis on the quality of life (QOL) experienced by these individuals. The assessment of quality of life (QOL) during and after treatment has the potential to enhance the overall situation.[13,14]

METHODOLOGY

Study design: In a cross-sectional study, the Atal Bihari Vajpayee Regional Cancer Centre in Agartala specifically targeted cervical cancer patients who needed medical intervention at the hospital. The institutional review board of Agartala Govt. Medical College granted ethical approval. The research center incorporates extensive cancer treatment capabilities, making it the only cancer hospital in Tripura. The study recruited 384 cervical cancer patients through face-to-face interviews who attended outpatient department (OPD) between June 2021 and June 2023. Out of all the patients with cervical cancer, only those who satisfied all of the criteria were included in the study.

Individuals diagnosed with cervical cancer at any stage who underwent chemotherapy and radiotherapy as part of their treatment at least six months before registration fulfilled the inclusion criteria. Furthermore, patients' inclusion was contingent on their written consent. The study excluded participants who indicated a lack of interest in participating in the interview or were under the age of 18. The study also recruited a control group including 384 healthy volunteers, including patient's relatives, attendants, and other medical workers from the hospital. Participants without a prior history of cancer and aged above 18 years were enrolled with their signed consent as control. Individuals who opted out or failed to complete the surveys were excluded.

Data collection procedure: An interviewer administered a standardized questionnaire consisting of two sections. The initial segment concentrated on the factors, including demographics and health problems. To obtain the initial segment, we conducted face-to-face interviews with participants and reviewed patient care records. The second phase of the study directed its attention towards the examination of quality of life (QOL) and employed the EORTC (The European Organisation for Research and Treatment of Cancer) questionnaire modules QLQ-C30 and QLQ-CX24. Each of these modules was offered in both English and Bengali languages. Both EORTC QLQ-C30 and QLQ-CX24 (Cervical cancer module) questionnaire have been validated in Bengali. The EORTC questionnaire has been extensively utilised and evaluated across several cultures, demonstrating its validity. The EORTC QLQ-CX24 is the most pertinent and valid instrument for assessing cervical cancer-specific health-related quality of life through self-reported health status evaluation. The Bengali version of the EORTC QLQ-CX24 was validated for cervical cancer patients and demonstrated reliability and efficacy in clinical studies assessing quality of life.[15,16,17]

Scoring Procedure of EORTC QLQ-C30 & QLQ-CX24 questionnaire: The EORTC QLQ-C30 is made up of five different functional domains: physical, role, cognitive, emotional, social and three distinct symptom scales: pain, nausea/vomiting, and weariness. Furthermore, it includes global health and comprehensive quality of life metrics. Six distinct categories, including dyspnoea, appetite loss, sleep disturbance, constipation, and diarrhoea, are assessed because they are additional symptoms frequently reported by cancer patients. Finally, it enquires about disclosed financial challenges.

From 0 to one hundred, that is the range of possible scores on all scales and tests. Scores over average suggest a high degree of response on the scale. High scores on the global health status scale, functional scale, and symptom scales all point to an outstanding quality of life, substantial level of functioning, and a great deal of symptomatology or difficulties, respectively.

There is no variation in the scoring concept that applies to these scales in all situations: Perform the calculation to determine the approximate mean of all of the components that make up the scale; this is what is known as the raw score. As a result of the raw score being standardised by the use of a linear transformation, the scores are now restricted to a range that extends from 0 to 100 degrees.

A score that is superior indicates that the individual is operating at a higher level, whereas a score that is inferior indicates that the intensity of the symptoms has grown. Because the bulk of the items have values that fall between 1 and 4, the answer range for the item is 3, which is also the range of the item.

When applied to all scales, the Raw Score (RS) is the average of the scores obtained from each individual item.

The realm of the functional scale:
Score (S)={1-(RS−1)/range}×100

The realm of symptom scales and the global health status and quality of life: S={(RS−1)/range}×100

There are twenty-four items that make up the EORTC QLQ-CX24. Symptom experience, body image, and sexual/vaginal functioning are three of the scales that contain several items, whereas the remaining six measures (lymphoedema, peripheral neuropathy, menopausal symptoms, sexual worry, sexual activity, and sexual enjoyment) consist of single items. The scoring method of the QLQ-CX24 is theoretically similar to that of the QLQ-C30's symptom scales and individual items, using the formula

$[S=\{(RS-1)/range\}\times 100]$.

In the EORTC QLQ-CX24 assessment, elevated scores signify more severe symptoms or conditions. An elevated score in the domains of sexual pleasure and sexual engagement indicates reduced challenges or excellent performance.[16,17,18,19]

Statistical Analysis: Statistical analysis was conducted on the data using SPSS version 16 software, created by IBM Corporation, together with Microsoft Excel. The means and standard deviations for quantitative variables were calculated using descriptive statistics, whereas percentages were computed for categorical variables. The scores derived from the QLQ-C30 and QLQ-CX24 surveys were classified into three distinct categories: excellent, rather satisfactory, or less satisfactory. Good scores were defined as scores of ≥66.7%, middling scores were defined as scores between 33.4% and 66.6%, and poor scores were defined as scores ≥33.3%. Based on the previously documented scoring manual, these classifications were established.[17,18] Due to disparities in demographic features between the cervical cancer survivors and control groups, mean differences were used to compare the two groups in terms of age, education, economic position, marital status, first pregnancy, and place of residence by using propensity score matching. The demographic and clinical characteristics of the subjects were analyzed using count percentages and quartiles. In order to compare continuous variables between the control group and the cervical cancer survivors' group, t tests were conducted. A statistical significance was established when the p-value was below 0.05.

RESULTS

Table 1 presents the sociodemographic characteristics of the cohort under investigation. 384 women in the healthy control group and 384 cervical cancer survivors who met the study's eligibility requirements provided informed consent and filled out questionnaires. The average age at the diagnosis of CC patients is 50.35 ± 11.66 and for healthy control is 48.71 ± 12.69.

Table 1: Sociodemographic profile of cervical cancer patients and healthy control group participants

Characteristics	Cervical cancer survivor	Control Group	P value
Age at diagnosis (year)	50.3 ± 11.6	48.7 ± 12.6	0.05
Marital Age	20.8 ± 6.9	24.2±4.5	<0.01
Age of First Pregnancy	21.4 ± 6.6	26.4±6.0	<0.01
Education level			
Primary	271(71)	104(27)	0.05
Secondary	89(23)	157(41)	
Graduate & Higher	15(4)	75(19.5)	
Illiterate	09(2)	48(12.5)	
Economic Status			
Lower class	173(45)	152(40)	0.60
Middle class	197(51)	204(53)	
Upper class	14(4)	28(7)	
Place of Residence			
Urban	139(37)	161(42)	0.999
Rural	245(63)	223(58)	

Numbers (%) or mean ± standard deviation are used to display the values

Demographic data, encompassing age (p 0.05), education (p 0.05), economic position (p 0.64), marital status (p 1.51), first pregnancy (p 2.35), and place of residency (p 1.0), exhibited no statistically significant differences between the cervical cancer survivors and control groups.

The socio-economic status (SES) is determined according to the Kuppuswamy socioeconomic status classification revision of 2021. The 1976 Kuppuswamy scale assessed socioeconomic level based on occupation, total family income, and education, irrespective of joint or nuclear family structure. There are five socioeconomic classes: upper, upper middle, middle, lower middle, and lower. The upper and upper middle classes constitute the highest echelon, and the lower middle and lower classes represent the lower strata, with the middle class occupying a central position.[20]

Table 2 presents the clinical characteristics of patients with cervical cancer. A significant proportion of women who had survived cervical cancer had stage IIIA (36%) and IIB (24%) diseases, according to the International Federation of Gynecology and Obstetrics (FIGO). Squamous cell carcinoma was the predominant histological type, accounting for 84% of cases. The treatment type has been categorized into three groups, with the majority of patients receiving chemoradiotherapy (58%).

Table 2: Clinical details of cervical cancer patients who participated in the study

Cervical cancer survivor	Participant's (%)
Histopathological finding	
Squamous cell carcinoma	322 (84)
Adenocarcinoma	57 (15)
Others	5 (2)
FIGO Stage	
IA	4 (1)
IB	7 (2)
IIA	57 (15)
IIB	93 (24)
IIIA	137 (36)
IIIB	52 (13)
IVA	27 (7)
IVB	7 (2)
Treatment type	
Surgery + RT	69 (18)
Surgery +CT+RT	92 (24)
CT+RT	223 (58)

FIGO: The International Federation of Gynecology and Obstetrics[21]

Table 3: Percentage of patients with issues and their condition based on the QLQ-C30 scale (N = 384)

Variables	(Scoring≤33.3) Poor (%)	(Scoring 33.4–66.6) Moderate (%)	(Scoring≥66.7) Good (%)
QLQ-C30 Functional Scales			
Global health score	**9**	**38**	**53**
Physical functioning	2.6	16.2	81.2
Cognitive functioning	3.8	9.9	86.3
Role Functioning	5.7	9	85.3
Social Functioning	21.8	8.2	70
Emotional Functioning	9.2	18.9	71.9
QLQ-C30 symptom scales			
Fatigue	80.8	12.4	6.8
Nausea & vomiting	79.3	5.1	15.6
Pain	53.2	15	31.8
Dyspnea	96.5	0	3.5
Insomnia	62.2	0	37.8
Appetite loss	68.7	0	31.3
Constipation	63	0	37
Diarrhea	95	0	5
Financial difficulties	19.3	27	53.7

Table 4: Percentage of patients with issues and their condition according to QLQ-CX24 scale scores (N = 384)

Variables	Scoring ≤33.3 (%)	Scoring 33.4–66.6 (%)	Scoring≥66.7(%)
QLQ-CX24 symptom scales			
Symptom experience	83.5	12.4	4.1
Body image	75.6	11	13.4
Lymphoedema	86.7	6.2	7.1
Peripheral neuropathy	74.5	9	16.5
Menopausal symptom	70	0	30
Sexual/Vaginal functioning	51	24	25
Sexual worry	69	14	17
QLQ-CX24 Functional Scales			
Sexual Activity	84.4	0	15.6
Sexual enjoyment	89	0	11

Table 5: Comparative analysis of QLQ C30 and QLQ CX 24 between cervical cancer patients and the control group

Variables	Cervical cancer survivor	Healthy Control Group	P value
EORTC QLQ-C30			
Global health score	**64.67±2.68**	69.9±5.5	1.62
Physical functioning	76.26±3.27	80.6± 4.5	2.98
Cognitive functioning	77.51±3.35	78.3±5.1	0.01
Role Functioning	76.51±3.65	80.9±4.3	1.06
Social Functioning	66.09±2.73	74.4±6.9	3.38
Emotional Functioning	70.92±2.97	76.1±4.1	3.3
Fatigue	25.35±3.2	39.9±6.9	1.79
Nausea & vomiting	28.63±3.0	40.7±6.4	5.26
Pain	42.87±2.4	49.4±4.7	7.89
Dyspnea	18.90±3.4	32.8±4.9	7.5
Insomnia	41.83± 3.2	43.3±6.9	0.00016
Appetite loss	37.49± 2.6	49.3±8.0	2.02
Constipation	41.31±3.6	40.8±3.2	0.03
Diarrhea	20.11±3.5	31.9±2.2	1.75
Financial difficulties	66.3±2.3	61.46±2.6	2.8
EORTC QLQ-CX24			
Body image	29.33±3.0	31.6±4.8	1.64
Symptom experience	23.42±3.36	27.32±6.7	5.59
Lymphedema	23.2±3.2	22.8±2.1	0.04
Peripheral neuropathy	24.03±3.32	22.8±4.1	<0.001
Menopausal symptoms	36.6±4.1	31.1±4.5	1.94
Sexual/Vaginal functioning	39.5±2.6	31.4±4.1	0
Sexual worry	76.6±3.1	38.2±3.4	0
Sexual activity	15.1±3.83	38.1±6.1	1.8
Sexual enjoyment	37.8±4.3	40.3±5.9	3.77

The mean ± standard deviation is used to display the values. Mean score < 33.3 shows problems; mean score >66.7 shows good functioning in the functioning scale. In the symptom scale, a mean score >66.7 shows poor functioning.

The overall quality of life and global health status of patients with cervical cancer were determined to be 64.67±2.68, indicating a moderate level of well-being. A majority of the sample, specifically 53% (n = 213), exhibited favourable global health status. According to the study's findings, the domain of social functioning had the lowest score at 21.8%, while the domain of cognitive functioning had the highest score at 86.3%, according to the EORTC QLQ C30 assessment. Moreover, a significant proportion of individuals, specifically 53.7%, are currently experiencing financial challenges. Additionally, a notable percentage of respondents, amounting to 37%, have reported instances of constipation (Table 3).

As presented in Table 4, the domain EORTC QLQ CX 24 demonstrates significant findings. 89% have low sexual enjoyment scores. 84.4% of individuals have experienced a decline in interest or lack of engagement in sexual activities for an extended period of time. 30% of patients had symptoms frequently associated with menopause, and 16.5% had peripheral neuropathy.

As indicated in Table 5, the survivors of cervical cancer and the control group were compared with respect to the EORTC QLQ-C30 and CX24 scores. The two groups differed significantly on the following scales: cognitive performance (p = 0.01), constipation (p = 0.03) in the EORTC QLQ-C30, and lymphoedema (p = 0.04) in the EORTC QLQ-CX24. Among the subscales of the EORTC QLQ-CX24 measuring sexual and vaginal functioning, survivors of cervical cancer reported a shorter vaginal length compared to the control group (mean, 39.5 vs. 31.6; p = 0), and patients with cervical cancer also reported a lack of sexual activity (15.1 vs. 38.1; p = 1.80).

Discussion

The current study found that both the control group and cervical cancer survivors experienced higher rates of lymphoedema and peripheral neuropathy as post-treatment complications.

According to reports, individuals who have survived gynecologic cancers have shown a reluctance to engage in sexual activity because they are afraid of experiencing a recurrence of the disease.[22] The previous study found that, among cervical cancer survivors, lack of sexual activity eliminated 38.2% (91/238) within 3 months, compared to just 10.6% (28/265) in the control group[23] One aspect of QoL is body image. The majority of individuals with rectal, stomach, and head and neck cancers have a compromised body image. The impaired body image during cancer therapy may progressively improve post-treatment. Nevertheless, body image frequently remains inadequately restored, even five years post-treatment. Social position is known to influence body image.[24,25] The women who survived cervical cancer had a more positive perception of their bodies than the control group, which is an intriguing finding. Those who had survived cervical cancer had more severe lymphoedema symptoms than those in the

control group. Radiation and surgery cannot completely heal a damaged lymphatic system. Patients' quality of life can also decline due to the long-lasting or persistent symptoms of lymphoedema.[22]

Several studies conducted in various countries like Ethiopia, Iran, Tanzania, China, etc. have provided data on the overall quality of life (QOL), with reported values of 48.3, 46.9, 64.4, and 65.3, respectively. Our findings align with these previous studies, as we observed a global health status value of 64.67±2.68 in Tripura.[26,27,28] The predominant adverse symptoms reported included insomnia, constipation, a lack of appetite, financial hardship, menopausal symptoms, and peripheral neuropathy. These findings bear resemblance to other similar studies.[13,29,30] The study observed a positive correlation between age and cognitive performance, suggesting that younger patients exhibited higher levels of engagement in daily activities, as well as enhanced abilities to concentrate and retain information, in comparison to their older counterparts. This finding exhibit resemblance to previous studies.[24,31] Multiple studies have shown that sexuality has an adverse influence on individuals diagnosed with various types of cancer. The study findings indicate that the younger patients exhibited a higher prevalence of sexual concern in comparison to the older ones. Consistent with the scope of our investigation, prior studies have indicated that younger patients express concerns regarding fertility, femininity, treatment-induced menopause, and challenges connected to interpersonal relationships.[17,32,33]

Sexuality has a fundamental role in the context of gynecological cancer, thus serving as a pivotal factor in determining an individual's quality of life. The current investigation saw a notable reduction in the sexual activity score. According to other studies, CC and its therapy affect the same bodily regions that are important for sexual response, leading to sexual dysfunction in 40% to 100% of patients. Patients who underwent surgery in combination with chemotherapy and radiotherapy exhibited poorer sexual and vaginal functioning compared to patients who only underwent surgery.[24,34]

The ability of radiotherapy (RT) to damage not only cancerous cells but also adjacent healthy cells around the tumor sets it apart from other treatment techniques. Consequently, the adjacent anatomical structures, namely the cervix, uterine body, vagina, bladder, and rectum, experience concurrent effects. Bladder and intestinal diseases have a higher prevalence following radiation therapy, which also leads to ovarian failure in premenopausal women. The study's results show that lowering the dose of external beam radiation therapy can lessen the damage to nearby healthy organs while keeping the treatment's therapeutic effectiveness. Another strategy for mitigating the adverse effects on quality of life is to use a mixed approach using external radiation therapy in conjunction with brachytherapy.[35,36,37] This study's limitations stem from the use of a cross-sectional design, which prevented longitudinal quality of life evaluation and prevented a comparison of QOL scores before and after treatment. The study limited the scope of data collection to a single institution, thereby limiting the applicability of the findings to the entire cancer survivor population in the North-East region of India· Longitudinal research and intervention studies including a control group may provide a more comprehensive evaluation of the quality of life (QOL) among cervical cancer survivors.[17,38]

Conclusion

Our research shows that many people with cervical cancer report a high quality of life despite their diagnosis. In order to enhance quality of life, it may be necessary to implement interventions that prioritize social and psychological assistance as well as physical rehabilitation. Researchers have identified that individuals diagnosed with cervical cancer is mostly from rural residency (63%) compared to control group. Researchers found significant impairment in the sexual functioning of cervical cancer survivors who underwent chemoradiotherapy compared to the healthy control group. The domain of social functioning had the highest degree of impairment and showed limited improvement over time. The individual encountered significant financial challenges while also experiencing persistent issues with constipation and insomnia.

References

1. Rahman, Z., Singh, U., Qureshi, S., Nisha, Srivastav, K., & Nishchal, A. Assessment of quality of life in treated patients of cancer cervix. *Journal of Midlife Health*. 2017;*8*(4), 183. DOI: 10.4103/jmh.jmh_40_17
2. Profile of cancer and related health indicators in the North East region of India-2021. Available at: https://ncdirindia.org/All_Reports/NorthEast2021/Default.aspx Accessed October 18th, 2024
3. Oswal, K., Kanodia, R., Pradhan, A., Nadkar, U., Avhad, M., Venkataramanan, R., Sethuraman, L., Caduff, C., & Purushotham, A. Assessment of knowledge and screening in oral, breast, and cervical cancer in the population of the Northeast region of India. *JCO Global Oncology*.2020; *6*, 601–609. DOI: 10.1200/jgo.19.00257
4. Pfaendler, K. S., Wenzel, L., Mechanic, M. B., & Penner, K. Cervical cancer survivorship: long-term quality of life and social support. *Clinical Therapeutics*. 2015;*37*(1), 39–48. DOI: 10.1016/j.clinthera.2014.11.013
5. O'Malley, D., Hudson, S. V., Ohman-Strickland, P., Bator, A., Lee, H. S., Gundersen, D. A., & Miller, S. M. Follow-up care education and information: Identifying cancer survivors in need of more guidance. *Journal of Cancer Education*. 2014;*31*(1), 63–69. DOI: 10.1007/s13187-014-0775-y
6. Petignat, P. & Roy, M. Diagnosis and management of cervical cancer. *BMJ*. 2007;*335*(7623), 765–768. DOI: 10.1136/bmj.39337.615197.80
7. Burmeister, C. A., Khan, S. F., Schäfer, G., Mbatani, N., Adams, T., Moodley, J., & Prince, S. Cervical cancer therapies: current challenges and future perspectives. *Tumour Virus Research*. 2022;*13*, 200238. DOI: 10.1016/j.tvr.2022.200238

8. Wang S, Wen H, Gao Y, Lv Q, Cao T, Wang S, et al. Assessment of pelvic floor function and quality of life in patients treated for cervical cancer: A multicenter retrospective study. Gynecol Obstet Invest. 2021;86(4):353–60. DOI: 10.1159/000517995

9. Controlling symptoms of advanced cervical cancer . Cancerresearchuk.org. Available at: https://www.cancerresearchuk.org/about-cancer/cervical-cancer/treatment/controlling-symptoms-advanced-cervical-cancer. Accessed October 14th ,2024.

10. Ding, X., Zhang, Y., Wang, J., Huang, A., Liu, Y., Yan, H., & Hu, D. The association of adverse reactions and depression in cervical cancer patients treated with radiotherapy and/or chemotherapy: moderated mediation models. *Frontiers in Psychology*.2023; *14*. DOI: 10.3389/fpsyg.2023.1207265

11. Tadesse, S. K. Socio-economic and cultural vulnerabilities to cervical cancer and challenges faced by patients attending care at Tikur Anbessa Hospital: A cross-sectional and qualitative study. *BMC Women's Health*.2015; *15*(1). DOI: 10.1186/s12905-015-0231-0

12. *Side effects of radiation therapy | Radiation effects on body*. (n.d.). American Cancer Society. Available at: https://www.cancer.org/cancer/managing-cancer/treatment-types/ radiation/effects-on-different-parts-of-body.html. Accessed October 12th ,2024

13. Mvunta, D. H., August, F., Dharsee, N., Mvunta, M. H., Wangwe, P., Ngarina, M., Simba, B. M., & Kidanto, H. Quality of life among cervical cancer patients following completion of chemoradiotherapy at Ocean Road Cancer Institute (ORCI) in Tanzania. *BMC Women's Health*.2022; *22*(1). DOI: 10.1186/s12905-022-02003-6

14. *Quality of Life of Patients with Advanced Cervical Cancer Before and After Chemoradiotherapy*. (2016). PubMed. https:// pubmed.ncbi.nlm.nih.gov/27509935/

15. Aaronson, N. K., Ahmedzai, S. H., Bergman, B., Bullinger, M., Cull, A., Duez, N., Filiberti, A., Flechtner, H., Fleishman, S. B., De Haes, J., Kaasa, S., Klee, M., Osoba, D., Razavi, D., Rofe, P., Schraub, S., Sneeuw, K., Sullivan, M., & Takeda, F. The European Organization for Research and Treatment of Cancer QLQ-C30: A Quality-of-Life Instrument for Use in International Clinical Trials in Oncology. *Journal of the National Cancer Institute*.1993; *85*(5), 365–376. DOI: 10.1093/jnci/85.5.365

16. Form [Internet]. EORTC – Quality of Life. EORTC - Quality of Life; 2023. https://qol.eortc.org/form/ . Accessed October 12th ,2024

17. Thapa, N., Maharjan, M., Xiong, Y., Jiang, D., Nguyen, T., Petrini, M. A., & Cai, H. Impact of cervical cancer on quality of life of women in Hubei, China. *Scientific Reports*.2018; *8*(1). DOI: 10.1038/s41598-018-30506-6

18. EORTC QLQ-C30 Scoring Manual. Available at https://www.eortc.org/app/uploads/sites/2/2018/02/SCmanual.pdf. Accessed on November 21st, 2024.

19. Greimel, E., Vlasic, K. K., Waldenström, A., Duric, V., Jensen, P. T., Schnittger, S., Chie, W., Nordin, A., Radisic, V. B., & Wydra, D. The European Organization for Research and Treatment of Cancer (EORTC) Quality-of-Life questionnaire cervical cancer module. *Cancer*.2006;*107*(8), 1812–1822. DOI: 10.1002/cncr.22217

20. Majumder S. Socioeconomic status scales: Revised Kuppuswamy, BG Prasad, and Udai Pareekh's scale updated for 2021. J Family Med Prim Care. 2021;10(11):3964–7. DOI: 10.4103/jfmpc.jfmpc_600_21

21. Bhatla N, Singhal S, Dhamija E, Mathur S, Natarajan J, Maheshwari A. Implications of the revised cervical cancer FIGO staging system. Indian J Med Res [Internet]. 2021;154(2):273–83. Available from: DOI: 10.4103/ijmr.IJMR_4225_20

22. Reis N, Beji NK, Coskun A. Quality of life and sexual functioning in gynecological cancer patients: results from quantitative and qualitative data. *Eur J Oncol Nurs.* 2010;14:137–46.

23. Lee Y, Lim MC, Kim SI, Joo J, Lee DO, Park SY. Comparison of Quality of Life and Sexuality between Cervical Cancer Survivors and Healthy Women. Cancer Research and Treatment. 2016;48(4):1321–9. DOI: 10.4143/crt.2015.425

24. Li X, Song X, Chen Z, Li M, Lu L, Xu Y, et al. Quality of life in rectal cancer patients after radical surgery: a survey of Chinese patients. *World J Surg Oncol.* 2014;12:161.

25. Lee SS, Chung HY, Kwon OK, Yu W. Quality of life in cancer survivors 5 years or more after total gastrectomy: a case-control study. *Int J Surg.* 2014;12:700–5.

26. Khalil J, Bellefqih S, Sahli N, Aff M, Elkacemi H, Elmajjaoui S, et al. Impact of cervical cancer on quality of life: beyond the short term (Results from a single institution). Gynecol Oncol Res Pract. 2015;2:7. DOI: 10. 1186/s40661-015-0011-4.

27. Torkzahrani S, Rastegari L, Khodakarami N, Akbarzadeh-Baghian A, Alizadeh K. Quality of life and its related factors among Iranian cervical cancer survivors. Iran Red Crescent Med J. 2013;15(4):320–3.

28. Singh U, Verma M, Rahman Z, Qureshi S, Srivastava K. Factors affecting quality of life of cervical cancer patients: a multivariate analysis. J Cancer Res Ther. 2019;15:1338.

29. Dahiya N, Acharya AS, Bachani D, Sharma D, Gupta S, Haresh K, et al. Quality of life of patients with advanced cervical cancer before and after chemoradiotherapy. Asian Pac J Cancer Prev. 2016;17(7):3095–9.

30. Huang HH, Tsai W, Chou WY, Hung YC, Liu L, Huang KF, et al. Quality of life of breast and cervical cancer survivors. BMC Women's Health. 2017 Apr 12;17(1). DOI: 10.1186/s12905-017-0387-x

31. Stuopelytė R, Žukienė G, Breivienė R, Rudaitis V, Bartkevičienė D. Quality of Life in Cervical Cancer Survivors Treated with Concurrent Chemoradiotherapy. Medicina-lithuania. 2023 Apr 17;59(4):777. DOI: 10.3390/medicina59040777

32. Kaneyasu Y, Fujiwara H, Nishimura T, Sakurai H, Kazumoto T, Ikushima H, et al. A multi-institutional survey of the quality of life after treatment for uterine cervical cancer: a comparison between radical radiotherapy and surgery in Japan. Journal of Radiation Research. 2021 Jan 7;62(2):269-84. DOI: https://doi.org/10.1093/jrr/rraa107 PMid:33415337

33. Kimman M, Jan S, Peters SAE, Ch Y, Ca N, Bhoo-Pathy N, et al. Health-related quality of life and psychological distress among cancer survivors in Southeast Asia: results from a longitudinal study in eight low- and middle-income countries. BMC Medicine. 2017 Jan 13;15(1). DOI: 10.1186/s12916-016-0768-2

34. Kumar S, Rana ML, Verma K, Narayanjeet S, Sharma AK, Maria AK, et al. PREDIQT-CX: Post-treatment health-related quality-of-life prediction model for cervical cancer patients. PLOS ONE. 2014 Feb 26;9(2):e89851. DOI: 10.1371/journal.pone.0089851

35. Stuopelytė R, Žukienė G, Breivienė R, Rudaitis V, Bartkevičienė D. Quality of Life in Cervical Cancer Survivors Treated with Concurrent Chemoradiotherapy. 2023;59(4):777. 10.3390/medicina59040777

36. Yu H, Tang X, Yang X, Wen D, Li Z, Wen X, et al. Dose fusion and efficacy evaluation of different radical radiotherapy doses for cervical cancer. Brachytherapy. 2021;20(3):519–26. DOI: 10.1016/j.brachy.2020.12.001

37. Correia RA, Bonfim CVD, Da Silva Ferreira DK, Furtado BMASM, Da Costa HVV, Feitosa KMA, et al. Quality of life after treatment for cervical cancer. Escola Anna Nery. 2018;22(4). DOI: 10.1590/2177-9465-ean-2018-0130

38. Iyer NS, Osann K, Hsieh S, Tucker JA, Monk BJ, Nelson EL, et al. Health Behaviors in Cervical Cancer Survivors and Associations with Quality of Life. Clinical Therapeutics. 2016; 38(3): 467–75. DOI: 10.1016/j.clinthera.2016.02.006.