

# Health-related Quality of Life Among Cervical Cancer Survivors at a Tertiary Hospital in Kumasi, Ghana

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## Research

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# Abstract

## Background

Cervical cancer survivors often experience significant diminution in health-related quality of life (HRQoL). We aimed to investigate the overall HRQoL, determine the role of the stage of disease and type of treatment received on HRQoL, and evaluate predictors of HRQoL among cervical cancer survivors in Ghana.

## Methods

A hospital-based cross-sectional study was conducted in 153 cervical cancer patients who completed curative treatment between January 2004 and December 2018 at Komfo Anokye Teaching Hospital. The European Organization for Research and Treatment of Cancer core questionnaire (EORTC QLQ C-30) supplemented with the cervical cancer-specific (EORTC QLQ-CX24) module was used. The Kruskal-Wallis test was used to determine the effect of the stage of cervical cancer and the type of treatment received on mean scores of the different domains of HRQoL. Multivariate logistic regression was performed to identify predictors of HRQoL.

## Results

The mean global health status (GHS) was 79.7 (+/-16.2), and it differed significantly with FIGO stage, with 84.1, 76.2, and 79.9, for stages I, II and III respectively ( $p=0.012$ ). Financial burden was higher in participants with FIGO stage II compared to stage I disease (45.4 vs 20.8,  $p=0.012$ ). The mean GHS scores for surgery, chemoradiation and radiation only were 85.2, 75.9, and 82.1 respectively ( $p=0.027$ ). Compared to participants who were treated with Chemoradiation, those treated with surgery had lower financial difficulties (12.1 vs 41.6,  $p=0.019$ ), better body image (95.7 vs 79.5,  $p=0.039$ ) and better symptom experience (5.9 vs 12.0,  $p=0.043$ ). The likelihood that survivors' HRQoL is affected is decreased with illiteracy (AOR = 0.30, 95% CI=0.09–1.00), and increased with complaints of pain (AOR=5.50, 95%CI=1.68-18.29), loss of appetite (AOR=13.24, 95% CI=2.71–64.67) and diminution in body image perception (AOR = 6.04, 95% CI=1.67–21.83).

## Conclusion

Cervical cancer survivors in Ghana have overall satisfactory HRQoL. Surgical treatment is associated with improved HRQoL and less financial burden. Efforts to enhance HRQoL should also be focused on maximizing survivors' body image and managing pain and loss of appetite. Educating women about expected impacts on their quality of life, and strategies to manage and mitigate these impacts, is essential.

## Background

Although the incidence of cervical cancer (CC) remains low in many countries, it is significantly higher in developing countries.<sup>1,2</sup> Cervical cancer is the second most common cancer among women in Ghana.. Treatment of CC is primarily by surgery or radiation therapy, with chemotherapy as an important adjunct.<sup>3</sup> In Ghana, only 5.2% of women with CC present with Stage I disease, and are likely to benefit from surgery.<sup>4</sup> The risk of nodal involvement in Stage IA1 disease is low, and surgical treatment by conization and simple hysterectomy is often adequate.<sup>3</sup> Approximately, 7.4 % of patients with stage IA2 disease have pelvic lymph node involvement (PLNI), and modified radical hysterectomy and pelvic lymphadenectomy (PLND), with or without bilateral salpingo-oophorectomy, is standard treatment. Cone biopsy and radical trachelectomy plus PLND are options for women who desire future fertility.<sup>5,6</sup> Radiotherapy may also be used to provide comparable treatment outcomes for early invasive disease in women with severe comorbidities, such as morbid obesity with attendant detrimental anaesthetic risk, uncontrolled hypertension, or diabetes mellitus .<sup>3</sup> In the majority of low and middle income countries (LMICs) including Ghana, most patients present at a later stage where radiotherapy is the treatment of choice.<sup>4,7</sup> The treatment of locally advanced disease (FIGO Stage IB3-IVA) has changed over the years from radiotherapy alone to concurrent chemoradiotherapy, with a number of studies demonstrating survival advantage of cisplatin-based chemotherapy in both adjuvant and definitive setting.<sup>8-10</sup>

Cervical cancer survivors often experience physical symptoms and psychosocial distress that adversely affect their health-related quality of life (HRQoL). HRQoL encompasses domains of life which are directly affected by the presence of disease or treatments.<sup>11</sup> Several generic and disease-specific tools have been developed for the assessment of HRQoL. These are multidimensional, patient-reported tools, which assess aspects of life that are directly affected by changes in health.<sup>11,12</sup> The European Organisation for Research and Treatment of Cancer (EORTC) HRQoL tool is a commonly used questionnaire to assess quality of life among all cancer patients (e.g. EORTC QLQ C30), and can be supplemented by the EORTC-QLQ CX-24 to focus specifically on cervical cancer patients or survivors.<sup>12,13</sup>

In high-resource settings, the focus of cancer care has shifted from traditional treatment outcome measures (e.g. 5-year survival outcomes) to patients' symptoms and quality of life as they progress through treatment and into post-treatment life with cancer as a chronic disease.<sup>13</sup> However, in low-resource settings like Ghana, there is limited data on HRQoL among cervical patients and survivors.. An assessment of the impact of patient- and treatment- related factors on the survivor's QoL will provide insight into whether the survival benefits are justifiable, when compared with limitations posed by patients and treatment characteristics. The present study aims to investigate the overall HRQoL, HRQoL by stage and treatment received, and predictors of HRQoL, among cervical cancer survivors in a single centre in Kumasi, Ghana. Results can help set targets for planners, treatment benchmarks for healthcare providers and create national benchmarks for care that correlate with improved quality of life for survivors.

## Methods

## ***Study Site***

KATH is a teaching and referral centre for the northern half of Ghana. The Departments of Oncology and Obstetrics and Gynaecology are one of the largest cervical cancer treatment centres in Ghana, managing patients from all parts of Ghana and neighbouring West African regions. The logistics and human resource base for gynaecologic oncologic services have developed through international cooperation and perform full multi-disciplinary care for gynaecologic cancer patients. A total of 278 gynaecological cancer cases were seen in 2017. Out of hundred and thirty-seven women who were treated for cervical cancer, 14 (10.2%), 98 (64.2%), and 25 (25.6%) received surgery, chemoradiation, and radiotherapy respectively.

## ***Study design and data source***

A hospital-based cross-sectional study was conducted from July to September 2019. Participants were defined as women diagnosed with cervical cancer who completed curative treatment between 2004 and December 2018, at the Unit of Gynaecologic Oncology and the Department of Radiation Oncology of KATH. Survivors were considered eligible if they were disease-free at least 6 months prior to the study. Women who were treated for malignancy of another anatomic site or who were critically ill were excluded from the study. Nine survivors were critically ill and seven declined participation. (figure 1).

## ***Sample size***

An estimated sample size of 145 had adequate power to detect a global health score with a standard deviation of 21.5 and a desired margin of error of 3.5 scores.<sup>14</sup> In adjusting for possible non-response and effect of confounding variables at 10%, 160 survivors were required for the study.

## ***Sampling***

A total of 462 records of women with disease-free status after curative treatment were identified, and computer-generated simple random sampling without replacement was used to select 160 participants. (figure 1).

## ***Data collections tools and variables***

Ethical approval was obtained by the Committee on Human Research, Publications and Ethics (CHRPE) of the School of Medical Sciences, Kwame Nkrumah University of Science and Technology and KATH (\_insert ##)

Written informed consent was obtained. Telephone or face-to-face interviews were conducted in Twi, a local language, or in English to administer the questionnaires. Socio-demographic and clinical characteristics of the participants were extracted from their medical records.

The evaluation of the HRQoL was performed using the EORTC core questionnaire (EORTC QLQ C-30), supplemented with the cervical cancer-specific module EORTC QLQ-CX24.<sup>15</sup> The 30-item EORTC QLQ-C30 is the most frequently used HRQOL assessment tool. Data on the use of the tool in Ghana is scarce, but it has been validated in many geographic and cultural settings.<sup>14,16</sup> It is comprised of 15 subscales, 5 functional domains (physical, role, cognitive, emotional and social functioning); 3 multi-item symptom scales (fatigue, pain, and nausea/vomiting), 6 single items that assess additional symptoms commonly reported by cancer patients (dyspnoea, appetite loss, sleep disturbance, constipation, and diarrhoea), perceived financial difficulties and global health status (GHS). The EORTC QLQ-CX24 is a 24-item scale, grouped into 3 multi-item scales, 11 items with symptom experience domain, 3 items with body image domain, and 4 items with sexual/vaginal functioning domain. Further, it has single-item scales, that assess lymphoedema, peripheral neuropathy, menopausal symptom, sexual worry, sexual activity, and sexual enjoyment

### ***Scoring***

All scores on the EORTC QLQ-C30 and QLQ-CX24 were transformed into 0 to 100 scale according to the EORTC QLQ scoring manual.<sup>17</sup> A higher score on the GHS and functioning scale represented a better level of functioning. A higher score on the symptom scale represented worse levels of symptoms/ high level of problems or ill-health.

## ***Data Analysis and interpretation***

Descriptive statistics were used to present the QOL scores, and patient- and treatment -related variables. The Kruskal-Wallis test was used to determine the effect of stage of disease and type of treatment received on mean score of the different domains of HRQoL. The HRQOL domains were then dichotomized; functional domain and global health status/QOL score < 75 were considered affected (75 or above score indicated “no problem at all” ) whereas on the symptom scale, a score 25 and above were considered affected (below 25 indicated “ no problem at all”).<sup>18</sup> Stepwise multivariate logistic regression was performed to identify predictors of HRQoL. Only variables with  $p < 0.25$  and clinically significant variables were included in the multivariable logistic regression model. All hypotheses involved were two-sided tests;  $p < 0.05$  was considered statistically significant. An internal consistency of the multi-item scales was calculated using the Cronbach  $\alpha$  coefficient; values of  $\alpha \geq 0.70$  were considered acceptable for group comparisons. All analyses were performed using Stata 13 (StataCorp, College Station, TX, USA).

## **Results**

### ***Sociodemographic, clinical and treatment characteristics***

The mean ( $\pm$ SD) age of the survivors was 58.3 ( $\pm$  11.4) years, with a median follow up time of 33.8 months (range: 6.3 to 180.5 months) after completion of treatment. (Table 1). Regarding level of education, 61 (39.9%) had no formal education and (11.1%) received senior high school or tertiary education.

Time since completion of treatment was more than one year in the majority (86.3%) with 29.4% being long-term survivors. About fifty-seven percent had anaemia, necessitating haemotransfusion in a third (32.0%) of the cases, before or during treatment.

Most participants had FIGO stage III cervical cancer (37.3%)(Table 2). Primary chemoradiation was the treatment option in about half (47.7%) of the women. Twenty-eight (18.3%) participants underwent primary radical surgery with or without adjuvant radiotherapy.

## Health-related quality of life

The GHS/Overall QoL mean ( $\pm$ SD) score was 79.7 ( $\pm$ 16.2). The EORTC QLQ-C30 multiple and single-item scales were also calculated and the mean ( $\pm$ SD) score of the functional scales ranged from 88.2 ( $\pm$ 14.1) to 91.8 ( $\pm$ 18.4), with the highest being social functioning and the lowest being cognitive functioning (Table 3). For the symptom scales, the mean ( $\pm$ SD) financial difficulty score was the highest 32.8 ( $\pm$ 40.9) followed by pain 17.9 ( $\pm$ 24.0) and fatigue 14.0 ( $\pm$ 19.0). The EORTC QLQ-CX24 domains mean ( $\pm$ SD) score ranged from 50.0 ( $\pm$ 40.7) for sexual enjoyment to 85.3 ( $\pm$ 26.0) for body image. On the cervical cancer-specific symptom scales, the lowest mean score 7.0 ( $\pm$ 19.7) was for lymphoedema and the highest was sexual worry 21.1 ( $\pm$ 35.4) (Table 3). The pattern of change in the EORTC QLQ C-30 and EORTC QLQ CX-24 score after treatment is displayed in Figures 2-4.

## Mean score differences of EORTC QLQ-C30 and QLQ-CX24 scales with stage and treatment characteristics

On the EORTC QLQ-C30 scale, only GHS/Overall QoL and financial difficulty score differed significantly with regards to the FIGO stage and primary treatment type. (Tables 4 & 5). Participants who survived with stage I disease had a better GHS/Overall QoL score with lower financial difficulties compared to those who had FIGO stage II and III disease. More women with Stage II disease received chemoradiation. On the cervical cancer specific module, body image and symptoms differed significantly with respect to the treatment modality applied, with surgical treatment resulting in better GHS and body image and less symptoms compared to radiotherapy with or without chemotherapy. There was no difference in financial difficulties by treatment type.

## Predictors of health-related quality of life

The outcome of the multivariate logistic model for HRQoL is displayed in table 6. For participants who were illiterate (AOR = 0.30, 95% CI = 0.09–1.00), they were 70% less likely to be classified as “affected” in the GHS dichotomized scale. For those who complained of pain (AOR = 5.50, 95%CI=1.68-18.29), loss of appetite (AOR = 13.24, 95% CI = 2.71– 64.67) or diminution in body image (AOR = 6.04, 95% CI = 1.67– 21.83) were more likely to have global health score affected.

## Discussion

This is a maiden study conducted in Ghana to investigate HRQoL among cervical cancer survivors. The GHS/overall QOL was satisfactory. The score in functional domains were high, with highest scores seen in social functioning, followed by role functioning. Financial difficulties, pain and fatigue were the most frequently reported symptoms. Participants with FIGO stage II cervical cancer had lower GHS/overall QoL score and greater financial difficulties. Compared to other modes of treatment, surgery was associated with better overall QOL and body image. Chemoradiation was associated with more clinical complaints and financial difficulties. Illiteracy, body image, pain and loss of appetite were significantly associated with overall GHS/overall QoL. Cervical cancer and its treatment have significant impacts on the HRQoL, and thus its management should not be focused only on overall survival, but rather a holistic care also aimed at maximizing QoL.

Time since completion of treatment has effects on participants’ perception of HRQoL.<sup>19</sup> In our study, the pattern of change in GHS was highest at or after 15 years of treatment. The perceived increase in GHS was later when compared to the trend reported in a similar study in China.<sup>19</sup> This difference may be attributed to the mean age of the participants and the capacity to rehabilitate subjects after treatment. Similar recovery patterns were also noticed in all the EORTC functional domains with the exception of physical functioning, which was less brisk. Survivors reported worse score on this HRQoL domain with increasing period of survivorship.<sup>20</sup> The course of GHS appears to have an inverse relationship with the pattern of symptom complaints. Report of good GHS by survivors occur at the time of improved functioning, and they are unlikely to report symptoms during this period. This may explain the low symptom experience score. Comparable studies reported score range of 15.6 to 56 and 15.9 to 47 for and pain and fatigue respectively within a year of treatment completion.<sup>14,16,19,21</sup> These scores compare to the score of 20.6 and 19.4 for fatigue and pain recorded respectively within a year of the treatment in this current study. Further, we noticed an upward trend in complaint of pain within 10 years following treatment. An earlier study by Brown MR et al., 2014, reported 5 to 10 in 100 cervical cancer survivors complained of pain.<sup>22</sup>

Sexual function was a primary source of distress among cancer survivors.<sup>23</sup> It is an issues of paramount importance especially when a significant number of survivors are young in this study. At the time of the interview, only 56 (36.6%) were sexually active. This was comparatively higher than the rate reported among survivors in a similar study in Iran.<sup>24</sup> The level of sexual activity among survivor may have socio-demographic determinants, with increased sexual activity in a more liberal society.<sup>25</sup> Higher score in

sexual domains is also reported in participants reporting with early disease. Sexual worry (perception that sex will be painful) was higher within the first year of treatment, but thereafter, and then improved. Actual sexual activity decreased along the period of follow-up, although vaginal function and sexual enjoyment improved.<sup>19</sup>

Female survivor populations treated for an early disease tend to have good GHS/overall QOL.<sup>26</sup> In our study, the global health status for the cervical cancer survivors was  $79.7 \pm 16.2$ . This complements the findings of a similar in Taiwan which had few women surviving with stage IV disease.<sup>27</sup> A study that had relatively more women with advanced cervical cancer patient reported with a global health status of  $59.5 \pm 10.9$  (after excluding critically ill patients).<sup>28</sup> The differences in the global health status scores between these studies is related to the differences in treatment options and time since completion of treatment.

Participants treated for FIGO stage I disease reported the highest GHS followed by that of stage III. This finding was consistent with that of an earlier study by Thapa et al., 2018 in Hubei, China.<sup>19</sup> However in a similar work in Malaysia, women treated for stage III reported the highest GHS.<sup>29</sup> No clear relationship exists between GHS and the FIGO stage of cervical cancer. The disparity in perceptions of GHS may be explained by the response shift theory, which postulates that perception of overall health is influenced by a change in ones' condition of health.<sup>30</sup> Survivors who receive radiation with or without chemotherapy have worse HRQoL.<sup>19,25</sup> Relatively more women who survived FIGO stage II disease had chemoradiation, that may underline the poor perception of GHS in this group of survivors. The actual cost of treatment for stage II or III along with the cost accrued from loss of productivity is high with chemoradiation.<sup>31</sup>

Treatment of cervical cancer is primarily by surgery or radiation therapy, with chemotherapy as valuable adjunct.<sup>3</sup> In consonance with earlier studies, survivors who received surgery as a primary treatment modality in this study had lesser impact on their GHS, followed by survivors who received radiotherapy alone. The GHS, body image, financial difficulties and symptoms reported by survivors differed with the treatment option. In this study, surgery was associated with the highest GHS/overall QOL, which is consistent with earlier studies.<sup>16,19</sup> Earlier studies also reported more symptoms in women treated with radiotherapy with or without chemotherapy.<sup>32</sup> The symptoms experienced after treatment may underline the significant alteration in body image observed across the various treatment modalities. The loss of reproductive organs and external scarring of the genitalia via radical surgery and radiotherapy respectively, have been reported to negatively impact survivors' psychophysical identity and cause distortion of the body image.<sup>32</sup> The absence of uterus and cervix, and the inability to reproduce traditionally, although often overlooked, is a major source of stress or discomfort to young women living with or surviving cancer.<sup>33</sup> These organs are seen by survivors as embodiment of womanhood, femininity and fertility. In most of the cultures in Sub-Saharan Africa, childbearing is a significant expression of femininity.

Prior studies demonstrate that women who had radiotherapy, were worse off financially, compared to those who received surgery alone or surgery with postoperative radiotherapy (PORT).<sup>16,25</sup> These findings

were mirrored in this current study. Longer treatment time, and the need to suspend work during and after treatment may explain this phenomenon.<sup>34</sup> Minimal use of PORT maximizes the gains after surgery, and multi-modal treatment may unnecessarily overburden the surgical and radiation oncology facilities which are already inadequate in low-resource countries.<sup>35,36</sup> This places emphasis on diligent pre-treatment assessment especially in subjects with operable tumours. MRI should be considered in women being prepared for radical hysterectomy and pelvic lymph node dissection. Although accurate information about tumour size and lymph node involvement can be obtained from surgical pathology, it is desirable to estimate tumour volume and the presence of lymph node metastases or adverse prognostic findings before intended surgery. Women with node-positive disease or other surgical risk factors could then be managed appropriately, avoiding the potential drop in GHS associated with a combination of radical surgery and post-operative radiotherapy.<sup>37</sup>

Disparities may exist in terms of demographic factors for cervical cancer patients and survivors. While cervical cancer patients tend to be less educated and often dwell in rural areas, survivors as reported by this study were better educated and only few had rural residence.<sup>38</sup> Surprisingly, survivors with no formal education were less likely to describe their GHS as “affected”. An earlier study on cervical cancer survivors did not report the role of level of education on HRQoL.<sup>19</sup> Pain was a major predictor of GHS among this group of survivors, which is consistent with an earlier study with similar clinical and treatment characteristics.<sup>27</sup> The cause of pain in the survivor may not necessarily be attributable to the cancer or its management.<sup>22</sup> Current interventions in cancer care may afford survivors the chance to live longer and experience pain that may be secondary to the aging process or senescence. Loss of appetite has been reported among subjects during and after treatment.<sup>16,24,39</sup> Subjects who had lost appetite were likely to report an affected GHS in this study. Similar reports were recorded among survivors in Iran and Bangladesh.<sup>16,24</sup> From these findings, good diet and nutrition extend well into the period of remission, and significantly influencing the QoL of the CCS. On body image, feeling less physically attractive, less feminine or been dissatisfied with the self-image were predictive of an affected GHS in this study. The absence of uterus and cervix, and the inability to reproduce traditionally, although often overlooked, is a major source of stress or discomfort to young women living with or surviving cancer.<sup>33</sup> For these survivors, the organs are traditionally seen as embodiment of womanhood, femininity and fertility, and for most of cultures in Sub-Saharan Africa, childbearing is a significant expression of femininity.

Limitations of this study include that the EORTC assessment scale has not been validated in Ghana. The closest locally relevant interpretation of questions was adopted by the researchers. The GHS of cancer survivors’ changes over time. As this is a cross-sectional design, the assessment of GHS was not done over time, and the lack of the comparison of GHS score before and after treatment contribute to the limitations. Due to the retrospective nature of the treatment data, there is a possibility that some of clinical and treatment information may not have been documented. This was a single institution study so this population of cervical cancer survivors may not be representative of the cervical cancer survivor population in Ghana or in other LMIC. However, the study contributes to how to improve patient care and

further research for women with CC in Ghana. Additional longitudinal and intervention studies with control groups may further evaluate the HRQoL of CCS.

## **Conclusion**

Cervical cancer and its treatment affect survivors' HRQoL. Among cervical cancer survivors in Ghana, the HRQoL was satisfactory. Surgery offers the best prospects for HRQoL with the least financial burden. Efforts to enhance HRQoL should also be focused on maximizing survivors' body image and managing pain and loss of appetite. Educating women with cervical cancer about expected impacts on their quality of life, and strategies to manage and mitigate these impacts, is essential.

## **Abbreviations**

CHRPE: Committee on Human Research, Publications and Ethics EORTC QLQ-CX24: European Organization for Research and Treatment of Cancer-Cervix Module; EORTC QLQ-C30: European Organization for Research and Treatment of Cancer - core questionnaire; FIGO: International Federation of Gynaecology Obstetrics (FIGO) stage HRQoL: Health-related Quality of Life; KATH: Komfo Anokye Teaching Hospital; PLNI: pelvic lymph node involvement, PLND: Pelvic lymphadenectomy dissection, LMIC: low and middle income countries

## **Declarations**

### **Competing interests**

The authors declare no competing interests.

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There were no external grants received for the study. All expenses related to the study were borne by the authors.

### **Author's contributions**

KAA and YN conceived the research idea and designed the study; MBA was responsible for the data capture, KAA and SBN performed data analysis and interpretation; KAA and RA prepared the draft of the manuscript; KAA, YN, SBN, and PKA reviewed and edited the manuscript. All authors critically evaluated the final manuscript for important intellectual content and approved the final version of the manuscript.

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### **Availability of data and materials**

For data protection the data set is not publicly accessible. However, data can be accessed from the primary or corresponding author upon reasonable request with a signature of data privacy form.

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## Tables

Table 1 : Sociodemographic characteristics of cervical cancer survivors at Komfo Anokye Teaching Hospital, Kumasi, Ghana

VARIABLE	N=153	PERCENTAGE (%)
<b>Age at interview, years</b>	<b>Mean+/-SD 58.3-/±11.4</b>	
<40	9	5.9
40-49	27	17.7
50-59	48	31.4
60-69	40	26.1
>=70	29	18.9
<b>Time since completion of treatment (TCT), years</b>	<b>Median 33.8 months</b>	
< 1	21	13.7
1-5	87	56.9
>5	45	29.4
<b>Education</b>		
Illiterate	61	39.9
Elementary	45	29.4
Junior high	30	19.6
Senior high	13	8.5
Tertiary	4	2.6
<b>Occupation</b>		
Self-employed	103	67.3
Housewife	2	1.3
Civil Servant	3	2
Retired	13	8.5
Unemployed	32	20.9
<b>Marital status</b>		

Married	73	47.7
Widow	55	36
Divorced	22	14.4
Single	2	1.3
Cohabitant	1	0.7
<b>Town of residence</b>		
Urban	99	64.7
Rural	54	35.3
<b>Region of residence</b>		
Western Region	10	6.5
Ashanti Region	81	52.9
Brong Ahafo Region	28	18.3
Central Region	10	6.5
Other Regions*	24	15.6
<b>Tribe/ethnicity</b>		
Akan	123	80.4
Mole Dagbane	11	7.2
Gruni	9	5.9
Ewe	7	4.6
Others	3	2.0

Other Regions\*

Table 2: Clinical characteristics of cervical cancer survivors at Komfo Anokye Teaching Hospital, Kumasi, Ghana

<b>CHARACTERISTICS</b>	<b>N=153</b>	<b>PERCENTAGE (%)</b>
<b>BMI (Kg/m2)</b>	<b>24.8-/+5.1</b>	
Underweight (< 18.5)	10	7.9
Normal (18.5 - 24.9)	63	49.6
Over-weight (25 - 29.9)	35	27.6
Obese (> 30)	19	15
<b>FIGO Stage</b>		
stage I	42	27.4
Stage II	54	35.3
Stage III	58	37.3
<b>Treatment Modality</b>		
Surgery Alone	17	11.1
Surgery Plus Radiotherapy	11	7.2
Radiotherapy Alone	52	34.0
Chemoradiation	73	47.7
<b>Presence of Comorbidities</b>	<b>Yes (%)</b>	<b>No (%)</b>
Anaemia	87 (56.9)	66 (43.1)
Hypertension	49 (32.0)	104 (68.0)
*Others comorbidities	11 (11.1)	150 (88.9)
<b>Haemoglobin level (g/dL)</b>	<b>Mean -/+ SD 11.4 -/+1.6</b>	
Severe Anaemia (< 8)	6	3.9
Moderate Anaemia (8 -10.9)	47	30.7
Mild Anaemia (11-11.9)	34	22.2
Normal (> or = 12)	66	43.1

<b>Haemotransfusion</b>		
No	111	72.6
Yes	42	27.4
<b>Units of Blood transfused, N=42</b>	<b>Mean-/+ SD (3.1-/+1.6)</b>	
= < 2	18	11.8
3 – 4	19	12.4

**\*Other comorbidities: Deep vein thrombosis, diabetes, human immunodeficiency, cholelithiasis, haemorrhoid, left ventricular hypertrophy and paraparesis**

Table 3: Mean (SD) EORTC score at Komfo Anokye Teaching Hospital, Kumasi

VARIABLES	Item Number	MEAN (SD)
<b>QLQ-C30 Functional scale</b>		
Global health status	29,30	79.7 (16.2)
Physical function	1-5	88.2 (14.1)
Role functioning	6,7	87.1 (19.5)
Cognitive functioning	20,25	80.5 (24.9)
Emotional functioning	21-24	87.8 (18.1)
Social functioning	26,27	<b>91.8 (18.4)</b>
<b>QLQ-C30 Symptom scales</b>		
Energy/fatigue	10,12,18	<b>14.0 (19.0)</b>
Nausea and vomiting	14,15	3.3 (10.3)
Pain	9,19	<b>17.9 (24.0)</b>
Short of breath	8	5.7 (15.2)
Sleep disturbance	11	9.8 (19.8)
Lack of appetite	13	7.4 (18.8)
Constipation	16	<b>8.7 (19.0)</b>
Diarrhea	17	3.2 (9.9)
Financial difficulty	18	<b>32.8 (40.9)</b>
<b>QLQ-CX24 Functional scale</b>		
Body image	45-47	85.3 (26.0)
Sexual activity	<b>49</b>	77.6 (34.0)
Sexual enjoyment, n=56	<b>54</b>	<b>50.0 (40.7)</b>
Sexual/vaginal functioning, n=56	50-53	71.7 (24.2)
<b>QLQ-C24 Symptom scales</b>		

Symptom experience	31-37,38,41-43	10.0 (10.3)
Lymphedema	38	7.0 (19.7)
Peripheral neuropathy	40	17.6 (26.2)
Menopausal symptoms	<b>44</b>	12.4 (25.0)
Sexual worry	48	21.1 (35.4)

Table 4: STAGE OF DISEASE AND TREATMENT MODALITIES

Stage	Surgery alone	Radiation alone	Chemoradiation alone	Surgery plus Radiotherapy
I	17 (40.5%)	7 (16.7%)	11 (26.2%)	7 (16.7%)
II	0	16 (30.2%)	33 (62.3%)	4 (7.5%)
III	0	29 (50%)	29 (50%)	0
	<b>17 (11.1%)</b>	<b>52 (34.0%)</b>	<b>73 (47.7%)</b>	<b>11 (7.2%)</b>

Table 5: HRQoL by FIGO Stage and Treatment options.

	FIGO Stage			*Clin Rel.	
	STAGE I	STAGE II	STAGE II		
<b>EORTC_QLQ</b>	N = 42	N = 54	N = 58	P	
<b>Global Health Score</b>	84.1 (15.7)	76.2 (16.0)	79.9 (16.2)	0.012	No
<b>Final Difficulties</b>	20.8 (37.4)	45.4 (41.9)	29.8 (39.7)	0.012	Yes
<b>Primary Treatment</b>					
	<b>option</b>				
	<b>Surgery</b>	<b>Radiotherapy</b>	<b>Chemoradiation</b>	p	
<b>EORTC_QLQ</b>	N = 28	N = 52	N = 73		
<b>Global Health Score</b>	85.2 (11.3)	82.1 (14.0)	75.9 (18.0)	0.027	No
<b>Final Difficulties</b>	12.1 (28.9)	31.7 (36.5)	41.6 (45.0)	0.019	Yes
<b>Body Image</b>	95.7 (15.6)	87.9 (21.9)	79.5 (30.1)	0.039	No
<b>Symptom experience</b>	5.9 (5.7)	9.4 (10.1)	9.4 (10.1)	0.043	No

\*Clinical relevance  $\geq 10$  points differences

Table 6: Logistic regression analysis of global health status/QoL of cervical cancer patients with socio-demographic, clinical characteristics, EORTC-QLQ-CX24 and EORTC-QLQ-C 30 subscale variables

Variables	GHS		Odds Ratio (CI)	
	Affected (%)	Unaffected (%)	COR	AOR*
Age at interview				
< 50	11 (28.2)	25 (21.3)	1	
50-59	11 (23.1)	37 (34.2)	0.68 (0.25-1.80)	
60-69	9 (23.1)	31 (27.2)	0.66 (0.24-1.84)	
> 70	8 (25.6)	21 (16.7)	0.87 (0.29-2.55)	
TCT				
> 5years	12 (30.7)	33 (29.1)	1	
1-5 years	20(51.3)	67 (58.7)	0.73 (0.33-1.66)	
< 1 year	6 (15.4)	15 (13.6)	0.98 (0.31-3.10)	
Level of education				
Literate	26 (66.7)	66 (57.9)	1	1
<b>Illiterate</b>	<b>13 (33.3)</b>	<b>48 (42.1)</b>	0.69 (0.32-1.47)	<b>0.30 (0.09-1.00) *</b>
Occupation				
Self-employed	24 (61.5)	79 (69.3)	1	
Civil Servant	0	3 (2.6)	1	
Housewife	1 (2.6)	1(0.9)	3.29 (0.20-54.63)	
Retired	5 (12.8)	8 (7.0)	2.06 (0.08-0.81)	
Unemployed	9 (23.1)	23 (20.2)	1.29 (0.34-2.17)	
Town of Residence				
Urban	28 (71.8)	71 (62.3)	1	
Rural	11 (28.2)	43 (37.7)	0.65 (0.29-1.43)	
Proximity to facility				
Ashanti	20 (51.3)	61 (53.5)	1	
Brong Ahafo	6 (15.4)	22 (19.3)	0.88 (0.42-3.38)	
Central	2 (5.1)	8 (7.0)	0.82 (0.25-6.69)	
Western	6 (15.4)	4 (3.5)	4.89 (0.06-0.85)	

Northern	3 (7.7)	6 (5.3)	1.63 (0.15-2.87)
Other regions	2 (5.1)	13 (11.4)	0.82 (0.21 – 3.20)
Tribe			
Akans	32 (84.6)	91 (78.9)	1
Mole Dagbane	3 (7.7)	8 (7.0)	1.07 (0.26-4.27)
Gruni	2 (5.1)	7 (6.1)	0.81 (0.16-4.11)
Other tribes	2 (2.6)	8 (5.3)	0.71 (0.14-3.52)
Marital status			
Married	18 (46.2)	55 (48.3)	1
Widow	16 (41.0)	39 (34.2)	1.25 (0.60-2.78)
Other Status	5 (12.8)	20 (17.5)	0.76 (0.25-2.76)
Religion			
Christianity	34(87.2)	103(90.4)	1
Islam	5(12.8)	11(9.6)	1.98 (0.64-5.60)

**Table 6 (Continuation I )**

Variables	GHS			
	Affected (%)	Unaffected (%)	COR (95%CI)	AOR (95%CI)
<b>BMI</b>				
Normal weight	9 (33.3)	43 (43.4)	1	
Underweight	5 (17.9)	16 (16.2)	1.49 (0.43 - 5.13)	
Overweight	10 (35.7)	25 (25.3)	1.91 (0.22 - 1.63)	
Obese	4 (14.3)	15 (15.2)	1.27 (0.34 - 4.75)	
<b>Parity</b>				
≤ 4	15 (38.5)	55 (48.3)	1	
> 4	24 (61.5)	59 (51.8)	1.49 (0.71-3.13)	
<b>Stage</b>				
Stage I	6 (12.8)	36 (32.5)	1	
Stage II	16 (48.7)	38 (30.7)	2.52 (0.89-7.17)	
Stage III	17 (38.5)	40 (36.8)	2.55 (0.91-7.17)	
<b>Primary Treatment</b>				
Surgery	2 (5.1)	26 (22.8)	1	
Radiation alone	15 (33.3)	37 (34.2)	5.27 (1.11-25.04)	
Chemoradiation	22 (61.54)	51 (43.0)	5.61 (1.22-25.71)	
<b>Haemoglobin Level</b>				
Normal	15 (38.5)	51 (44.7)	1	
Mild	7 (18.0)	27 (23.1)	0.88 (0.33-2.42)	
Moderate	15 (38.5)	32 (28.1)	1.59 (0.69-3.70)	
Severe	2 (5.1)	4 (3.5)	1.70 (0.28-10.21)	
<b>Units of Blood Transfused</b>				
≤ 2	4 (33.3)	14 (46.7)	1	
> 2	8 (66.7)	16 (53.3)	1.75 (0.43-7.08)	
<b>Physical functioning</b>				
Unaffected	23 (59.0)	98 (86.0)	1	
Affected	16 (41.0)	16 (14.0)	4.2 (1.86-9.75)	

<b>Role Functioning</b>			
Unaffected	23 (59.0)	96 (84.2)	1
Affected	16 (41.0)	16 (16.8)	3.71 (1.65-8.36)
<b>Cognitive functioning</b>			
Unaffected	17 (43.6)	84 (73.7)	1
Affected	22 (56.4)	30 (26.3)	3.62 (1.70-7.73)
<b>Emotional functioning</b>			
Unaffected	22 (56.4)	98 (86.0)	1
Affected	17 (43.6)	14 (14.0)	4.73 (2.08-10.80)
<b>Social functioning</b>			
Unaffected	24 (61.5)	105 (92.1)	1
Affected	15 (38.5)	9 (7.9)	7.29 (2.85-18.62)

**Table 6 (continuation II)**

Variables	GHS		COR (95%CI)	AOR* (95%CI)
	Affected (%)	Unaffected (%)		
<b>Fatigue</b>				
Unaffected	36 (92.3)	104 (91.2)	1	
Affected	3 (7.7)	10 (8.8)	0.87 (0.23-3.33)	
<b>Nausea &amp; vomiting</b>				
Unaffected	34 (87.2)	112 (98.3)	1	
Affected	5 (12.8)	2 (1.75)	8.24 (1.53 - 44.37)	
<b>Pain</b>				
Unaffected	14 (35.9)	90 (78.9)	1	1
Affected	<b>25 (64.1)</b>	<b>24 (21.1)</b>	<b>6.70 (3.03-14.81)</b>	<b>5.5 (1.68 - 18.29) *</b>
<b>Dyspnea</b>				
Unaffected	27 (69.2)	105 (92.1)	1	
Affected	12 (30.8)	9 (7.9)	5.19 (1.98-13.57)	
<b>Insomnia</b>				
Unaffected	20 (51.3)	101 (88.6)	1	
Affected	19 (48.7)	13 (11.4)	7.38 (3.14-17.32)	
<b>Loss of appetite</b>				
Unaffected	24 (61.5)	108 (94.7)	1	1
Affected	<b>15 (38.5)</b>	<b>5 (4.3)</b>	<b>13.63 (4.52-41.11)</b>	<b>13.24 (2.71-64.67) *</b>
<b>Constipation</b>				
Unaffected	24 (61.5)	99 (86.8)	1	
Affected	15 (38.5)	15 (13.2)	4.13 (1.78-9.59)	
<b>Diarrhea</b>				
Unaffected	32 (82.1)	107 (93.9)	1	
Affected	7 (17.9)	7 (6.1)	3.34 (1.09-10.24)	
<b>Financial difficulty</b>				
Unaffected	9 (23.1)	71 (62.3)	1	
Affected	<b>30 (76.9)</b>	<b>43 (37.7)</b>	<b>5.5 (2.39-12.69)</b>	

**Table 6 (continuation III)**

Variables	GHS		COR (95%CI)	AOR* (95%CI)
	Affected (%)	Unaffected (%)		
<b>Body image</b>				
Unaffected	16 (41.0)	101 (88.6)	1	1
Affected	<b>23 (58.0)</b>	<b>11 (11.4)</b>	<b>11.17 (4.72-26.41)</b>	<b>6.04 (1.67 – 21.83)*</b>
<b>Sexual activity</b>				
Unaffected	26 (66.7)	71 (62.3)	1	
Affected	13 (33.3)	43 (37.7)	0.82 (0.38-1.78)	
<b>Sexual enjoyment</b>				
Unaffected	5 (38.5)	11 (25.6)	1	
Affected	8 (61.5)	32 (74.4)	0.55 (0.15-2.04)	
<b>Sexual functioning</b>				
Unaffected	4 (30.8)	19 (44.2)	1	
Affected	9 (69.2)	24 (55.8)	1.78 (0.47-6.69)	
<b>Symptom experience</b>				
Unaffected	30 (76.9)	110 (96.5)	1	
Affected	9 (23.1)	4 (3.5)	8.25 (2.37-28.65)	
<b>Lymphoedema</b>				
Unaffected	33 (84.6)	100 (87.7)	1	
Affected	6 (18.0)	14 (12.3)	1.70 (0.62-4.63)	
<b>Peripheral neuropathy</b>				
Unaffected	17 (43.6)	79 (69.3)	1	
Affected	22 (56.4)	35 (30.7)	2.92 (1.38-6.17)	
<b>Menopausal symptom</b>				
Unaffected	26 (66.7)	90 (79.0)	1	
Affected	13 (33.3)	24 (21.0)	1.88 (0.83-4.19)	
<b>Sexual worry</b>				
Unaffected	22 (56.4)	85 (74.6)	1	

Affected	17 (43.6)	29 (25.4)	2.26 (1.06-4.84)
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**Other Status: Divorced, single/cohabitant**

**Other Tribes: Sissala, Gonja, Ewe and Nigerian**

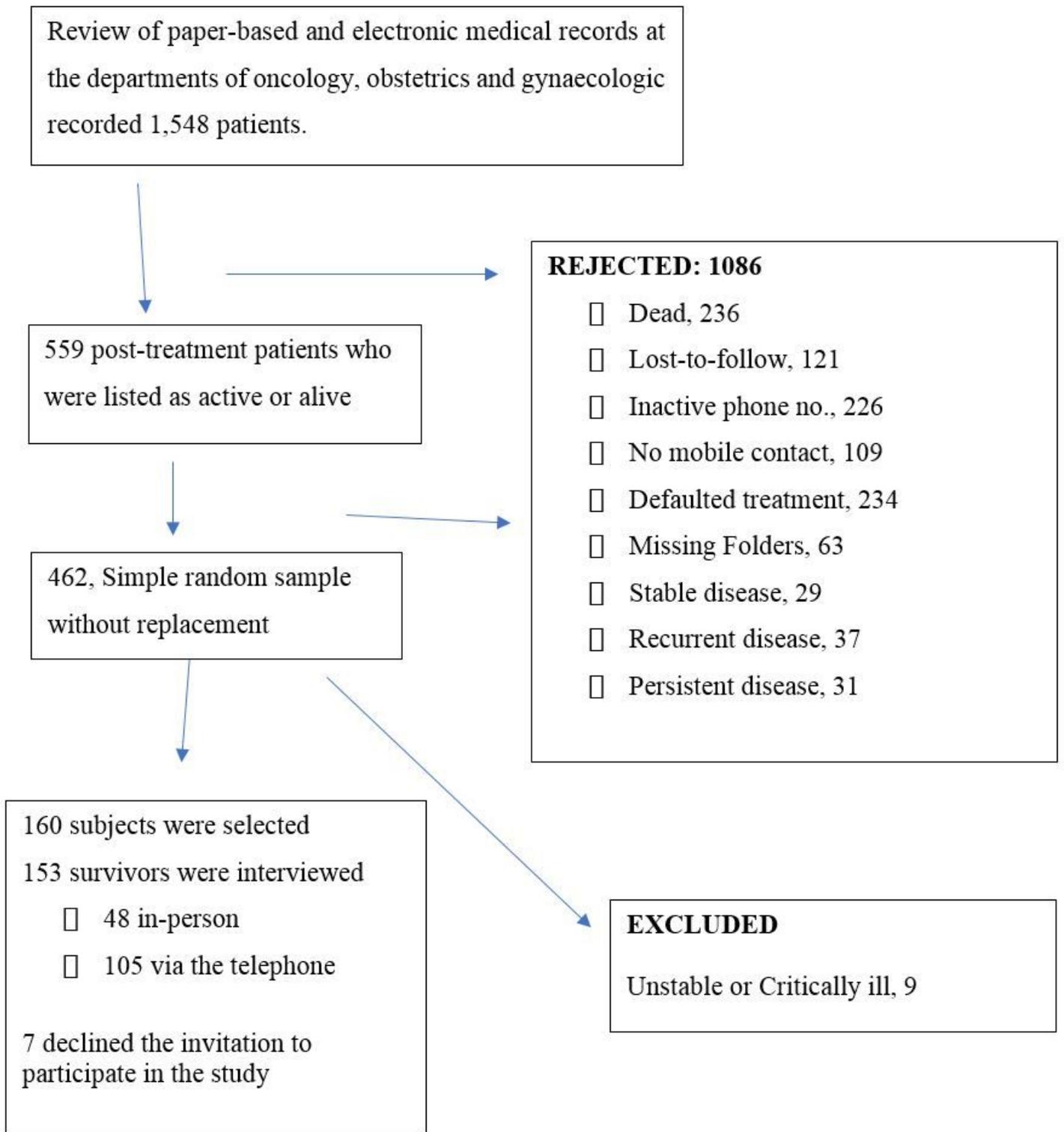
**Other Regions: Greater Accra, Eastern, Upper East and West, Volta and Northern Regions of Ghana**

**COR: Crude odds ratio**

**\*AOR: Adjusted odds ratio**

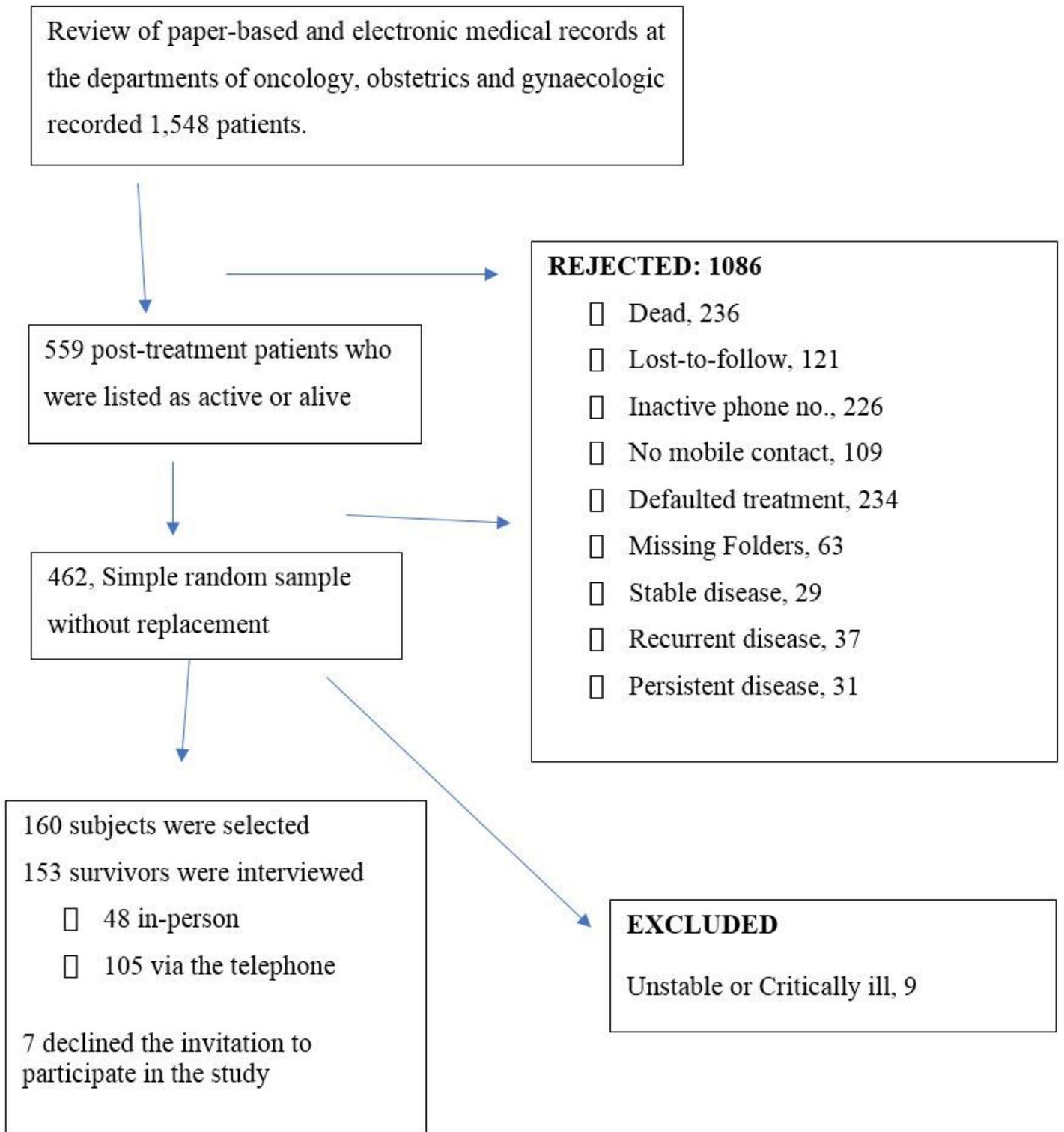
**TCT : Time since Completion of Treatment**

## **Figures**



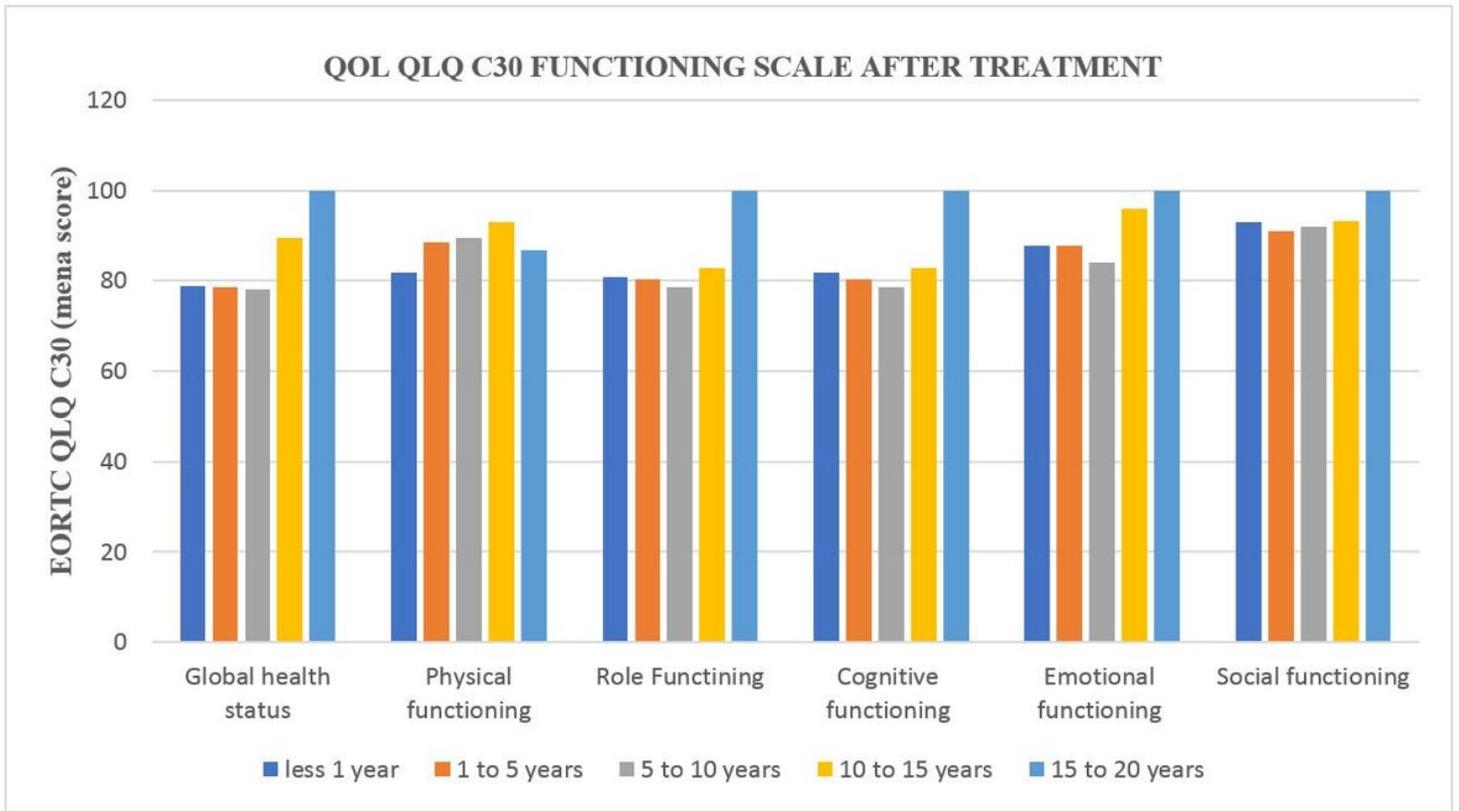
**Figure 1**

FLOW CHART OF THE SAMPLING METHOD



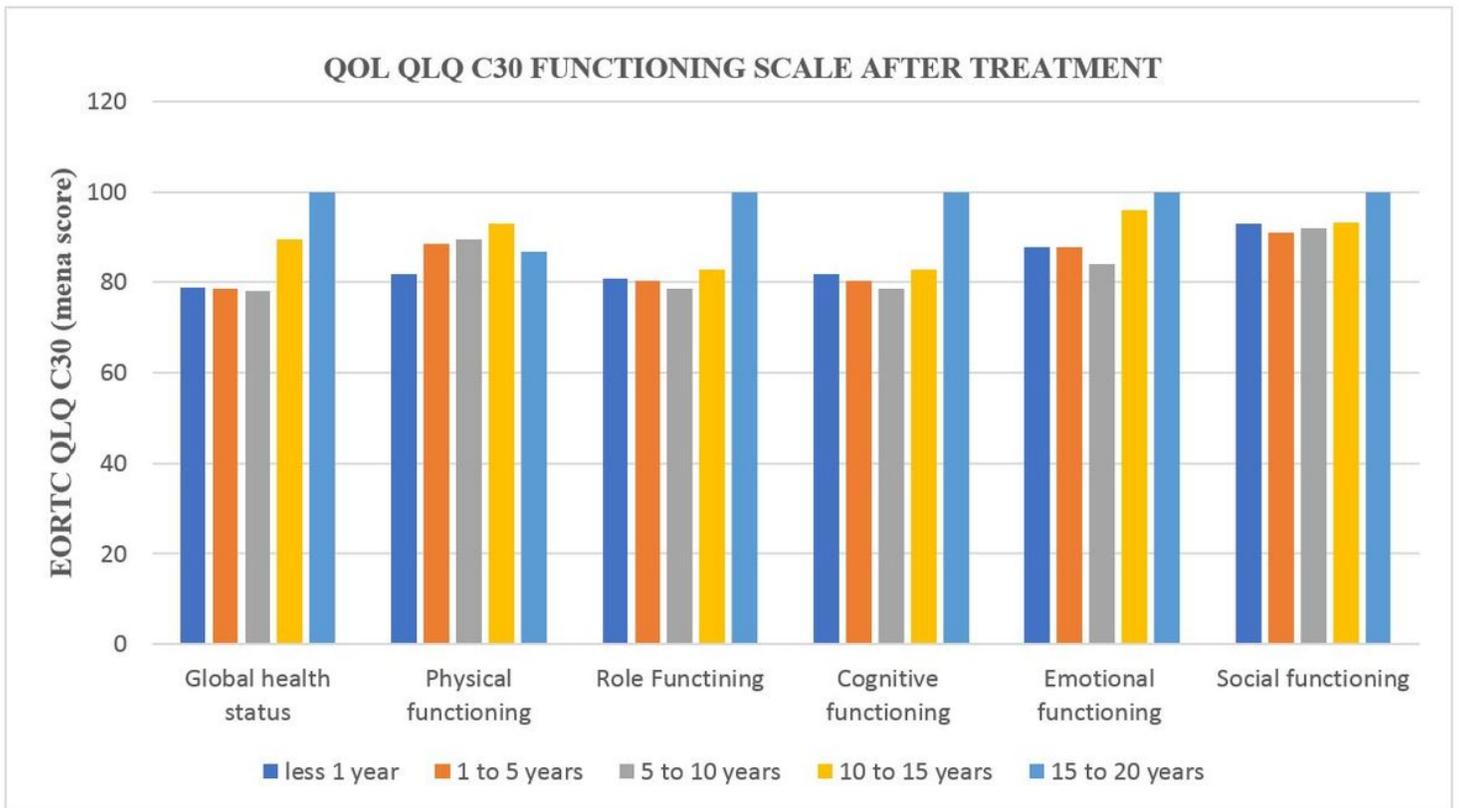
**Figure 1**

FLOW CHART OF THE SAMPLING METHOD



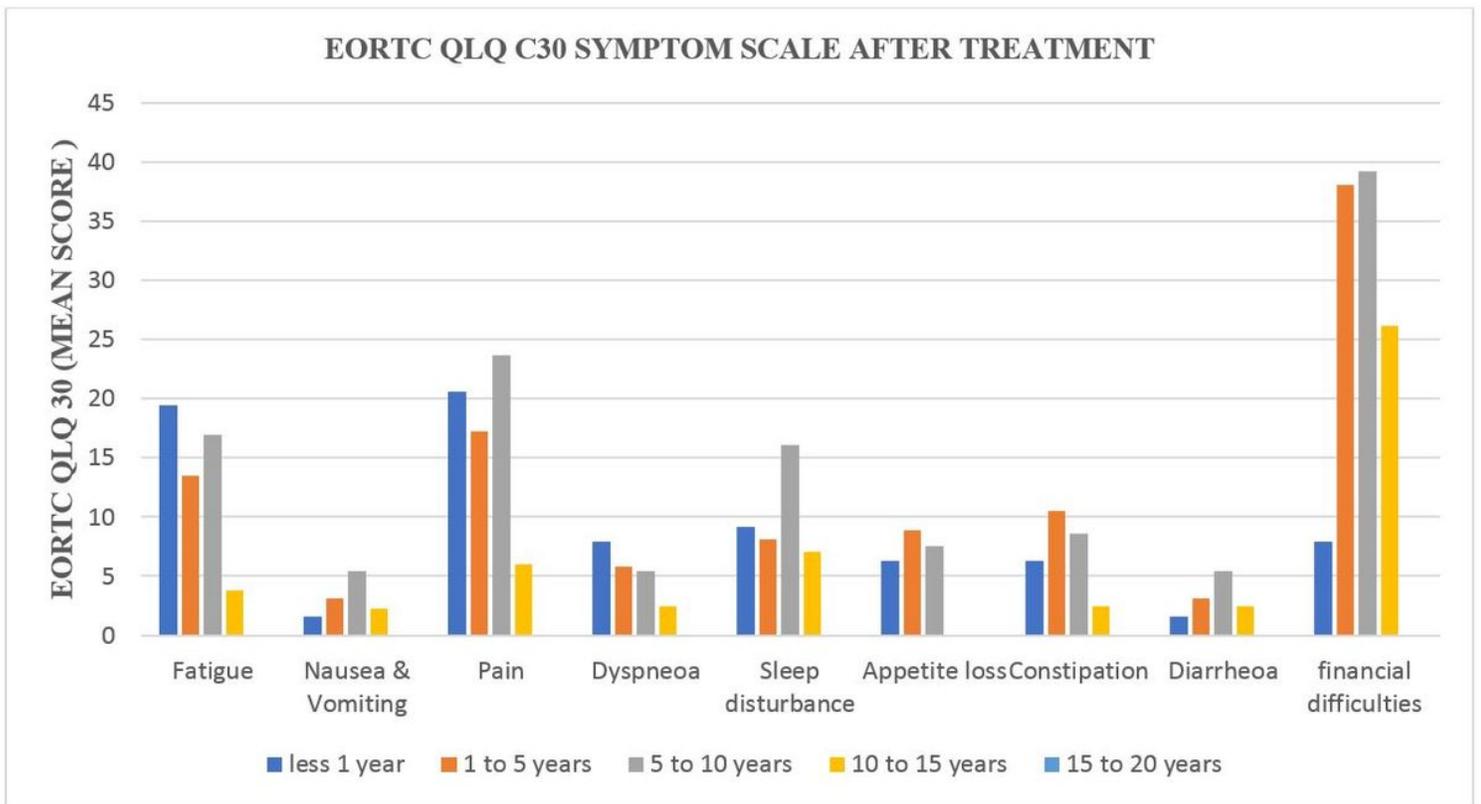
**Figure 2**

THE PATTERN OF EORTC QLQ C30 SYMPTOM SCORE AFTER TREATMENT.



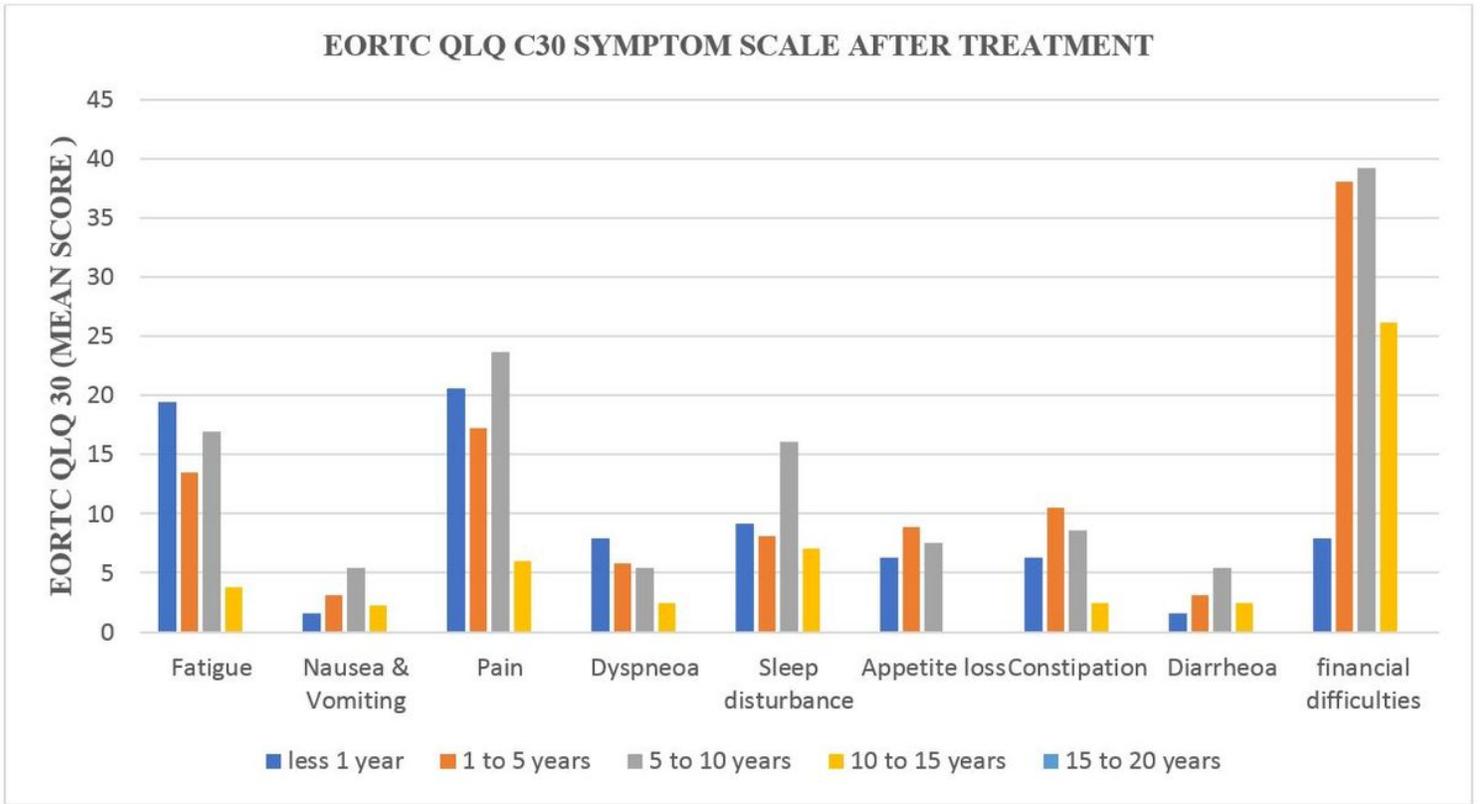
**Figure 2**

THE PATTERN OF EORTC QLQ C30 SYMPTOM SCORE AFTER TREATMENT.



**Figure 3**

THE PATTERN OF EORTC QLQ C30 SYMPTOM SCORE AFTER TREATMENT.



**Figure 3**

THE PATTERN OF EORTC QLQ C30 SYMPTOM SCORE AFTER TREATMENT.

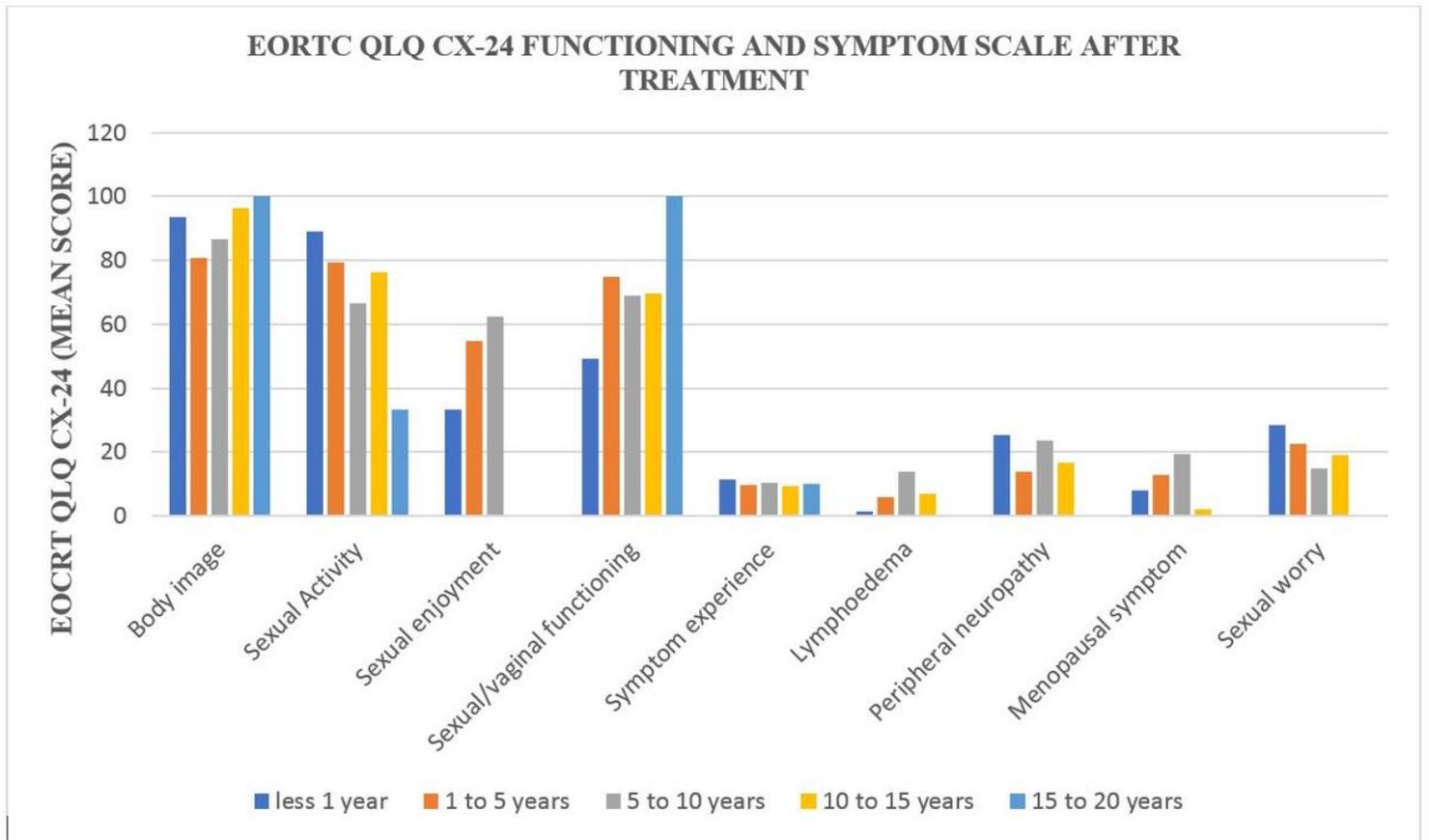


Figure 4

THE PATTERN OF EORTC QLQ CX 24 FUNCTIONING AND SYMPTOM SCORE AFTER TREATMENT.

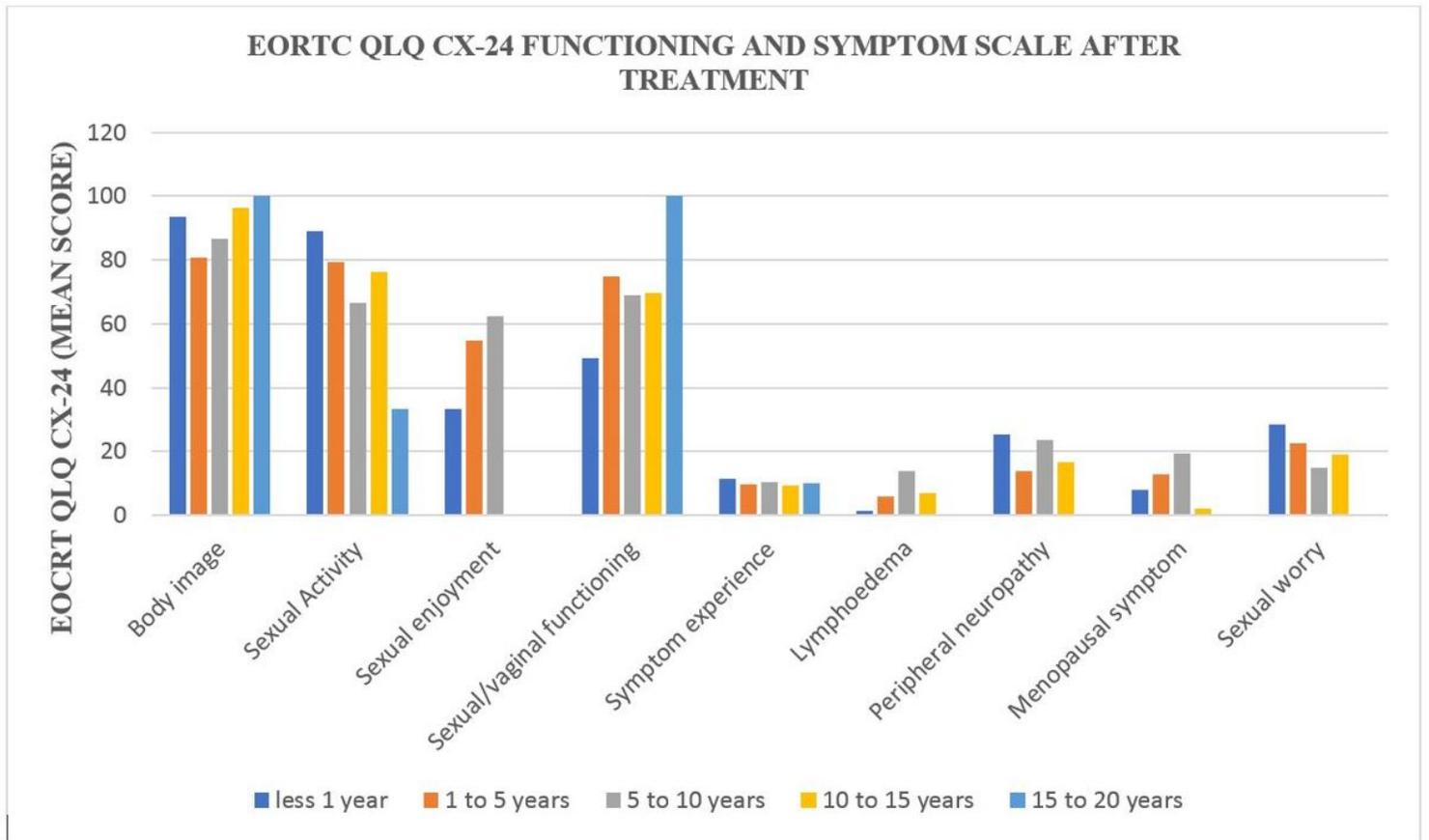


Figure 4

THE PATTERN OF EORTC QLQ CX 24 FUNCTIONING AND SYMPTOM SCORE AFTER TREATMENT.