



# Stress, Anxiety, and Coping with Late Side Effects of Radiation Therapy among Cervical Cancer Patients and Survivors Receiving Care at Cancer Diseases Hospital-Lusaka Zambia

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## Abstract

**Background:** Cervical cancer treatment by radiation therapy causes both acute and late effects. Some of the late physical side effects include menopausal symptoms, poor body image, sexual and or vaginal dysfunction, dyspareunia, vaginal narrowing and bleeding. These side effects are a major source of stress and anxiety among cervical cancer patients and survivors because they influence the emotional, psychosocial, and sexual well-being of the patients.

**Aim:** To assess the magnitude of stress and anxiety due to late side effects of radiation therapy among cervical cancer patients and survivors, and explore the coping strategies they utilize to cope with late side effects of radiotherapy.

**Method:** This study used a concurrent mixed methods design, with a cross-sectional for the quantitative component and an exploratory descriptive phenomenological for the qualitative component. Quantitative data employed binary logistic regression to identify factors influencing stress and anxiety levels. Qualitative data was analyzed using content analysis.

**Results:** The study reveal that 58.70% (n=81) of the women had low levels of stress while 71.01%, (n=98) had high levels of anxiety. This study found that older age, living in high-density areas, unemployment, lower education level, having more children, and lower income were associated with higher stress and anxiety levels among cervical cancer patients and survivors. Women coped with the late side effects of radiation therapy by seeking support from family and friends, medical help, going to church, and hoping to be healed. The study also identified challenges faced by cervical cancer patients and survivors.

**Conclusion and recommendation:** Cervical cancer patients and survivors face high levels of anxiety and stress, which can impact their recovery. Coping with stress and anxiety is essential for recovery from cancer and its treatment hence, Clinical psychologists should be included in the care of cervical cancer patients and survivors.

**Keywords:** Cervical cancer patients and survivors, Late side effects of radiation therapy, Levels of stress and anxiety, Coping strategies, Cervical cancer

Quick Response Code:



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**Received:** 07 September, 2023

**Published:** 26 September, 2023

**Citation:** Celestin M, Patricia KM, Kalusopa VM, Mwauluka M, Phiri F, Lubinda L, Sinkamba PP. Stress, Anxiety, and Coping with Late Side Effects of Radiation Therapy among Cervical Cancer Patients and Survivors Receiving Care at Cancer Diseases Hospital-Lusaka Zambia. *Trends Nur Health Care Res.* 2023;3(2):1-18. DOI: [10.53902/TNHCR.2023.03.000526](https://doi.org/10.53902/TNHCR.2023.03.000526)

## Introduction

Globally, cervical cancer (CaCx) is the third most prevalent cancer (9%, n=529,800 per year) and the fourth cause of cancer mortalities (8%, n=275,100 per year) in women.<sup>1</sup> Africa has the highest incidence and mortality rates of CaCx among other regions of the world, this includes Southern African countries with Swaziland having the highest incidence rate, followed by Eastern Africa with Malawi having the highest rate of death followed by Zimbabwe.<sup>2</sup> Similarly, in Zambia, the most frequent cancer in 2018 was CaCx with 3,000 new cases.<sup>3</sup> CaCx is commonly treated by primary surgery, radiotherapy also called radiation therapy (RT), and/or chemotherapy.<sup>4</sup>

Cervical cancer treatment by RT causes both acute and late effects.<sup>5</sup> Some of the late physical side effects include menopausal symptoms, poor body image, sexual and or vaginal dysfunction, vaginal narrowing and bleeding, dyspareunia, vaginal toxicity, and chronic fatigue.<sup>6</sup> These late side effects of radiation therapy (LSERT) are a major source of stress and anxiety (SA) as they influence the emotional, psychosocial, and sexual well-being of the patients and survivors.<sup>7,8</sup> Stress is a person-situation interaction, one that is dependent on the subjective cognitive judgment that arises from the interplay between the person and the environment.<sup>9</sup> The relationship between stressor exposure and stress outcome depends on how a person faced with a stressful situation deems it threatening, harmful, benign, or challenging. Anxiety refers to fear or nervousness about what might happen.<sup>10</sup> The American Psychological Association<sup>11</sup> defines anxiety as a mood that is accompanied by tense feelings, anxious thoughts, and bodily changes like elevated blood pressure. Lazarus and Folkman in 1984 defined coping as constantly changing cognitive and behavioral efforts to manage specific external and/or internal demands that are appraised as taxing or exceeding the resources of the person. Coping with stressful situations can reduce harmful environmental conditions and improves the individual's perspectives on recovery.

Although the late effects of cervical treatment are well known, research reflecting on the coping and experiences of women living with these effects does not seem to be available.<sup>5</sup> In addition, there have been few studies and no systematic reviews concerning the psychosocial needs of patients who have been treated with radiation therapy.<sup>12</sup> This means there may be an underestimation of the impact of late effects of radiation therapy on the lives of the patients and survivors<sup>13</sup> as well as the SA that comes with it. From the Zambian context, there seems to be limited information describing the levels of Stress and Anxiety due late effects of radiotherapy, and the coping strategies utilized by women who were treated with radiation therapy for cervical cancer. Hence, the study was aimed at determining the levels of stress and anxiety and exploring the coping

strategies among cervical cancer patients and survivors (CaCxPS) with late side effects of radiation therapy.

## Materials and Methods

### Study design, setting and Participants

A concurrent mixed methods research design was employed in this study. An analytical cross-section research design was used for the quantitative part to measure the levels of SA due to late effects of radiation therapy among CaCxPS. While an explorative descriptive phenomenological study was used for the qualitative part to explore the coping strategies utilized by CaCxPS experiencing late the side effects of radiation therapy. Data were collected over a period of three months (from November 2021 to February 2022) at Cancer Diseases Hospital (CDH) outpatient department. The Hospital provides services to the whole population of Zambia and some neighboring countries and it serves as a national referral center for all cancers nationwide with the catchment comprising all the 10 provinces of Zambia. The study population included all women above 18 years old at CDH who were diagnosed with cervical cancer and were at least 6 months post-radiation therapy. However, it excluded women who had multiple cancers.

Ethical clearance was sought from the University of Zambia Biomedical Research Ethics Committee (UNZABREC), and permission from National Health Research Authority (NHRA) and Cancer Diseases Hospital Management. Data was collected over a period of three months. Participants were assured of anonymity and confidentiality by interviewing them in privacy individually after consenting to participate with their signature. The researcher administered a questionnaire in face-to-face interviews that lasted about 20 to 30 minutes. The researcher also engaged a psychosocial counselor who was capable of meeting the psychological needs of the patients.

### Quantitative sampling

A systematic sampling technique was used to select participants using a sampling frame for eligible CaCxSP who sought medical care from the CDH Out-patient department. Systematic sampling involves selecting individuals or elements at regular intervals (sampling intervals) from the sampling frame. The total sample size for the quantitative part was 138, calculated using the proportion precision formula according to Sapsa<sup>14</sup> and data was collected in 12 weeks. Thus  $138/12 = 11.5$ , therefore, the desired number of participants per week was 12. On average CDH sees approximately 30 CaCxPS every week on a Thursdays at Outpatient Department (OPD), the sampling interval was given by  $30/12 = 2.5$ . Therefore, the sampling interval was three. Every third count was selected. The OPD of CDH sees cervical cancer patients every Thursday of the

week as mentioned above and therefore, on this particular day, 12 participants were selected starting with the first one being selected randomly and the rest were selected on an interval of three. This went on every Thursday for a period of 12 weeks until the sample size was reached.

### Qualitative Sampling

A purposive sampling method was used to select participants who were going to provide data on coping strategies utilized and challenges faced by CaCxPS due to the LSERT. Purposive sampling helps to select participants with rich information or experience about the case of interest.<sup>15</sup> Women who were available during data collection and seeking health care at the OPD of CDH were selected. They were selected for the study based on the diversities that existed among CaCxPS such as age, marital status, educational levels and when last they received RT in order to elicit a variety of perceptions among CaCxPS. Participants were selected to participate if they said yes to having had cervical cancer, were treated with RT or having cervical cancer during the time of data collection but were at least six months post-radiation therapy. Additionally, patients who had no other form of cancer or cancers existing apart from cervical cancer and they had no chronic medical condition which existed and was not as a result of the LSERT were allowed to participate.

The sample size for the qualitative is dependent on data saturation, which entails no new information but only redundancy of previously collected data according to Creswell.<sup>16</sup> Creswell further suggests that the sample size for qualitative phenomenological studies should range from five to 25. Data saturation in this study was assumed to be reached after interviewing a sample of 14 CaCxPS however, data saturation was reached after interviewing 12 participants, two more participants were interviewed to reach the sample size of 14 but there was still no new information that emerged. Cypress,<sup>17</sup> supports that interviewing additional participant helps with increasing the scope, adequacy, and appropriateness of the data. The 14 women also participated in the quantitative part of this study. A structured (self-administered) questionnaire was used to collect quantitative data. Stress was assessed using an adapted Perceived Stress Scale (PSS-10) developed by Cohen, Kamarck, and Mermelstein in 1983 while Anxiety was assessed using a State-Trait Anxiety Inventory (STAI) developed in 1983 by Spielberger, Gorsuch, Lushene, Vagg, and Jacobs. The scales are widely used and well-validated tools used to measure stress and anxiety. The PSS-10 is self-report tool that measures the level or degree to which a situation in one's life is perceived or appraised as stressful. It measures how one feels overburdened as a result of the situation they are in as well as how they perceive the situation as being uncontrollable and unpredictable.<sup>18</sup> The PSS 10 has items, it asks a person about

their feelings and thoughts during the last month. The STAI is one of the most used self-report measures of anxiety in research and clinical settings.<sup>19</sup> It is a Likert scale containing 20 items with four options to choose from based on how the person feels right at that particular moment. While a semi-structured interview schedule was used to collect qualitative data on coping strategies utilized by women experiencing late side effects of radiation therapy. Themes generated were presented in the results and findings section.

### Data Analysis

#### Quantitative data analysis

Data was analyzed using the International Business Machines (IBM) ® Statistical Package for Social Sciences (SPSS®) for Windows version 24.0. Chi-square test was used to determine the categorical variables (level of education, marriage status, residence, occupation, levels of income receiving support) associated with stress and anxiety. The continuous variables were tested for normality using the Shapiro-Wilk test, and 'age' was found to be normally distributed thus the mean and standard deviation were reported while the number of children was not normally distributed thus the median and interquartile range were reported.

A binary logistic regression was used to determine the relationship between the dependent variable, which were Stress and Anxiety, and the independent variables, which included demographic factors (Age, Number of children, Level of education, Residence, Marital status, Social support) and economic factors. The two dependent variables (stress and anxiety) were analyzed separately. Stress had initial outcomes of low stress, moderate stress, and high-perceived stress according to the Perceived Stress Scale while anxiety has no or low anxiety, moderate anxiety, and high anxiety according to the State-Trait Anxiety Inventory. The outcomes of stress were grouped into dichotomous as low levels of stress and high levels of stress while those of anxiety were grouped as low levels of anxiety and high levels of anxiety to meet the assumptions of binary regression analysis. Confidence Interval was set at 95% and a p-value of < 0.05 was set as a level of statistical significance.

#### Qualitative data analysis

Data was collected and analyzed using content analysis, the responses were transcribed and familiarization was achieved by reading, re-reading, and reviewing repeatedly for content understanding. This helped to identify comments relevant to research objectives and they were coded as themes and eight themes emerged from the responses. Data was validated by involving a research fellow who read and re-read the transcribed data, the fellow was also involved in validating the transcribed data from the audio recording.

## Results and Findings

A total of 138 cervical cancer patients and survivors participated in the quantitative part and 14 of them participated in the qualitative part of this study. The initial results before the responses were converted in dichotomous were as follows, for the stress variable, 1 (0.72%) had low stress, 134 (97.10%) had moderate stress and 3 (2.17%) had high levels of the stress according to the PPS. While for the anxiety variable 14 (10.14%) had low anxiety, 59 (42.75) had moderate anxiety and 65 (47.10) had high anxiety according to the STAI. After the responses were converted into dichotomous, it was discovered that for stress variable, 81 (58.7%) of the women were found to have low levels of stress and 57 (41.3%) had high levels of stress while for the anxiety variable, 40 (28.99%) had low levels of anxiety and 98 (71.01%) had high levels of anxiety.

Two themes and four subthemes emerged from the assessment of the coping strategies utilized by women to cope with the late side effects of radiation therapy. Seeking family and medical help, and religious support were the two themes identified. One of the women said, "My husband has been supportive throughout, he was the only one who supported me in terms of family, my relatives were not there for me, but my husband was there for me". The study also investigated the challenges faced by cervical cancer patients and survivors, two themes and four subthemes emerged. Most women claimed that they were not told about the late side effects of radiation therapy that they experienced and this was difficult for them to cope with the late side effects of radiation because these side effects of RT came as surprise.

Table 1 shows that the age range of participant was between 17 to 87 years. The average age was 53 years. More than 50% of women were married and the average number of children women had was five. The highest number of children that some participants had was 11. The majority (82.61 %) of the women had a monthly income of less than K5000.

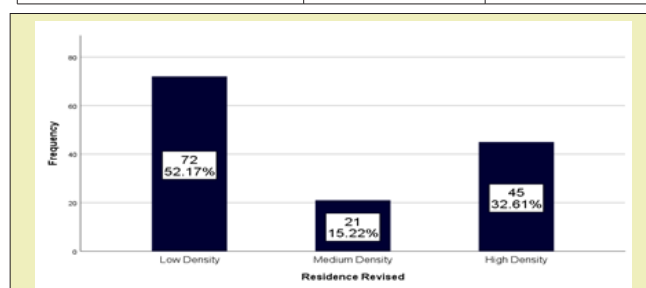
Figure 1 shows that the majority of the respondents 72 (52.17%) were from a low-density area, while 21 (15.22%) were from a medium density and the rest 45 (32.61%) were from a high-density area.

Figure 2 shows that 76 (55.7%) of the respondents were self-employed while 45 (32.61%) were unemployed and 17 (12.3%) were in formal employment.

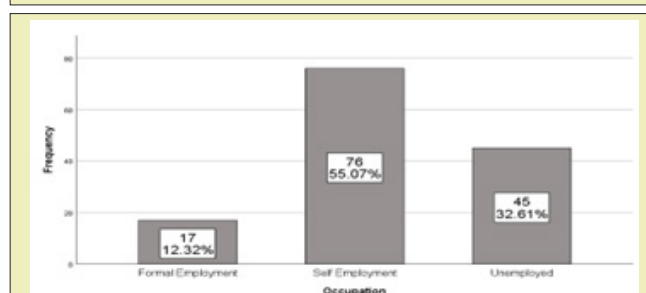
Table 2 shows the initial levels of stress obtained using the PSS and it shows that 134 (97.10%) women had moderate stress while only one had low stress. It also shows that 81 (58.70%) respondents had low levels of stress and the remaining 57 (41.30%) had high levels of stress after the responses were converted into dichotomous outcomes.

**Table 1:** The demographic characteristics of 138 Cervical Cancer patients and survivors

Variable	Frequency	Percent
<b>Age</b>		
Mean	53	
Minimum	17	
Maximum	87	
<b>Education</b>		
No formal education	20	14.5
Primary	48	34.8
Secondary	56	40.6
Tertiary	14	10.1
<b>Total</b>	<b>138</b>	<b>100</b>
<b>Marital status</b>		
Single	9	6.5
Married	76	55.1
Widowed	41	29.7
Divorced	12	8.7
<b>Total</b>	<b>138</b>	<b>100</b>
<b>Number of children</b>		
Mean	5	
Minimum	0	
Maximum	11	
<b>Level of income</b>		
< K5000	114	82.6
> K5000	24	17.4
<b>Total</b>	<b>138</b>	<b>100</b>



**Figures 1:** Residential area (n=138).



**Figures 2:** Participant's occupation (n=138).

Table 3 shows the initial levels of anxiety obtained using the STAI. It shows that 66 (47.10 %) of the women had high anxiety while 14 (10.14) had low anxiety and the rest had moderate anxiety. The table also shows 98 (71.01%) of the respondents had high levels of anxiety and the rest had low levels of anxiety after the responses were converted into dichotomous outcomes.

Table 4 shows that age and marriage were statistically significant association to levels of stress. The variables education (P=0.129), number of children (P=0.106), residence (P=0.107), occupation (P=0.581), level of income (0.184) and receiving support (P=0.801) were not significantly associated with levels of stress.

Table 5 shows that for every unit increase in age, the odds of having high levels of stress increased by 1.066 compared to having low levels of stress (CI:1.024-1.110, OR; 1.066, P:0.002) and the effect was statistically significant. Attaining primary and secondary education reduced the odds of having high levels of stress by 0.378 and 0.735, (CI: 0.111-1.290, OR; 0.378, P: 0.120) and (CI: 0.200-2.704, OR; 0.735 P: 0.643). While attaining tertiary education increases the odds of having high levels of stress more than 1.5 times (CI:0.251-9.980, OR; 1.581, P: 0.626) compared to not attaining formal education, however, the effect was not statistically significant. Leaving in a high-density area reduced the odds of having high levels of stress by 0.280 compared to leaving in a low-density area and the reduction was statistically significant (CI: 0.105-0.747 OR; 0.280 P: 0.011). Being unemployed reduced the odds of having high

stress levels by 0.163 and surprisingly the effect was statistically significant (CI: 0.038-0.713, OR 0.163, P: 0.016).

Table 6 shows that there was a statistically significant association between level of income level of anxiety. The variables age (P=0.111), education (P=0.091), number of children (P=0.088), marital status (P=0.248), residence (P=0.052), occupation (P=0.054) and receiving support (P=0.383) were associated to levels of anxiety but the effect was not statistically significant.

Table 7 shows that for every increase in age, the odds of having high levels of anxiety increased by 6.7% (CI: 1.015-1.122, OR; 1.067, P: 0.011) and the effect was statistically significant. Attaining primary education reduced the odds of having high levels of anxiety by 0.193 and the effect was significant (CI: 0.040-0.944, OR; 0.193, P: 0.042) while attaining tertiary education increased the odds of having high anxiety levels by 1.339 relatively to not attain formal education (CI: 0.120-15.003, OR; 1.339, P: 0.813). Being married increased the odds of having high levels of anxiety four times while being divorced increased the odds of having high levels of anxiety over 14 times compared to being single (CI: 0.778-24.617, OR; 4.378, P:0.094) and (CI: 0.920-237.593, OR; 14.782, P:0.57). However, this effect was not statistically significant. Being unemployed increased the odds of having high levels of anxiety more than three times compared to having formal employment, (CI: 0.686-20.999, OR; 3.796, P:0.126), however this increase was not significant.

**Table 2:** Initial scoring of stress using the PSS and Dichotomous scoring.

Outcomes of Stress	Scoring	Frequency	Percentage %
Initial Stress outcome	0-13=Low Stress	1	0.72
	14-26=Moderate Stress	134	97.1
	27-40=High Stress	3	2.17
Dichotomous Stress outcome	0-20=Low levels of Stress	81	58.7
	21-40=High levels of Stress	57	41.3

**Table 3:** Initial scoring of Anxiety using the STAIL and Dichotomous scoring.

Outcomes of Stress	Scoring	Frequency	Percentage %
Initial Anxiety outcome	0-13=Low Anxiety	14	10.14
	14-26=Moderate Anxiety	59	42.75
	27-40=High Anxiety	66	47.1
Dichotomous Anxiety outcome	0-20=Low levels of Anxiety	40	28.99
	21-40=High levels of Anxiety	98	71.01



**Table 4:** Cross tabulation of Factors that influence levels of stress among cervical cancer patients and survivors (N=138).

Characteristic	Low Stress No 100 %)	High Stress No (100%)	Total %	P-value
<b>Age in years, mean (standard deviation)</b>	50.2 (11.6)	56.7 (15.4)		<b>0.005<sup>IT</sup></b>
<b>Level of education</b>				
No formal education	7 (35.0)	13 (65.0)	100	0.129 <sup>PCS</sup>
Primary	31 (64.6)	17 (35.4)	100	
Secondary	35 (62.5)	21 (37.5)	100	
Tertiary	8 (57.1)	6 (42.9)	100	
<b>Number of children, (median IQR)</b>	5 (3-6)	5 (4-7)		0.106 <sup>IT</sup>
<b>Marital Status</b>				
Single	9 (100.0)	0(0.0)	100	<b>0.029<sup>PCS</sup></b>
Married	46 (60.5)	30 (39.5)	100	
Devoiced	7 (58.3)	5 (41.7)	100	
Widowed	19 (46.3)	22 (53.7)	100	
<b>Residence</b>				
Low density	37 (51.4)	35 (48.6)	100	0.107 <sup>PCS</sup>
Medium density	12 (57.1)	9 (42.9)	100	
High Density	32 (71.1)	13 (28.9)	100	
<b>Occupation</b>				
Formal employment	8 (47.1)	9 (52.9)	100	0.581 <sup>PCS</sup>
Self-employment	45 (60.5)	30 (39.5)	100	
Unemployed	27 (60.0)	18 (40.0)	100	
<b>Level of income</b>				
< K5000	64(56.1)	50(43.9)	100	0.184 <sup>PCS</sup>
≥ K5000	17(70.8)	7(29.2)	100	
<b>Receiving support</b>				
Yes	80(58.8)	56(41.2)	100	0.801 <sup>PCS</sup>
No	1(50.0)	1(50.0)	100	

IQR= Interquartile range, IT= Independent t test, PCS=Pearson chi-square test

**Table 5:** Binary logistic regression analysis of factors associated with stress n=138.

Variables	Indicators	Adjusted estimates			p-value
		AOR	95% CI		
			Lower	Upper	
<b>Age</b>	Age in years	1.07	1.024	1.11	<b>0.002</b>
<b>Level of education</b>	No formal education	Ref			
	Primary	0.38	0.111	1.29	0.12
	Secondary	0.74	0.2	2.704	0.643
	Tertiary	1.58	0.251	9.98	0.626
<b>Children</b>	Number of children	0.97	0.805	1.176	0.778
<b>Residence</b>	Low density	Ref			
	Medium density	0.8	0.26	2.436	0.688
	High Density	0.28	0.105	0.747	<b>0.011</b>
<b>Occupation</b>	Formal employment	Ref			
	Self-employment	0.28	0.77	1.029	0.055
	Unemployed	0.16	0.038	0.713	<b>0.016</b>

Level of income	< K5000	Ref			
	≥ K5000	0.25	0.067	0.896	<b>0.034</b>
Receiving Support	Yes				
	No	13.8	0.56	340.6	0.108

AOR= Adjusted Odds Ratio, CI= Confidence Interval, Percentage agreement 71%, Hosmer and Lameshow Test =0.503, Nagelkerke R square = 0.248

**Table 6:** Factors associated with anxiety (N=138).

Characteristic	Low Levels of Anxiety	High Levels of Anxiety No	Total % (100)	P-value
<b>Age in years (mean standard deviation)</b>	50 (11.9)	54.1(12.2)		0.111 <sup>IT</sup>
<b>Education</b>				0.091 <sup>PCS</sup>
No formal education	3 (15.0)	17 (85.0)	100	
Primary	20 (41.7)	28 (58.3)	100	
Secondary	14 (25.0)	42 (75.0)	100	
Tertiary	3 (21.4)	11 (78.6)	100	
<b>Number of children (Median, IQR)</b>	5 (3-7)	5 (3-6.25)		0.088 <sup>IT</sup>
<b>Marital Status</b>				0.248 <sup>PCS</sup>
Single	4 (44.4)	5 (55.6)	100	
Married	21 (27.6)	55 (72.4)	100	
Divorced	1 (8.3)	11 (91.3)	100	
Widowed	14 (34.1)	27 (65.9)	100	
<b>Residence</b>				0.052 <sup>PCS</sup>
Low density	26 (36.1)	46 (63.9)	100	
Medium density	7 (33.3)	14 (66.7)	100	
High Density	7 (15.6)	38 (84.4)	100	
<b>Occupation</b>				0.054 <sup>zPCS</sup>
Formal employment	6 (35.3)	11 (64.7)	100	
Self-employment	27 (35.5)	49 (64.5)	100	
Unemployed	7 (15.6)	38 (84.4)	100	
<b>Level of income</b>				0.045 <sup>PCS</sup>
< K5000	29 (25.4)	85 (74.6)	100	
≥ K5000	11 (45.8)	13 (54.2)	100	
<b>Receiving support</b>				0.383 <sup>PCS</sup>
Yes	40 (29.4)	96 (70.6)	100	
No	0 (0.0)	2 (100.0)	100	

IQR= Interquartile range, IT= Independent t test, PCS=Pearson chi-square test

**Table 7:** Binary logistic regression analysis of factors associated to anxiety.

Variables	Indicators	Adjusted estimates			
		AOR	95% CI		p-value
			Lower	Upper	
<b>Age</b>	Age in years	1.067	1.015	1.122	<b>0.011</b>
<b>Level of education</b>	No formal education	Ref			
	Primary	0.193	0.04	0.944	<b>0.042</b>
	Secondary	0.486	0.87	2.701	0.41
	Tertiary	1.339	0.12	15.003	0.813
<b>Children</b>	Number of children	0.759	0.599	0.961	<b>0.022</b>

<b>Marital Status</b>	Single	Ref			
	Married	4.378	0.778	24.617	0.094
	Divorced	14.782	0.92	237.593	0.57
	Widowed	1.325	0.181	9.694	0.782
<b>Residence</b>	Low density	Ref			
	Medium density	1.441	0.419	4.956	0.562
	High Density	2.408	0.811	4.956	0.113
<b>Occupation</b>	Formal employment	Ref			
	Self-employment	1.44	0.327	6.337	0.629
	Unemployed	3.796	0.686	20.999	0.126
<b>Level of income</b>	< K5000	Ref			
	≥ K5000	0.419	0.116	1.515	0.185

AOR: Adjusted Odds Ratio; CI: Confidence Interval Percentage agreement 80%; Hosmer and Lemeshow Test=0.380; Nagelkerke R square =0.380

## Qualitative Data

### Coping strategies of respondents

Two themes and four subthemes emerged from the assessment of the coping strategies utilised by women to cope with late side effects of radiation therapy. Theme (1) Seeking family and medical help, subthemes (1) support from family and friends (2) help from the hospital. Theme (2) Religious support, subthemes (1) going to church, (2) hoping to be healed.

#### Theme 1: Seeking family and medical help

##### Subtheme 1: Support from friends and families

Most of the women stated that they received support from friends and families. This support was important in their lives and they did not take it for granted because it helped them identify people who were helpful in the times of trouble.

*What gave me hope was my children who used to encourage me and told me that I will be okay (Participant 2)*

*My friends came to visit me and encouraged me to be strong (Participant 3)*

*My husband has been supportive throughout, he was the only one who supported me in terms of family, my relatives were not there for me, but my husband was there for me. Everyone including my family from my side and those of my husband abandoned me. The only one that I had was my husband and he supported me through and through. My husband is the most supportive person even in this time (Participant 13).*

##### Subtheme 2: Help from the hospital

Women said they received help from the hospital. Some of the participants said the hospital gave them medication for symptoms such pain and it was the relief of pain that help them to cope with cancer recovery process and its treatment.

*The hospital is helping, they have even written medication for me (Participant 1).*

*I am receiving enough help from this hospital. The hospital is helping a lot, if not for the hospital maybe this time it would have been another thing (Participant 11).*

*The doctors and nurse are very supportive, they have given me B6 (Participant 14)*

#### Theme 2: Religious support

##### Subtheme 1: Going to church

Women described going to church as what gave them courage and were able to cope with late side effects of radiation therapy because listening to the word of God kept them looking forward and moving throughout the days. Some of the participants stated as follows.

*Going to church and reading the bible and putting myself in God's hands. In addition, meeting with my church members at Jehovah's Witness (Participant 2).*

*I believed in God that he will help me the same way he helped Job who was sick in the bible, I believed that God was going to heal me as well (Participant 3).*

*I used to pray to God because he is the Doctors of Doctors, so I put everything in God's hands (Participant 14).*

##### Subtheme 2: Hoping to be healed

Women said they believed in hope as they hoped for a recovery through faith. One woman said the Doctor told her that the recovery process takes about 5 years and this made her hope for the possible recovery.

*The encouragement from my children gave me hope (Participant 2)*



*Going to church gave me hope that I will get better in Jesus name (Participant 3)*

*I had hope that I will get healed (Participant 13)*

This study also looked at the coping strategies utilized by Cervical Cancer patients and survivors and it went further and looked at the challenges faced they face.

### **Challenges faced by cervical cancer patients and survivors**

The results of the challenges faced by cervical cancer patients and survivors revealed two themes and four subthemes; first theme: Insufficient education; subtheme 1; Inadequate knowledge on late side effects of RT. Second theme: Physical burden and injury; subthemes (1) leg and back pain, (2) burns and sores on female private part (3) bleeding and fluid discharge from the private part.

### **Themes 1: Insufficient education**

#### **Subtheme 1: Inadequate knowledge on late side effects of RT**

Cervical Cancer patients and survivors had inadequate knowledge on the late side effects of RT and this was the most prominent theme. Women said they were disappointed that they were not fully told about the late side effects they were going to experience.

*They did not tell us that there are side effects after radiation therapy. I just saw sores coming then I started cleaning myself the way we clean wounds. They did not tell us about the side effects like they do when you are going to start chemotherapy, for example that you shall be vomiting, sometimes diarrhoea, sometimes nausea, sometimes no appetite. I was very disappointed that they did not tell me about the side effects. Here at radiation they should tell me so that I start the treatment while ready for that, they should tell me any side effects so that I know. I was very disappointed and hurt at the sometime (Participant 9)*

*They did not explain to me about the problems. I didn't have any information from anyone but I used to goggle. They should tell us that after treatment, there will be side effects so that we don't get worried when we see them. You should be telling us about the side effect to expect so that we know that from point A we are going to point B. This reduces the worries, otherwise I was worried that cervical cancer is coming again. I even went to do biopsy again and they found nothing, the sore continued developing and they were very painful. (Participant 11)*

*They never told us about the side effects such as sore. I was going to prepare myself on how to handle the side effects if I was told about them, because when you know about the side effects, you prepare yourself rather than the side effects come as surprise. It was difficult*

*for me to handle. My recommendation to the health worker is that, it is better to tell us about the side effect before we even start the treatment, so that we choose or help us make the right decision, sometime you may choose not to have the treatment. (Participant 13)*

### **Theme 2: Physical burden and injury**

#### **Subtheme 1: Leg and back pain**

Another subtheme generated was leg and back pain. Women complained of leg and back pain, which occurred due to walking and sitting for a long time.

*I was feeling my legs paining and was not able to kneel. The legs could feel tight and I could not make a long step. The legs felt heavy and I failed to walk (Participant 8)*

*My legs are paining. Right now my back is paining and when I walk for a long distance, my back pains. (Participant 11).*

*I experience backache when I sit or stand for a long time. (Participant 6)*

*In the review room, they just asked me how are you feeling? I told them that I usually feel backache and they wrote medicine for me (Participant 10).*

*I never used to sit upright I used to learn toward. Right now my back is paining and when I walk a very long distance my back pains (Participant 12).*

#### **Subtheme 2: Burns and sores**

Women experienced burn sensation and sores that affected their private parts. They describe the burns and sore as one of the most uncomfortable side effects they experienced.

*I had sore on the anus and they were painful (Participant 1)*

*I had some burns, which were terrible and uncomfortable. They felt more like they were torturing me. The nurses told us that we shouldn't be bathing with soap and they never told us to scrub the burns but me I used to scrub them. I was going to cope very well if I was told about the burns as side effects (2).*

*I developed some sore behind my back. The sores were the most uncomfortable. I managed to cope by cleaning the sores with Savlon, sometimes with salty water. (Participant 9)*

*If you urinated too much or with force, you would feel the skin is burning, there is a burning sensation when urinating. The skin around the vagina feels burning when you urinate forcefully (Participant 11).*

*I had diarrhoea and sore on my vagina. I was mostly not comfortable with the sore because they took time to heal and they were so painful (Participant 13)*

### Subtheme 3: Bleeding and fluid discharge from the private part

Bleeding and fluid discharge from the vagina was one of the complains that women described as one of the side effects that affected their sexual life and some women had to hide this challenge from their husbands.

*I bleed sometime, I have sores and fluids comes out of my vagina, and I do not feel sexual desire. It takes time for me to get aroused sexually. I do not know if it is caused by radiation therapy. (Participant 10)*

*Am cured of cancer but blood comes out when I put a syringe. (Participant 14)*

*I have discharge of fluids from the vagina and I never told my husband about it (Participant 1)*

### Discussion

The age distribution of participants ranged from 17 to 87 years with a mean age of 53 years. This implies that cervical cancer affects women who are in their middle age. These results are similar to those of Arbyn 2020, who found that the average age of women diagnosed with cervical cancer globally was 53 years. The majority (40.06%) of the women were found to have attained secondary education. The current study also found that more than half (76, 55.1%) of the respondents were married. Most of the women 72 (52.17 %) in this study were from a low-density area, 21 (15.22%) were coming from a median density area and the rest 45 (32.61%) were from a high-density area. In this study, it was found that 17 (12.32) had formal employment, 45 (32.61) were unemployed and 76 (55.07) were self-employed as shown in table 3.1. Previous studies have found that, unemployed women are more vulnerable to diseases such as cervical cancer, given that economic and social conditions decisively influence health conditions (Correia 2018).

#### Levels of stress and anxiety

This study reveals that 81 (58.7%) of the women surprisingly had low levels of stress as shown in table 3.2. These results are however in contrast to those of <sup>20</sup> who found that most women had high perceived stress. The reason for this difference would be that women in the current study were able to cope with certain challenges they were facing as they sought help from the hospital. In addition, table 3.3 shows that 98 (71.01%) of the respondents had high levels of anxiety. High levels of anxiety have been reported in similar studies. A prospective study conducted by <sup>21</sup> revealed that women had high anxiety scores and were depressed. However, the results of high levels of anxiety in this study are in contrast with those of <sup>22</sup> and <sup>23</sup> who found that anxiety levels in cancer patients and survivors reduce six months after cancer treatment and that the levels of anxiety may depend on race, the complexity of the

treatment and its side effects.

#### Factors that influence the levels of stress among CaCxPS

A binary logistic regression was performed and it showed that age was significantly associated with high levels of stress among CaCxPS (CI:1.024-1.110, OR; 1.066, P:0.002) as shown in table 3.5. Each unit of increase in age increased the chances of one having high levels of stress. This could have been because of worrying about the unwanted side effects and fear of dying at the age of 50 as well as reproductive concerns. In addition, table 3.5 shows that women who lived in high-density areas were 0.28 less likely to have high levels of stress, and the effect was statistically significant (CI: 0.105-0.747 OR; 0.280 P: 0.011). Urban areas tend to have easy access to health and social services, and this can contribute to less emotional and physical tensions. This is consistent with Thapa <sup>e24</sup> who reported that living in rural areas increases the risk of poor health outcomes and socioeconomic status. The current study further discovered that women who were unemployed had 0.163 times reduced chances of having high levels of stress and the association was surprisingly significant (CI: 0.038- 0.713, OR: 0.163, P: 0.016). These findings are not congruent with studies conducted by Tomic-Golubovic<sup>21</sup> who reported that factors such as unemployment predict a greater chance of developing psychological burden among cervical cancer patients. However, a possible reason for this discrepancy could be due to differences in study settings.

#### Factors that influence the levels anxiety among CaCxPS

Age and number of children increased the chances of having high levels of anxiety among CaCxPS as seen in table 4.7 and this effect was statistically significant (CI: 1.015-1.122, OR; 1.067, P:0.011), (CI: 0.599-0.961, OR; 0.759, P: 0.022). These results are similar to the results of Aquil<sup>25</sup> and Morais<sup>26</sup> who reported that being young negatively influence the perception of the body image in patients with cervical cancer, which in turn leads to high psychological effects. These results are not surprising, as this concerns the female reproductive organs (uterus, ovary) and breasts represent sexuality, fertility, and motherhood. Additionally, it is well known that radiotherapy to treat cervical cancer may affect the possibility of having children because it affects the womb and ovaries, arising from onset of an early menopause.<sup>25-27</sup>

In the current study, table 4.7 on page 48 shows that attaining primary education was found to significantly contribute to high levels of anxiety compared to attaining secondary or tertiary education (CI: 0.040-0.944, OR; 0.193, P: 0.042). The possible reason for the observed results could be that women who attained secondary or tertiary education are more likely to have been exposed to or able to look for information on cervical cancer and its treatment and have a better understanding of the information compared to those who attained primary education.

Furthermore, it was discovered that divorced women were more associated with having high anxiety levels compared to those who were single and married. A study conducted by Morais,<sup>28</sup> reported that the presence of a partner or spouse is important for the emotional well-being of the patients as married women were found to have higher mean scores than single women.

### Convergence of qualitative and quantitative findings and results

This study provides insight into the coping strategies (styles) utilized by CaCxPS with LSERT. Coping style is an important resource of psychological adjustment for cancer patients to combat-destructive emotions and stress.<sup>29</sup> Radiation is part of cervical cancer treatment and typically causes worse side effects and greater impairment of quality of life and sexual function compared to other modes of cervical cancer treatment.<sup>30</sup> One of the participants in this study complained saying 'I bleed sometimes, I have sores and fluids comes out of my vagina, and I do not feel sexual desire may support this. It takes time for me to get aroused sexually' (Participant 10). Living with the physical effects of cervical cancer treatment is not easy (Ntinga, 2015). The assessment of coping strategies revealed two themes and four subthemes; theme (1) Seeking family and medical help, subthemes (1) support from family and friends (2) help from the hospital. Theme (2) Religious support, subthemes (1) going to church, (2) hoping to be healed. These findings are similar to other findings reported in other studies. Other studies have identified spirituality and religious activities, relationships with or support from medical personnel, friends, and family support as main coping strategies.<sup>5,31,32</sup>

Hoping to be healed was also utilized as a coping strategy. Hope is found to help patients endure and to see a new way of being and generate the belief that one's life is worth living hence helping.<sup>33</sup> Hope is a positive psychological factor, which seems to help patients adapt and maintain a high level of well-being, give directions and reasons for survival. Similar studies among cancer survivors have revealed that cancer survivors were found to be hopeful. They further report that cancer survivors, who were more hopeful for the future coped better with cancer treatment and even experienced personal growth and hope. This played a substantial role in preventing impairments and had a beneficial effect on the quality of life among cancer survivors.<sup>29</sup> Support from friends and family was also utilized as a coping strategy among cervical cancer patients and survivors. Dewi<sup>31</sup> have reported similar findings.

The current study revealed that women received enough support from the hospital and the help was given mostly by nurses and doctors. Some participants said that doctors prescribed medication, which relieved some effects like pain, and this helped women to cope. Similarly, Katowa-Mukwato<sup>34</sup> discovered that cervical

cancer patients were able to cope through encouragement from the medical personnel.

### Challenges faced by cervical cancer patients and survivors

In this study, two themes and four subthemes emerged concerning the challenges cervical cancer patients and survivors faced. first theme: Insufficient education; subtheme 1; Inadequate knowledge on late side effects of RT, second theme: Physical burden and injury; subthemes (1) leg and back pain, (2) burns and sores on female private part (3) bleeding and fluid discharge from the private part.

The most prominent subtheme was inadequate knowledge of the late side effects of RT, almost all the participants experienced it. Similarly, studies conducted by<sup>35</sup> and<sup>36</sup> reported that cancer survivors claimed to have received little information about the potential side effects of cancer treatment. Survivors wanted more information about the treatment impact, psychological assistance, which bodily changes they could expect after cancer treatment. They also wanted to know how to adjust to life after cancer.

Other challenges discovered were leg and back pain, burns and sores, bleeding, and fluid discharge from the private part. These findings are not surprising because radiation treatment has been reported to have several late side effects among cancer patients and survivors. The symptoms of pain in the legs may be associated with peripheral neuropathy due to radiation in the pelvic area.<sup>37</sup> In addition, there could be delayed local damage to mature nerve tissues, causing microvascular injury and fibrosis due to radiation.<sup>6,37,38</sup> The challenges such as bleeding from the vagina and inadequate knowledge of the late side effects of RT may also have been contributing to high levels of anxiety.<sup>39,40</sup>

### Strengths of the Study

The sample size from the quantitative and qualitative were both reached and the sample included women from different cultural and geographical backgrounds, economic, marital and educational status, date of when the last RT was received. Therefore, the sample may have provided sufficient power to detect statistically significant associations and narratives by the participants.

Data collection was done with the help of the nurse research assistants who were trained in the data collection process and were asked to be polite and maintain an increased level of confidentiality of the information given to them, thus participants were free to give their responses without fear of victimization. A psychiatrist who was able to meet the needs of the participants was made available.

The objectives of the study were achieved even though the study was conducted during the time of Covid-19 when people had restrictions from accessing health facilities. The levels of SA and

factors that affected these levels were identified. The coping strategies utilized by CaCxPS and the challenges they faced as a result of LSERT were also identified.

### Limitations of the Study

The study was limited to women who had received RT only thus, a study should be conducted on women who were treated with chemotherapy and surgery for cervical cancer as this may help discover the psychological effects of other treatment modalities. Radiotherapy was perceived to cause worse side effects compared to other treatment modalities during the conception of this study hence, the reason why the study was limited to women who received RT. The data collection process was conducted when the COVID-19 pandemic was at its peak and most patients were restricted from accessing the hospital facility during this time. The restriction was one of the measures to prevent or minimize the spread of the virus. Hence, the accessible population was limited thus, data was collected for three months in order to have a larger accessible population.

### Conclusion

Cervical cancer patients and survivors face numerous challenges following their treatment and factors, such as age, education, number of children, marital status, income, residence, family and the presence or absence of a partner influence their levels of stress and anxiety. Conditions such as SA may be a normal reaction among cancer patients and survivors but can have serious effects if left untreated. The study concludes that counseling, support groups, and other forms of emotional support can help CaCxPS cope with the physical and emotional challenges due to the LSERT as coping with SA among CaCxPS is very vital in the recovery from cancer and its treatment. Hence, healthcare workers need to engage cancer patients and survivors in their care so that they identify individualized clients' needs and make personalized plans based on individual needs. There is a need for advice on how to deal with specific side effects of RT that CaCxPS may experience as well as complete disclosure of the long-term negative effects of radiation therapy.

### Implications of Findings to the Health Care System

#### Nursing practice

Stress and anxiety are common among CaCxPS undergoing RT, and can affect their physical, psychological, social, sexual, emotional, and spiritual well-being. Nurses should be aware of these impacts and provide counseling and support to help CaCxPS cope.

#### Nursing administration

The study found that most CaCxPS were not fully educated about LSERT, which may have contributed to their psychological distress. Appropriate IEC and counseling should be provided to ensure that CaCxPS have the information and support they need.

### Nursing education

The study found that inadequate education about LSERT and lack of knowledge among healthcare providers may have contributed to high levels of anxiety among CaCxPS. Nursing school curricula in Zambia should include oncology nursing and psychosocial counseling in the management of CaCxPS treated with RT to address these needs.

### Nursing research

Some women in this study were hesitant to discuss sexual challenges, so further research is needed to better understand the sexual challenges faced by CaCxPS and their spouses. A larger study would also allow for more precise conclusions and generalizations.

### Recommendations

1. The Ministry of Health (MoH) should incorporate clinical psychologists as members of the multidisciplinary team in the care of women at CDH. This will also help health workers identify the psychological needs of CaCxPS who are experiencing LSERT. MoH should also formulate policies to incorporate pelvic floor physical therapy in the continuity care of CaCxPS.
2. The present study revealed that age had a statistically significant effect on having high levels of SA. Therefore, CDH should give Information, education and communication (IEC) to women who are still of childbearing age that there is a chance of conceiving after cervical cancer. This may reduce their anxiety and stress as this may give them hope for being mothers again.
3. Families and friends should be involved in the continued care of CaCxPS. In addition, patient support groups comprising members with similar or previously had the condition should be created as this may benefit CaCxPS. This is in view that they may teach each other some coping strategies and good health-seeking behaviors.

### Acknowledgements

My supervisors, Professor Katowa-Mukwato Patricia and Mrs Victoria Mwiinga Kalusopa for their guidance and support, without which, I would have not succeeded with this study.

My sponsor, South Valley University for enabling me to undertake the studies for Master of Science in Clinical Nursing at the School of Nursing Sciences

### Conflict of Interest

The authors declare no conflict of interest regarding the publication of this article.

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## Appendices

### Appendix i: data collection tool for quantitative data

#### Semi structured questionnaire

Stress, anxiety, and coping with late side effects of radiation therapy by cervical cancer patients and survivors receiving care at cancer diseases hospital-Lusaka Zambia

#### Questionnaire number

Date of interview.....

Place of interview.....

Name of interviewer.....

#### Instructions for the interviewer

1. Introduce yourself to the respondent and explain the reason for the interview.
2. Assure the respondent of confidentiality and anonymity
3. Do not write the name of the respondent on the interview schedule
4. Fill in the most appropriate response to the question on the space provided.
5. Tick [ ] in the box next to the chosen response, for questions with alternatives.
6. Provide time for the respondent to ask questions at the end of the interview.
7. Thank the respondent at the end of each interview.
8. Keep the questionnaire safe

#### Section A: demographic factors

1. How old were you at your last birthday

.....

2. What is your level of Education

i. No formal education [ ]

ii. Primary [ ]

iii. Secondary [ ]

iv. Tertiary [ ]

3. Marital status

i. Single [ ]

ii. Married [ ]

iii. Widowed [ ]

iv. Divorced [ ]

4. Number of children.....

5. Where do you reside? .....

6. What is your occupation? .....

7. What is your level of income
- i. Less than K5000 [ ]
- ii. More than K5000 [ ]
8. Would you say you receive enough support from friends and relatives
- i. Yes [ ]
- ii. No [ ]
9. When did you receive your last radiotherapy dose?

## Section B

### Measurement of Stress using the Perceived Stress Scale (PSS)

The questions in this scale ask you about your feelings and thoughts during the last month. In each case, you will be asked to indicate by circling a number indicating how often you felt or thought in a certain way.

Serial number.....Date.....

Age.....

**0 = Never    1 = Almost Never    2 = Sometimes    3 = Fairly Often    4 = Very Often**

1. In the last month, how often have you been upset because of something that happened unexpectedly.....**0    1    2    3    4**
2. In the last month, how often have you felt that you were unable to control the important things in your life? .....**0    1    2    3    4**
3. In the last month, how often have you felt nervous and "stressed"? ..... **0    1    2    3    4**
4. In the last month, how often have you felt confident about your ability to handle your personal problems? ..... **0    1    2    3    4**
5. In the last month, how often have you felt that things were going your way?..... **0    1    2    3    4**
6. In the last month, how often have you found that you could not cope with all the things that you had to do? .....**0    1    2    3    4**
7. In the last month, how often have you been able to control irritations in your life?.....**0    1    2    3    4**
8. In the last month, how often have you felt that you were on top of things?.. ..... **0    1    2    3    4**
9. In the last month, how often have you been angered because of things that were outside of your control?..... **0    1    2    3    4**
10. In the last month, how often have you felt difficulties were piling up so high that you could not overcome them? ..... **0    1    2    3    4**

**Section C****Measurement of anxiety using the State Trait Anxiety Inventory (STAI 20)**

Read each statement and select the appropriate response to indicate how you feel right now by circling a number that represents how you are feeling. There are no right or wrong answers. Do not spend too much time on any one statement but give the answer which seems to describe your present feelings best.

Where <b>1 = Not at all</b>	<b>2 = A little</b>	<b>3 = Somewhat</b>	<b>4 = Very Much So</b>			
1. I feel calm			1	2	3	4
2. I feel secure			1	2	3	4
3. I feel tense			1	2	3	4
4. I feel strained			1	2	3	4
5. I feel at ease			1	2	3	4
6. I feel upset			1	2	3	4
7. I am presently worrying over possible misfortunes			1	2	3	4
8. I feel satisfied			1	2	3	4
9. I feel frightened			1	2	3	4
10. I feel uncomfortable			1	2	3	4
11. I feel self confident			1	2	3	4
12. I feel nervous			1	2	3	4
13. I feel jittery			1	2	3	4
14. I feel indecisive			1	2	3	4
15. I am relaxed			1	2	3	4
16. I feel content			1	2	3	4
17. I am worried			1	2	3	4
18. I feel confused			1	2	3	4
19. I feel steady			1	2	3	4
20. I feel pleasant			1	2	3	4

**Appendix ii: data collection tool for qualitative data****Semi-structured interview schedule****Research topic**

**Stress, anxiety, and coping with late side effects of radiation therapy by cervical cancer patients and survivors receiving care at cancer diseases hospital-Lusaka Zambia**

**questionnaire number**

**Date of interview**.....

**Place of interview**.....

**Name of interviewer**.....

Instructions for the interviewer

1. Introduce yourself to the respondent and explain the reason for the interview.
2. Assure the respondent of confidentiality and anonymity
3. Do not write the name of the respondent on the interview schedule
4. Fill in the most appropriate response to the question on the space provided.
5. Tick [ ] in the box next to the chosen response, for questions with alternatives.
6. Write the response for section B in the spaces provided, or use a tape recorder that will be provided to record the responses.
7. Provide time for the respondent to ask questions at the end of the interview.
8. Thank the respondent at the end of each interview.
9. Keep the questionnaire safe

#### Section a: Demographic factors

1. How old were you at your last birthday.....
2. What is your level of Education
  - i. No formal education [ ]
  - ii. Primary [ ]
  - iii. Secondary [ ]
  - iv. Tertiary [ ]
3. Marital status
  - i. Single [ ]
  - ii. Married
  - iii. Widowed [ ]
  - iv. Divorced [ ]
4. Do you have children.....if **No** skip question 5
  - i. Yes [ ]
  - ii. No [ ]
5. Number of children.....
6. Where is your residence? .....
7. What is your occupation? .....
8. What is your level of income
  - i. Less than K5000 [ ]
  - ii. More than K5000 [ ]
10. Would you say you receive enough support from friends and relatives
  - i. Yes [ ]
  - ii. No [ ]
11. When did you receive your last radiotherapy dose?

**Section b: coping strategies inquiry**

1. What problems are you experiencing that were caused by the cervical cancer treatment you received?
2. What is the most uncomfortable side effect did you experience, is still there?
3. At what point did you start experiencing the side effects?
4. What do you do to cope with the problems you are experiencing right now?
5. What do you think about yourself now?
6. How has the problems you are experiencing affected your social life?
7. What do you think is giving you hope to keep up with problems you are experiencing?
8. Do you think you are receiving enough help from this hospital during your review time by the health works, what do you think can further be done to help you.
9. Did you receive any information about radiation therapy YES or NO. If yes what was the source of the information?
10. What information did you have about side effects of radiation therapy before you started receiving it?
11. How do you think you would have handled the side effects if you had prior-knowledge on the late side effects of radiation therapy?