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Impact of treatment on the quality of life of patients with cervical cancer at a tertiary facility in sub-Saharan Africa

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Abstract

Introduction: Cervical cancer remains a significant public health concern in sub-Saharan Africa, with treatment modalities such as chemoradiotherapy impacting patients' quality of life (QoL). This study assessed the QoL of cervical cancer patients undergoing definitive chemoradiotherapy.
Methods: This cross-sectional study was conducted at the National Radiotherapy, Oncology and Nuclear Medicine Centre, Korle-Bu Teaching Hospital, Accra, between February and May 2023. A total of 120 adult female cervical cancer patients, treated with definitive chemoradiotherapy, were purposively recruited. Data were collected using the FACT-Cx questionnaire, which assessed physical, social, emotional and functional well-being as well as additional concerns. Statistical analysis included descriptive and inferential methods with Spearman Rho used to examine correlations.
Results: The mean age of participants was 53·5 years (SD 15·6), with most (77%) employed and half (50%) married. QoL scores were highest in social well-being (mean = 17·3/24·0) and emotional well-being (mean = 16·8/24·0), but lower in physical (mean = 15·4/28·0) and functional well-being (mean = 12·3/24·0). Most participants (66·7%) reported a good QoL, while 6·7% reported poor QoL. Key challenges included fatigue, pain and dissatisfaction with sex life, although participants received strong emotional support from their families. Correlations between age and QoL domains were statistically insignificant ($p > 0{\cdot}05$).
Conclusions: The findings suggest that despite the physical and functional challenges faced during chemoradiotherapy, most participants reported good overall QoL, largely attributed to strong family and social support. Future studies should incorporate longitudinal designs with baseline data collection to better understand treatment-related changes in QoL.

Introduction

Cervical cancer is a significant public health challenge globally, particularly in low- and middle-income countries due to late diagnosis, advanced stages of diagnosis, lack or inaccessibility of treatment, lack of treatment facilities and logistic and cultural obstacles to treatment resulting in poor prognosis.[1] It is the fourth most frequently diagnosed cancer among women worldwide, with 661,021 new cases and 348,189 deaths recorded in 2022 alone.[2] The burden of cervical cancer is disproportionately higher in sub-Saharan Africa, where it accounts for the highest incidence and mortality rates due to limited access to preventive and therapeutic cancer care services.[3] The management of cervical cancer has psychological implications for patients' self-identity, their ability to satisfy their partners and the overall self-perception as a female, which often affect their quality of life (QoL) negatively.[3,4] A study found that the emotional functioning of patients with cervical cancer worsened after treatment compared to their emotional functioning before treatment.[5] Important components of emotional functioning include feelings of fear, hopelessness, anger, shock and self-blame as a result of the outcomes of physical changes associated with treatment.[6] The physical functioning of patients with cervical cancer can also be impaired by acute adverse effects of radiation treatment such as diarrhoea, making it difficult for patients to attend social functions.[5]

Assessment of the QoL of patients with cervical cancer has become necessary due to significant improvements in long-term survival,[7] attributable to modern therapeutic modalities. The impact of cancer treatment on patients' well-being and overall QoL is of growing interest in cancer research.[8] Some psychological factors also contribute to the toxicity experienced by patients with cervical cancer undergoing treatment such as depression, somatization and anxiety.[9,10] High anxiety levels at the start of treatment are associated with decreased QoL.[11]

QoL focuses on four concepts, comprising physical, social, emotional and functional well-being—to provide a holistic outcome per patients' own perspective.[12] Multiple questionnaires have been developed and validated for the assessment of the QoL of patients diagnosed with cancer, such as the European Organization for Research and Treatment of Cancer (EORTC QLQ-C30)[13,14] and the Functional Assessment of Cancer Therapy—General (FACT-G) questionnaires.[15]

Although some studies have been carried out in other jurisdictions to assess the QoL of patients with cervical cancer undergoing treatment,[14,16] only a few have been conducted in the sub-Saharan African setting.[17] The aim of the study was to evaluate the impact of radiotherapy on the overall QoL of patients with cervical cancer using a validated assessment tool.

Methods

This research was a quantitative cross-sectional study conducted between February and May, 2023 at the National Radiotherapy, Oncology and Nuclear Medicine Centre, Korle-Bu Teaching Hospital (KBTH) in Accra in Ghana. The study involved adult female patients (≥ 18 years) with a histopathologically confirmed diagnosis of cervical cancer who were treated with definitive chemoradiotherapy. Patients with metastatic cervical cancer and those with locally advanced disease treated with palliative intent were excluded from the study. Likewise, patients with cervical cancer who received only radiotherapy, without concurrent chemotherapy were not included in the study. Based on the Taro Yamane formula[18] [$N/(KN(E)^2)$ where K(constant)=1, N(Population of study) =140 and E(degree of error expected) = 0.05], a sample size of 103 patients was determined to be appropriate for this study. Out of 140 eligible patients, a purposive sampling technique was used to recruit 120 consenting participants for the study. Data were collected using the FACT-Cx questionnaire.[19] The first section of the questionnaire elicited information regarding patients' age, marital and employment status. The second section elicited information pertaining to the physical, social, emotional and functional well-being of the participants as well as their additional concerns. The questionnaire was offered to patients after they had received radiotherapy for at least two weeks, to allow enough time for patients to experience the acute effects of radiotherapy prior to completing the research questionnaire. For participants who faced challenges in fully comprehending certain questionnaire items, verbal clarifications were provided in English by trained research personnel, ensuring that participants understood the intent and meaning of the questions without altering their original phrasing. Statistical analysis for the study was conducted using the Statistical Package for Social Sciences (version 22), employing both descriptive and inferential statistical methods to analyse data. Categorical variables, such as demographic and clinical characteristics, were summarized with frequency distributions and percentages, while continuous variables, including FACT-CX scores, were described using means and standard deviations. Correlations between groups were performed using Spearman Rho correlational analysis. p-values $< 0{\cdot}05$ were considered to be statistically significant.

Ethical approval for the study was obtained from the Ethical and Protocol Review Committee of the School of Biomedical and Allied Health Sciences, University of Ghana, Legon (SBAHS/AA/RAD/10573772/2023). Participants' privacy and the confidentiality of their data were safeguarded throughout the study. Data were anonymized to remove all patient-identifying information prior to analysis. The study involved only participants who provided written informed consent. All standard ethical considerations were rigorously adhered to, ensuring that the study was conducted with respect for the rights, dignity and welfare of all the participants.

Table 1. Baseline characteristics of the study participants ($N = 120$)

Characteristics	Variables	Frequency (*n*)	Percentage (%)
Age range (years)	< 40	20	16·6
	40–49	32	26·7
	50–59	28	23.3
	60–69	12	10
	≥ 70	28	23.4
Marital status	Single	12	10
	Married	60	50
	Divorced	12	10
	Widow	36	30
Employment status	Employed	92	77
	Unemployed	20	17
	Retired	8	6

Results

Baseline characteristics

Overall, there were 120 participants, with a mean age of 53·5 years (SD 15·6), ranging from 29 to 83 years. In all, 16·6% were younger than 40 years and 23·3% were ≥ 70 years. Half of the participants (50%) were married whiles 30% were widowed. The majority of the participants (77%) were employed whereas 17% were unemployed and 6% retired as summarized in Table 1.

QoL *of patients with cervical cancer*

1. Physical well-being

Table 2 summarizes participants' responses to questionnaire items regarding the impact of cervical cancer and its treatment on their physical well-being. Half of the respondents (50·0%) reported a significant lack of energy ("very much") and 20·0% did not experience any lack in energy. Also, 56·7% experienced no nausea compared with 30% who experienced significant nausea.

2. Social well-being

All participants concurred that their family had accepted their illness. In all, 90% received overwhelming emotional support from their family and 80% were satisfied with their family's communication about their illness (Table 3). However, 6·7% did not feel close to their partners during the treatment period. Additionally, 30% were very satisfied with their sex life, however, a considerable majority (46·7%) were not satisfied at all.

3. Emotional well-being

A considerable majority (60%) were very sad, 46·7% felt very nervous about their condition and more than half of the participants (73·3%) had hope in the fight against their illness. Also, 66·7% were not worried at all, that their condition would get worse (Table 4).

4. Functional well-being

A considerable majority (56·7%) were not at all content with their QoL and 23·3% were unable to enjoy the things they usually

Table 2. Physical well-being of patients with cervical cancer ($N = 120$)

Questionnaire items	Not at all n (%)	Somewhat n (%)	Very much n (%)
I lack energy	24 (20%)	36 (30%)	60 (50%)
I have nausea	68 (56·7%)	16 (13·3%)	36 (30%)
Because of my condition, I have trouble meeting the needs of my family	28 (23·3%)	32 (26.6%)	60 (50%)
I have pain	16 (13·3%)	20 (16·7%)	84 (70%)
I am bothered by the side effects of treatment	24 (20%)	48 (40%)	48 (40%)
I feel ill	64 (53·3%)	40 (33·3%)	16 (13·3%)
I am forced to spend time in bed	76 (63·3%)	20 (16·7%)	24 (20%)

Table 3. Social well-being of the study participants ($N = 120$)

Questionnaire items	Not at all n (%)	Somewhat n (%)	Very much n (%)
I feel close to my friends	8 (6·7%)	20 (16·7%)	92 (76·7%)
I get emotional support from my family	0 (-)	12 (10%)	108 (90%)
My family has accepted my illness	0 (-)	0 (-)	120 (100%)
I am satisfied with my family's communication about my illness	0 (-)	24 (20%)	96 (80%)
I feel close to my partner (or the person who is my main support)	68 (56·7%)	8 (6·7%)	44 (36·7%)
I am satisfied with my sex life	56 (46·7%)	28 (23·3%)	36 (30%)

Table 4. Emotional well-being of the study participants ($N = 120$)

Questionnaire items	Not at all n (%)	Somewhat n (%)	Very much n (%)
I feel sad	16 (13·3%)	32 (26·7%)	72 (60%)
I am satisfied with how I am coping with my illness	0 (-)	12 (10%)	108 (90%)
I am losing hope in the fight against my illness	88 (73·3%)	4 (3·3%)	28 (23·3%)
I feel nervous	36 (30%)	28 (23·3%)	56 (467%)
I worry about dying	76 (633%)	36 (30%)	8 (6·7%)
I worry that my condition will get worse	80 (66·7%)	40 (33·3%)	0 (-)

did for fun (Table 5). All of the participants (100%) had accepted their illness whereas only 33·3% were very much able to enjoy their life.

5. Additional concerns

In all, 50% were not bothered at all by the experience of vaginal discharge and/or bleeding and 46·7% were not bothered by vaginal odour. However, 70% were afraid to have sex even though 20% and 33·3% felt "somewhat" and "very much" sexually attractive, respectively (Table 6). Majority (80%) were able to eat the food they liked as most participants (63·3%) had a very good appetite.

The mean scores obtained in Table 7 show that the scores of the various QoL domains were above half of the total scores which is satisfactory. Proportionally, the lowest mean scores were obtained for functional well-being (12·3/24·0), physical well-being (15·4/28·0) and additional concerns (33·0/560). The highest scores were obtained in social well-being (17.3/24.0) and emotional well-being (16·8/24·0).

The majority of participants (66·7%) reported having a good QoL, indicating a favourable outcome for the majority in the population whereas 6·7% reported poor QoL (Figure 1).

Table 8 depicts the correlation between age and the subdomains of QoL. There was statistically insignificant positive correlation between age and the emotional (Rho =0·069, $p = 0·709$) as well as functional well-being domains (Rho =0·147, $p = 0·440$). Also, there was a statistically insignificant negative correlation between age and the physical (Rho =–0.240, $p = 0·201$) as well as social well-being domains (Rho =–0·119, $p = 0·587$) (Table 8).

Discussion

QoL during and after treatment has become the focus for treatment aside from survival statistics as was the norm in the recent past, in Ghana and other sub-Saharan African countries.[20] Among young survivors of cancer, loss of reproductive organs due to radiation and or surgery can have a negative impact on psychophysical identity[20] and even more significantly affect QoL than in an older population of cancer survivors.[21] This could be a source of distress among nulliparous married women after undergoing radical treatment for cervical cancer. The impact of radiation therapy on sexual relationships between survivors and their partners cannot be overlooked.[20] A 5–10-year post-treatment survey found that

Table 5. Functional well-being of the study participants (*N* = 120)

Questionnaire items	Not at all *n* (%)	Somewhat *n* (%)	Very much *n* (%)
I am able to work (including work at home)	40 (33·3%)	36 (30%)	44 (36·7%)
I am able to enjoy life	68 (56·7%)	12 (10%)	40 (33·3%)
I have accepted my illness	0 (-)	0 (-)	120 (100%)
I am sleeping well	20 (16·7%)	40 (33·3%)	60 (50%)
I am able to enjoy the things I usually do for fun	28 (23·3%)	64 (53·3%)	28 (23·3%)
I am content with the quality of my life right now	68 (56·7%)	32 (26·7%)	20 (16·6%)

Table 6. Additional concerns of patients (*N* = 120)

Questionnaire items	Not at all *n* (%)	Somewhat *n* (%)	Very much *n* (%)
I am bothered by vaginal discharge and/or bleeding	60 (50%)	20 (16·7%)	40 (33·3%)
I am bothered by vaginal odour	56 (46·7%)	12 (10%)	52 (43·3%)
I am afraid to have sex	32 (26·7%)	4 (3·3%)	84 (70%)
I feel sexually attractive	28 (23·3%)	24 (20%)	40 (33·3%)
My vagina feels too narrow or short	76 (63·3%)	24 (20%)	20 (16·7%)
I have concerns about my ability to have children	76 (63·3%)	8 (6·7%)	36 (30%)
I am afraid the treatment may harm my body	96 (80%)	4 (33%)	20 (167%)
I am interested in sex	56 (46·7%)	16 (13·3%)	48 (40%)
I like the appearance of my body	32 (26·7%)	16 (13·3%)	72 (60%)
I am bothered by constipation	76 (63·3%)	40 (33·3%)	4 (3·3%)
I have a good appetite	4 (3.3%)	40 (33·4%)	76 (63·3%)
I have trouble controlling my urine	32 (26·7%)	40 (33·4%)	48 (40%)
It burns when I urinate	44 (36·7%)	28 (23·3%)	48 (40%)
I am able to eat the foods that I like	4 (3·3%)	20 (16·7%)	96 (80%)

Table 7. Descriptive analysis of total scores

QoL domains	Mean/ (SD)	Median (mode)	Min	Max	Possible variation
Physical well-being	15·4 (5·0)	160 (18·0)	6	24	0–28
Social well-being	17·3 (41)	16·0(16.0)	11	24	0–24
Emotional well-being	16·8 (4·5)	18·0(16·0)	8	24	0–24
Functional well-being	12·3 (56)	12·0(9·0)	4	24	0–24
Additional concerns	33·0 (8·5)	32·5(28·0)	12	45	0–56
Total (FACT-Cx)	94·8 (277)	94·5(87·0)	41	141	0–156

survivors of cervical cancer still experience more sexual discomfort, pain with penetration and vaginal dryness than controls even though sexual pleasure was similar compared with control group.[22] Le Borgne et al. (2013) noted that overall sexual and vaginal functioning improved over time, with 15-year survivors reporting improved sexual function among 173 study participants.[23] Aside from the reproductive changes, treatment for cervical cancer also disrupts the working lifestyle of patients.[20] Treatment with radiation and systemic therapies concurrently requires daily visits to the facility. Patients who must travel and relocate for care due to sparsely distributed treatment facilities (as seen in Ghana) will therefore have to be absent from work for long periods for their care as well as recovery from adverse effects of care. This has severe financial implications for patients and their families.

The mean age of 53·3 years (SD 15·6) in this study is comparable with the results of a previous study at KBTH that reported a mean age of 56·8 years[24] and another study in the Ashanti region that reported a mean age of 56·9 years.[25] Furthermore, a retrospective study in Lagos, Nigeria reported a mean age of 55·3 years (SD 12·5).[26] This highlights the younger age population of patients with cervical cancer in Africa and this may correlate with the amount of man-hours lost to contribute to the economy but rather used for treatment.[27] To further highlight this,

Table 8. Correlation between patients' age and QoL domains

QoL domains	Age Rho	 *p*-value
Physical well-being	−0·240	0·201
Social well-being	−0·119	0·587
Emotional well-being	0·069	0·709
Functional well-being	0·147	0·440

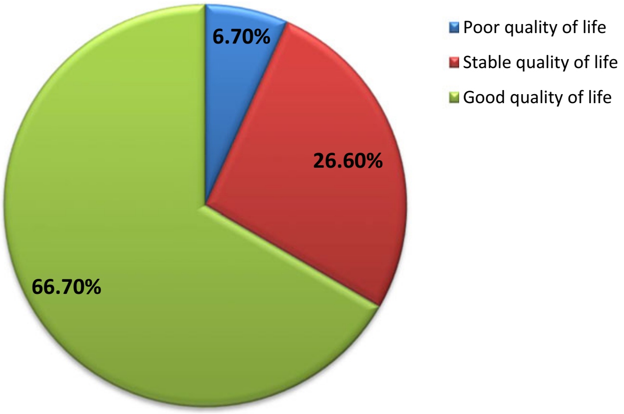

Figure 1. Distribution of the QoL of participants.

over seventy percent (77%) of the participants had gainful employment, 17% were unemployed and 6% were retired. Nartey et al. (2017) reported that 68·5% of patients with cervical cancer in the Ashanti region of Ghana were gainfully employed.[25] A similar finding in a related study conducted in Thailand corroborated this with 72·7% employed participants and 25·6% unemployed.[28] On the other hand, a study conducted in Zambia observed the opposite trend with 84% of the participants unemployed whereas 16% were employed.[29] In a low-middle income country where patients have to pay out of pocket for healthcare, affordability is key if patient is to report early. Therefore, employed patients are more likely to report for care but this may not be true as social factors such as the number of family members depending on patient for their living can influence this health-seeking behaviour. A further study will be needed to analyse this specifically for cervical cancer.

A considerable percentage (50%) of the participants were married, which is consistent with a Thailand study which also revealed that majority (60·1%) of patients with cervical cancer were married.[30] Taechaboonsermsak et al. (2005), on the other hand, recorded a higher 73·1% percentage of married and low percentage 2·2% of single patients as compared to this study.[28] The significance of marriage in cancer care is the social support advantage that it provides. It is a predictive factor indicating that the presence of a partner creates greater comfort and emotional support for patients diagnosed with cervical cancer.[31] On the contrary, it may also contribute to a poor psychological QoL as patients are worried about decreased sexual performance contributing to emotional stress.[32]

Seventy percent of patients were very much afraid to have sex, 46% were interested in sex and only 33·3% felt sexually attractive despite 63·3% not experiencing narrow or short vaginal canal. This finding translates into majority (60%) of patients losing interest in sex and they explained that they were afraid to have sex due to the intensity of pain felt during sexual intercourse as documented in other studies.[20,31,33] This can have a detrimental effect on patients' relationships with their partners.

Emotional well-being has been documented in previous studies to be associated and improved by age, marital status, modality of treatment and stage.[24,34,35] Poor emotional well-being scores have been recorded in patients with advanced disease.[5,36] In terms of association between treatment modality and emotional well-being, there is divided evidence in literature with respect to an association.[6,33,37] The emotional well-being of patients with cervical cancer recorded a mean score of 16·8/24. Almost all (90%) the participants were satisfied with their ability to cope with the ailment. Over seventy percent (73·3%) had hope in their fight against the illness and 66·7% were not worried that their condition would get worse. This explains the good total above average emotional well-being score recorded.

Functional well-being recorded the lowest scores (12·3/24) among all the sub-sections of QoL in this study. Other studies have documented higher functional well-being scores.[28,31,32] This is associated with the type of treatment modality and age with scores of concurrent radiotherapy and chemotherapy is lower than that of patients with surgery and postoperative adjuvant treatment.[35] More than half (56·7%) were not able to enjoy life and were not content with the QoL even though all the participants had accepted their illness. This might explain the lowest average score in the functional well-being domain compared with the other domains in this study. Half of the study population lacked energy, 45·6% had pain and 50% trouble meeting the needs of their family. These contribute to the average mean score in the domain of physical well-being. Although there is documented influence of age and education on physical well-being,[24,38] it is difficult to interpret. For instance, a Ghanaian study showed that the majority of the study population had no formal education and therefore might not comprehend the impact of their diagnosis or the educated population and younger population worry about the side effects of the treatment.[24]

In general, the total FACT-Cx mean score was higher than 50% of the maximum. This picture is seen to occur in all subdomains (table 7). The lowest mean score is seen in the functional well-being subdomain and this has been corroborated in previous studies.[24,30,31,35] Similar to other studies the data revealed that the items of the additional concerns domain: interest in sex, fear of having sex, feeling less sexually attractive and feeling the vagina is narrow or short were the negative evaluations observed.[31] However, there was no association between age and any of the subdomains or the total FACT-Cx scores. The study population included patients sampled during treatment, within a specific period of time and did not reflect the entire population of patients with cervical cancer seen at the centre and in the country. Furthermore, aside from age, the effect of other confounding factors such as the stage, marital status, educational level and employment status were not studied.

Conclusions

This study highlights that most participants with cervical cancer at a tertiary facility in sub-Saharan Africa reported a good QoL despite challenges in specific domains. The highest scores were recorded in social and emotional well-being, reflecting strong family support and emotional resilience. However, physical and functional well-being, as well as additional concerns such as fear of treatment impact and sexual health issues, showed lower mean scores, indicating areas requiring targeted interventions. No significant correlation was observed between age and QoL domains, suggesting that other factors may play a more critical role in influencing QoL outcomes.

Limitations

One major limitation of the study is the lack of baseline data on participants' QoL prior to the initiation of treatment which limits the ability to assess changes directly attributable to the treatment. Second, the study relied on self-reported data, which is subjected to recall bias and social desirability bias, potentially influencing participants' responses. Also, the cross-sectional design of the study does not allow for the assessment of long-term trends or causal relationships between treatment and QoL outcomes. Future studies addressing these limitations, particularly using longitudinal designs with baseline data collection, are recommended.

References

1. Hull R, et al. Cervical cancer in low and middle-income countries. Oncol Lett 2020; 20 (3): 2058–2074.
2. Bray F, et al. Global cancer statistics 2018: GLOBOCAN estimates of incidence and mortality worldwide for 36 cancers in 185 countries. CA Cancer J Clin 2018; 68 (6): 394–424.
3. Bhatla N, et al. Cancer of the cervix uteri. Int J Gynaecol Obstet 2018; 143 (Suppl 2): 22–36.
4. Ferrandina G, et al. Quality of life and emotional distress in early stage and locally advanced cervical cancer patients: a prospective, longitudinal study. Gynecol Oncol 2012; 124 (3): 389–394.
5. Pasek M, Suchocka L, and Urbanski K, Quality of life in cervical cancer patients treated with radiation therapy. J Clin Nurs 2013; 22 (5-6): 690–697.
6. Perrin KM, et al. Women's reactions to HPV diagnosis: insights from in-depth interviews. 2006; 43 (2): 93–110.
7. Xie Y, et al. Assessment of quality of life for the patients with cervical cancer at different clinical stages. Chin J Cancer 2013; 32 (5): 275–282.
8. Safaee A, et al. Predictors of quality of life in breast cancer patients under chemotherapy. Indian J Cancer 2008; 45 (3): 107–111.
9. Helen, J.M., Jolanda, and Guus L. Psychometric qualities of a brief self-rated fatigue measure: The fatigue assessment scale. J Psychosom Re 2003; 54 (4): 345–352.
10. Lee EM, et al. Toxicities and quality of life during cancer treatment in advanced solid tumors. Curr Oncol 2023; 30 (10): 9205–9216.
11. Schreier AM and Williams SA. The impact of cancer treatment toxicity on quality of life among cancer patients. J Clin Oncol 2004; 22 (12): 2565–2574.
12. Araya LT, et al. Health-related quality of life and associated factors among cervical cancer patients at Tikur Anbessa specialized hospital, Addis Ababa, Ethiopia. Health Qual Life Outcomes 2020; 18 (1): 72.
13. Torkzahrani S, et al. Quality of life and its related factors among Iranian cervical cancer survivors. Iran Red Crescent Med J 2013; 15 (4): 320–323.
14. Bjelic-Radisic V, et al. Quality of life characteristics inpatients with cervical cancer. Eur J Cancer 2012; 48 (16): 3009–3018.
15. Webster K, Cella D, and Yost K. The functional assessment of chronic illness therapy (FACIT) Measurement system: properties, applications, and interpretation. Health Qual Life Outcomes 2003; 1: 79.
16. Schaller A, et al. Quality of life during early radiotherapy in patients with head and neck cancer and pain. J Pain Res 2017; 10: 1697–1704.
17. Abegaz TM, Ayele AA, and Gebresillassie BM. Health related quality of life of cancer patients in Ethiopia. J Oncol 2018; 2018: 1467595.
18. Chaokromthong K and Sintao N. Sample size estimation using Yamane and Cochran and Krejcie and Morgan and green formulas and Cohen statistical power analysis by G* Power and comparisions. Apheit Int J 2021; 10 (2): 76–86.
19. Cella DF, et al. The functional assessment of cancer therapy scale: development and validation of the general measure. J Clin Oncol 1993; 11 (3): 570–579.
20. Amo-Antwi K, et al. Health-related quality of life among cervical cancer survivors at a tertiary hospital in Ghana. PLoS One 2022; 17 (6): e0268831.
21. Pfaendler KS, et al. Cervical cancer survivorship: long-term quality of life and social support. Clin Ther 2015; 37 (1): 39–48.
22. Wenzel L, et al. Quality of life in long-term cervical cancer survivors. Gynecol Oncol 2005; 97 (2): 310–317.
23. Le Borgne G, et al. Quality of life in long-term cervical cancer survivors: a population-based study. Gynecol Oncol 2013; 129 (1): 222–228.
24. Kyei KA, et al. Quality of life among cervical cancer patients undergoing radiotherapy. Pan Afr Med J 2020; 35: 125.
25. Nartey Y, et al. Cervical cancer in the Greater Accra and Ashanti regions of Ghana. 2017; 3 (6): 782–790.
26. Ola IO, et al. Clinical and non-clinical determinants of cervical cancer mortality: a retrospective cohort study in Lagos, Nigeria. Front Oncol 2023; 13: 1105649.
27. Ngcamphalala C, Östensson E, and Ginindza TG. The economic burden of cervical cancer in Eswatini: Societal perspective. PLoS One 2021; 16 (4): e0250113.
28. Taechaboonsermsak P, et al. Causal relationship between health promoting behavior and quality of life in cervical cancer patients undergoing radiotherapy. Southeast Asian J Trop Med Public Health 2005; 36 (6): 1568–1575.
29. Chitashi NS, Quality of life in Zambian cervical cancer women post chemo-radiotherapy. 2013.
30. Wilailak S, et al. Quality of life in gynecologic cancer survivors compared to healthy check-up women. J Gynecol Oncol 2011; 22 (2): 103–109.
31. Fernandes WC and Kimura M. Health related quality of life of women with cervical cancer. Rev Lat Am Enfermagem 2010; 18 (3): 360–367.
32. Wilailak S, et al. Quality of life in gynecologic cancer survivors compared to healthy check-up women. J Gynecol Oncol 2011; 22: 103–109.
33. Frumovitz M, et al., Quality of life and sexual functioning in cervical cancer survivors. J Clin Oncol 2005; 23 (30): 7428–7436.
34. Azmawati MN, et al.. Quality of life by stage of cervical cancer among Malaysian patients. Asian Pac J Cancer Prev 2014; 15 (13): 5283–5286.
35. Zhao M, et al.. Healthy-related quality of life in patients with cervical cancer in Southwest China: a cross-sectional study. BMC Health Serv Res 2021; 21 (1): 841.
36. Baze C, Monk BJ, and Herzog TJ. The impact of cervical cancer on quality of life: a personal account. Gynecol Oncol 2008; 109 (2 Suppl): S12–4.
37. Krikeli M, et al. Comparison of the impact of radiotherapy and radiochemotherapy on the quality of life of 1-year survivors with cervical cancer. Cancer Manag Res 2011; 3: 247–251.
38. Ashing-Giwa KT, Lim J.W., and Gonzalez P. Exploring the relationship between physical well-being and healthy lifestyle changes among European- and Latina-American breast and cervical cancer survivors. Psychooncology 2010; 19 (11): 1161–1170.