Journal of Advances in Medicine and Medical Research

33(16): 92-102, 2021; Article no.JAMMR.71247
ISSN: 2456-8899
(Past name: British Journal of Medicine and Medical Research, Past ISSN: 2231-0614, NLM ID: 101570965)

Health Related Quality of Life and its Determinants in Cancer Patients in a Low-resource Setting

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Authors' contributions

All authors made significant contribution to this work. Authors TCO and IOO, conceived the study while all authors approved the design and supervised data collection. Data analysis was by authors UO and TCO. Draft manuscript was written by authors TCO, UNI and UO while all authors approved the final draft. Author UNI was responsible for language and technical editing. Financial outlay was borne by all authors while author IOO is the guarantor of the manuscript. All authors read and approved the final manuscript.

Article Information

DOI: 10.9734/JAMMR/2021/v33i1631005
Editor(s):
(1) Dr. Syed Faisal Zaidi, King Saud Bin Abdulaziz University for Health Sciences, Saudi Arabia.
Reviewers:
(1) Syed Aziz Rasool, Shaheed Zulfikar Ali Bhutto Institute of Science & Technology, Pakistan.
(2) Masoga Sylven, University of Limpopo; South Africa.
Complete Peer review History: https://www.sdiarticle4.com/review-history/71247

Original Research Article

Received 10 May 2021
Accepted 15 July 2021
Published 16 July 2021

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ABSTRACT

Objectives: This study investigated the health-related quality of life (QoL) in patients with various cancers attending cancer clinics at a tertiary hospital in South-East Nigeria and also determined the predictors of the various domain of QoL in these patients.
Methods: This was a cross-sectional, descriptive study conducted among 104 participants. The WHO QoL questionnaire–short version was administered to patients with various cancer types. Analysis of Variance was used to compare the domains of quality of life among the various cancer types. The Independent t-test was used to compare socio-demographic variables of gender and quality of life across the domains and multiple linear regression analysis was used to further test if identified socio-demographic and clinical characteristics significantly predicted quality of life in all four domains.
Results: Of the 104 participants analysed, there was no significant association between individual cancers and overall quality of life (p = 0.67), and with individual cancers and satisfaction with health (p = 0.13). Occupation (p = 0.019), and the number of hospitalizations (p = 0.016) in the psychological domain; occupation (p = 0.032) and co-morbidities (p = 0.004) in the physical domain; age (p = 0.003) in the social domain, and level of education (p = 0.002) in the environmental domain predicted QoL in these patients.
Conclusion: Socio-demographic variables of age, number of hospitalizations, presence of comorbidities, education and occupation were significant predictors of QoL among cancer patients in this study. However, there was no association between cancer types and quality of life.

Keywords: Quality of life; cancer; WHOQoL-BREF; Nigeria.

1. INTRODUCTION

Chronic non-communicable diseases (NCDs) such as cancer, diabetes mellitus (DM) and hypertension have become significant causes of morbidity and mortality in sub-Saharan Africa [1]. Globally, cancer has become one of the leading causes of death and accounted for about 10 million deaths in 2020 [2]. The burden of cancer mortality is higher in low-and middle-income countries (LMICs) than in high-income countries (HICs) [3], and as high as 70% of cancer deaths occurs in LMICs [4]. According to WHO, the commonest cancers in 2020 were: breast (2.26 million cases); lung (2.21 million cases); colon and rectum (1.93 million cases); prostate (1.41 million cases); skin (non-melanoma) (1.20 million cases); and stomach (1.09 million cases). Deaths due to cancers in 2020 were from the following organs: lung (1.80 million deaths); colon and rectum (935 000 deaths); liver (830 000 deaths); stomach (769 000 deaths); and breast (685 000 deaths) [2].

Quality of life is an important aspect of life in persons with chronic diseases. It is defined by WHO as an individual's perception of their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards and concerns [5]. It predicts how well an individual would be able to handle his disease and maintain his long-term health and well-being vis-à-vis his/her disease condition and available treatment. The QoL of cancer patients is affected by their symptoms necessitating interventions for effective management towards control over their illness and treatment with the expected improvement of QoL. Health-related quality of life (HRQoL) refers to the physical, psychological and social domains of health that are affected by a person's experiences, beliefs, expectations and perceptions [6]. It has been utilized in the understanding of the physical, emotional and social impacts of chronic diseases such as cancer in order to improve on patient care. It is assumed that with assessment of HRQoL in patients with chronic diseases, subsequent knowledge obtained can inform treatment strategies that may result in fewer office visits or hospitalizations for such patients as well as reduced financial commitments [7, 8]. In addition, an understanding of the effects of this disease condition on HRQoL will assist in the formulation of health policies and strategies that will result in better health outcomes for cancer patients.

Cancer patients have lower QoL as a result of their illness [9]. The negative impact of cancer on quality of life for long-term survivors has been described by Zebrack et al in Austria [10]. This was linked to poor physical and mental health functioning. In another study, Gangane et al

[11], found that young age, low social, educational, financial and environmental supports were associated with negative health related quality of life (HRQoL) in Indian women with breast cancer.

Studies in Africa have looked at QoL in individual cancers and documented varying levels of quality of life [12, 13]. In Nigeria, a similar study using WHOQoL-BREF noted that QoL was negatively affected by male gender, older age, presence of depression, advanced stage of cancer and pain [14].

Many instruments are available to assess the QoL of cancer patients including WHOQOL-100, and its shortened form WHOQOL-BREF, the Short Form 36 (SF-36), European Organisation for the Research and Treatment of Cancer, QLQ-C30 (EORTC QLQ-C30), Functional Assessment of Cancer Therapy, (FACT-G), Visual Analogue Scale-Cancer (VAS-C), Profile of Mood States (POMS) and Rotterdam Symptom Checklist (RSCL). The WHOQOL-BREF is a questionnaire comprising 26 questions on the individual's perceptions of their health and well-being over the previous two weeks. The WHOQOL-BREF covers four domains each with specific facets viz: Physical health, Psychological, Social relationships and Environment [15].

The WHOQOL-BREF is a popular method for evaluating the QoL of cancer patients and has been validated for use in Nigeria [16]. Studies on the QoL in cancer patients in Nigeria and especially in the South East region are scarce and the predictors of the QoL of such patients have not been determined. We therefore set out to study the health related QoL in patients with various cancers and to determine the predictors of the various domains of QoL in these patients.

2. MATERIALS AND METHODS

2.1 Study Design

This was a questionnaire-based, cross-sectional, descriptive study conducted between November 2017 and March 2018. The study was approved by the Hospital Research and Ethics Committee (UNTH/CSA/329/Vol.5.NHREC/05/01/2008B).

2.2 Study Location

The study was conducted in the Oncology, Urology, Pain and Palliative Care and the Gastroenterology out-patient Departments (OPDs) of the University of Nigeria Teaching Hospital, Ituku-Ozalla, Enugu.

2.3 Sampling Method

The participants were selected by convenience sampling method if they met the inclusion criteria of being 18 years and older, had a histological diagnosis of cancer and attended any of the aforementioned outpatient clinics. Inpatients and children were excluded from the study and patients were excluded if they declined participation or had a mental or physical condition that precluded them from responding to questions asked. The details of sample selection process are shown in figure below:

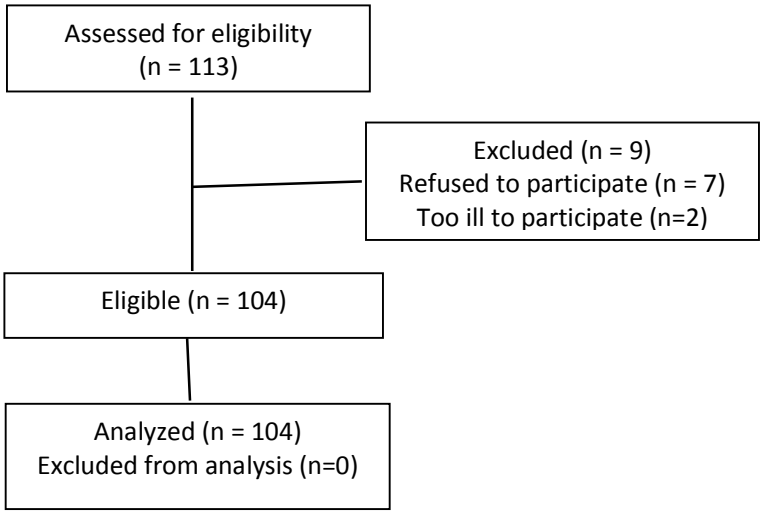

Fig. 1. Sample selection process

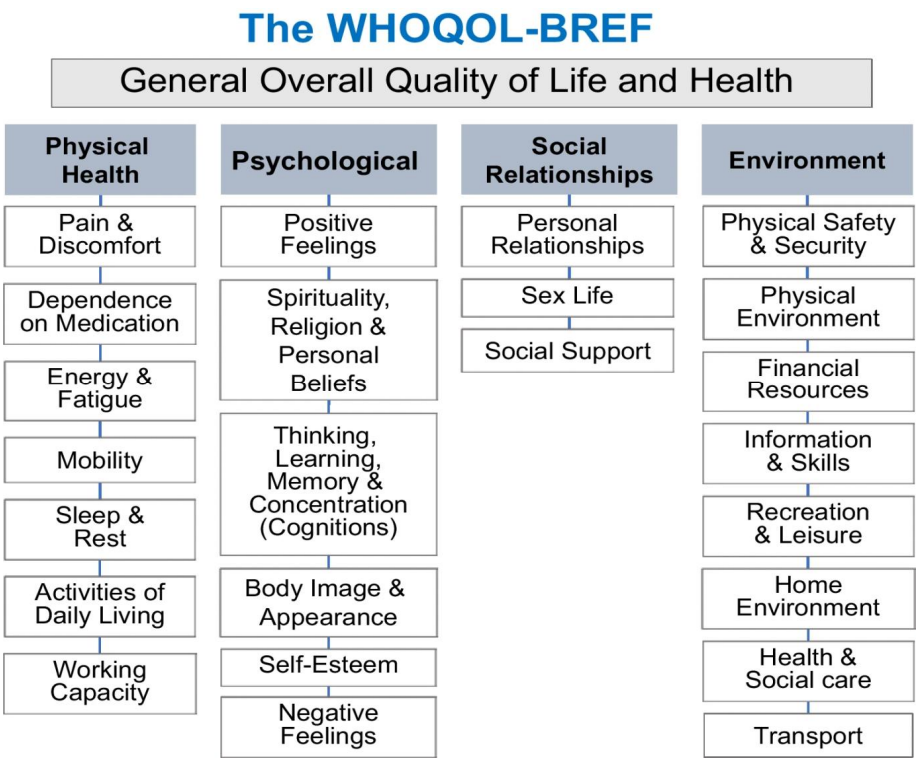

Fig. 2. Structure of the WHOQoL-BREF (Gartland, Long & Skevington 2019)

2.4 Study Instrument

The WHOQOL-BREF is a shorter version of the WHOQOL-100. Both were developed by the World Health Organisation (WHO). WHOQOL-BREF is a self-report questionnaire comprising 26 questions on the individual's perceptions of their health and well-being over the previous two weeks. It addresses four QOL domains: physical health (7 items relating to pain, energy and fatigue, sleep and daily activities), psychological health (6 items relating to self-esteem, body image, positive and negative feelings and religious beliefs), social relationships (3 items relating to social support, sexuality and interpersonal relationships), and environment (8 items relating to home and physical environment, security, finances and leisure). Fig. 2. The mean score of items within each domain is used to calculate the domain score. Mean scores are then multiplied by 4 to make domain scores comparable with the scores used in the WHOQOL-100.

2.5 Study Protocol

Adult patients with different stages of cancer were informed about the purpose and nature of the study as well as the right to withdraw at any point in the study without any implications to their clinical care. They were also informed that their responses would remain confidential.

After giving written informed consent, trained research assistants administered a demographics questionnaire to obtain socio-demographic data of age, gender, marital status, occupation, religion, level of education and income per month. Additional information obtained were family history of cancer, presence of co-morbidities and type of medical insurance cover. Some of this information was extracted from the patients' medical records. Subsequently, the WHOQOL-BREF questionnaire was administered by trained research assistants. Domain scores were multiplied by 4 to scale the mean scores to the standard WHOQOL-100. A mean score of 78 or greater in the WHOQol –BREF indicated a good quality of life, a mean score of 50-77 was regarded as moderate while a mean score lower than 50 was adjudged as poor QoL.

2.6 Data Analysis

Data were entered into IBM Statistical Package for Social Sciences (SPSS) version 22 (IBM

Corp., Amonk, NY) and analysed. Descriptive statistics were used to compute frequencies, percentages, ranges, means and standard deviations (±SD). Raw scores obtained from the WHOQoL-BREF evaluation were converted to transformed scores ranging from 1 to 100 which were used for statistical analyses in all domains. Analysis of Variance (ANOVA) was used to compare the QoL among the various cancer types. Also, an independent t-test was conducted to compare the socio-demographic variable of gender and the QoL across the domains. Multiple linear regression analysis was used to determine the predictors of HRQoL domains. A p-valve = 0.05 was considered statistically significant for this study.

3. RESULTS

3.1 Sociodemographic/Clinical Data of Respondents

There were 104 study participants comprising 29 (27.88%) males and 75 (72.1%) females with a male-female ratio of 1:2.6. Breast cancer was the commonest cancer 56 (53.8%), followed by prostate cancer, reproductive cancers and gastrointestinal cancers each accounting for 10 (0.96%). The majority of the participants were married (83.7%) and the predominant occupation was trading (58.7%). Forty-six patients (44.2%) had a minimum of secondary school education while seventy-four patients (71.2%) earned less than ten thousand nairas (twenty-seven dollars) per month and had an average of five dependents (mean = 4.8±3.6). The majority of participants had a positive family history of cancer (97.1%), and co-morbidities (83.7%). Only four (3.8%) had public health insurance coverage.

With regards to the socio-demographics and the quality of life domains, Table 1 shows that the type of occupation was significantly associated with psychological (p=0.02), physical (p<0.001) and social (p=0.05) domains of quality of life. Bonferroni post hoc analysis shows that professionals with cancer had significantly lower score in the psychological and physical domains of quality of life when compared with other types of occupation. Similarly, the level of education was significantly associated with environmental domain of quality life in patients with cancer (p=0.003). Post-hoc analysis shows that cancer patients with primary level of education had significantly lower quality of life in the environmental domain when compared with those with no, secondary or tertiary education. In addition, the presence of comorbidities was significantly associated with lower scores in the psychological domain of the quality of life (p=0.004). The rest of the sociodemographic characteristics are shown in Table 1.

3.2 Relationship between Cancer Types and HRQoL

Table 2 shows the QoL in the different domains of various cancer types. The highest mean scores of 79.2, 79.2 and 87.5 were recorded with reproductive cancers, respiratory cancers, and sarcoma respectively in the psychological domain, but these did not show any statistically significant difference (p = 0.88). The mean scores in the physical domain were the lowest for all cancers but this association was not statistically significant. Prostate cancer had the lowest mean scores in all domains except for the social relationship domain (mean = 74.2 ± 16.8) but it was not statistically significant (p = 0.88). Although sarcoma had the highest mean scores in all domains except for the physical domain (mean = 67.9 ± 0.00), suggesting a better QoL in those domains than for other cancer types, this association was not statistically significant. Patients with different cancer types were similar in their overall quality of life (p=0.67) and satisfaction with life (p=0.13) (Table 2).

3.3 Potential Predictors of Quality of Life among Cancer Patients

Table 3 shows the socio-demographic and clinical predictors of the various domains of quality of life using multivariate linear stepwise regression analysis. The table shows that occupational status was a significant predictor of both psychological and physical domains of quality, higher number of hospitalizations is a significant predictor of lower quality of life in the psychological health domain (β=-0.22, t=-2.38, p=0.006, R2=0.095), presence of comorbidities was a significant predictor of lower scores in the physical domain (β=-0.28, t=-2.95, p=0.004, R2=0.101), whereas age and level of education were significant predictors of social and environmental domains, respectively.

Table 1. Socio- Demographics and Mean of Different Domains of QoL

Variables	N (%)	Psychological Health Mean (±SD)	Physical Health Mean (±SD)	Social Relationships Mean (±SD)	Environment Mean (±SD)
Age Group					
18-25	2 (1.9)	73.2 ± 7.6	79.2 ± 5.9	62.5 ± 29.5	75.0 ± 17.7
26-35	11 (10.6)	64.6 ± 10.2	78.8 ± 11.4	63.6 ± 19.8	70.2 ± 6.0
36-45	29 (27.9)	66.3 ± 13.5	77.3 ± 12.3	66.7 ± 15.4	71.2 ± 14.7
46-55	25 (24.0)	64.0 ± 12.2	77.0 ± 14.2	70.3 ± 12.7	71.0 ± 10.4
56-65	18 (17.3)	61.1 ± 16.2	75.9 ± 15.2	75.0 ± 14.9	68.1 ± 14.0
>65	19 (18.3)	59.8 ± 15.5	73.5 ± 16.2	76.8 ± 15.9	64.3 ± 15.4
		F-stat = 0.8, p= 0.53	F-stat= 0.3, p = 0.92	F-stat= 1.8, p= 0.12	F-stat = 0.9, p= 0.50
Gender					
Male	29 (27.9)	63.7 ± 16.1	74.6 ± 15.7	72.4 ± 15.1	69.3 ± 16.2
Female	75 (72.1)	63.6 ± 12.8	77.2 ± 12.9	69.7 ± 16.1	69.3 ± 11.8
		t-stat = 0.8, p= 0.97	t-stat= 0.8, p= 0.38	t-stat= 0.8, p= 0.43	t-stat= 0.8, p= 0.99
Marital Status					
Single	13 (12.5)	61.0 ± 12.2	74.0 ± 9.3	66.0 ± 18.8	70.9 ± 10.5
Married	87 (83.7)	64.0 ± 14.2	76.7 ± 14.3	70.9 ± 15.2	69.3 ± 13.6
Divorced	1 (1.0)	71.4±0.0	75.0 ± 0.0	58.3 ± 0.0	75.0 ± 0.0
Separated	0 (0.0)	0.0 ± 0.0	0.0 ± 0.0	0.0 ± 0.0	0.0 ± 0.0
Widowed	3 (2.9)	60.7 ± 3.6	81.9 ± 14.6	80.6 ± 21.0	60.4 ± 13.1
		F-stat= 1.4, p= 0.81	F-stat= 0.3, p= 0.83	F-stat= 1.0, p= 0.41	F-stat= 0.6, p = 0.63
Occupation					
Trader/artisan	61(58.7)	66.5 ± 11.8	79.2 ± 12.5	70.5 ± 15.3	69.2 ± 12.6
Housewife	4 (3.8)	55.4 ± 14.4	74.0 ± 7.9	85.4 ± 14.2	75.8 ± 15.8
Student	5 (4.8)	65.7 ± 10.3	76.7 ± 4.8	56.7 ± 17.1	71.3 ± 10.2
Professional	3 (2.9)	36.9 ± 9.0	44.4 ± 19.2	58.3 ± 8.3	58.3 ± 1.8
Others	31 (29.8)	61.3 ± 15.0	74.6 ± 13.3	71.7 ± 15.8	69.5 ± 13.1
		F-stat = 4.7, p= 0.02*	F-stat= 5.8, p<.001*	F-stat= 2.5, p= 0.05	F-stat= 0.8, p= 0.53

Variables	N (%)	Psychological Health Mean (±SD)	Physical Health Mean (±SD)	Social Relationships Mean (±SD)	Environment Mean (±SD)
Level of education					
None	4	64.3 ± 10.5	77.1 ± 13.8	77.1 ± 13.8	71.1 ± 10.0
Primary	33	62.2 ± 14.9	76.1 ± 12.4	76.1 ± 12.4	62.9 ± 11.4
Secondary	46	64.3 ± 10.8	77.4 ± 13.6	77.4 ± 13.6	70.9 ± 12.1
Tertiary	21	64.1 ± 16.8	75.0 ± 16.5	75.0 ± 16.5	75.4 ± 14.9
		F-stat= 0.2, p= 0.93	F-stat= 0.2, p= 0.93	F-stat= 0.7, p= 0.57	F-stat= 4.9, p= 0.003*
Presence of co-morbidities					
Yes	17(16.3)	67.9 ± 16.8	58.0 ± 18.3	70.0 ± 17.7	65.3 ± 18.1
No	87(83.7)	78.2 ± 12.5	64.7 ± 12.5	70.5 ± 15.6	70.1 ± 11.8
		t-stat= 2.9, p= 0.004*	t-stat=1.9, p= 0.07	t-stat= 0.1, p= 0.93	t-stat=1.4, p= 0.16

**Statistically significant p-value*

Table 2. Association between cancer types and the domains of quality of life

Cancer type	Physical Domain Mean ± SD	Psychological Domain Mean ± SD	Social relationship Domain Mean ± SD	Environment Domain Mean ± SD	Satisfaction With Health Mean ± SD	Overall quality of life Mean ± SD
Breast	77.6 ± 12.5	64.5 ± 11.5	69.6 ± 13.8	70.6 ± 15.8	4.04**±** 0.54	3.85 **±** 0.87
Prostate	65.8 ± 17.1	56.8 ± 15.8	74.2 ± 16.8	63.4 ± 12.4	4.20 **±** 0.63	3.10 **±** 1.29
Blood	72.2 ± 21.0	61.3 ± 29.1	63.9 ± 19.0	64.6 ± 18.5	3.83 **±** 1.17	3.67 **±** 0.82)
Reproductive	79.2 ± 10.4	63.9 ± 11.8	70.8 ± 17.2	65.9 ± 19.6	4.00 **±** 0.47	4.30 **±** 0.48
Skin	76.7 ± 4.75	64.3 ± 11.0	75.0 ± 8.10	72.5 ± 7.72	4.00 **±** 0.00	4.00 **±** 0.00
GIT	77.5 ± 17.9	64.6 ± 15.6	68.3 ± 16.7	70.0 ± 9.98	4.10 **±** 0.32	3.90 **±** 0.74
Respiratory	79.2 ± 10.2	66.1 ± 15.4	72.2 ± 17.0	71.4 ± 15.0	4.17 **±** 0.41	4.00 **±** 0.00
Sarcoma	87.5 ±0.00	67.9 ± 0.00	83.3 ± 8.60	81.3 ± 9.60	5.00 **±** 0.00	4.00 **±** 0.00
	F-stat= 0.44, p= 0.88	**F-stat= 1.19, p= 0.32**	**F-stat= 0.43, p= 0.88**	**F-stat= 0.74, p= 0.64**	**F-stat= 0.70, p= 0.67**	**F-stat= 1.67, p= 0.13**

Table 3. **Multiple regression analysis of socio-demographic and clinical predictors of quality of life in all four domains of WHOQoL-BREF**

Dependent variable	Significant predictors	Standardized β - coefficient	t-stat value	*p*-value	R^2	Variance (R^2 %)
Total Psychological Health Domain score	Occupation	-0.22	-2.38	0.019*	0.035	3.5
	No. of hospitalizations	-0.26	-2.80	0.006*	0.095	9.5
Total Physical Health Domain score	Occupation	-0.20	-2.18	0.032*	0.034	3.4
	Presence of Co-morbidities	-0.28	-2.95	0.004*	0.101	10.1
Total Social Health Domain score	Age of participants	0.29	3.03	0.003*	0.074	7.4
Total Environmental Health Doman score	Level of education	0.30	3.18	0.002*	0.081	8.1

**Statistically significant p-value, R^2 = Coefficient of multiple determination*

4. DISCUSSION

The main finding in this study is that quality of life was moderate and similar across cancer types as the overall QoL of respondents was higher than the average mean score of 50. The QoL of cancer patients can be affected by several factors including treatment types and disease stage [17]. Quality of life is known to differ even among patients with the same health status but this was not borne out in this study. It can be concluded that the relatively good QoL of patients in this study may be related to the quality of service offered by the oncology centre of the hospital. It has been documented that cancer patients that adhered to established lifestyle modifications programs recommended by their oncology physicians have improved health-related QoL when compared with non-adherents [18]. The Oncology centre of the study site has a Palliative Care practice to which patients are referred and this may have contributed to the above-average QoL scores seen. Palliative care is helpful as it takes care of psychological, physical and spiritual aspects of the disease that are commonly neglected in the course of active or aggressive cancer treatment. Palliative care has also been shown to reduce symptom burden, thus improving the quality of life and satisfaction with care received by cancer patients, especially when integrated at the onset of medical treatment [19, 20].

Another explanation for the moderately good means scores obtained is the 'disability paradox' [21] which is an adaptive process where cancer patients choose what constitutes good QoL based on their extant circumstances. The authors infer that this may be due to the resilient and highly religious nature of the Nigerian patient which will cause him or her to re-prioritize values (e.g. 'Cancer is not my portion') which leads to a re-conditioning of the mind and subsequent coping. Except for the social domain, prostate cancer patients had the lowest QoL scores in the psychological, physical and environmental domains when compared with patients with other cancer types. While this finding was not statistically significant, it is worthy of note as a recent study has shown the correlation between illness perception, QoL and psychological distress in men with an early diagnosis of prostate cancer, thus highlighting the need for therapeutic interventions to prevent psychological distress in this group of cancer patients [22].

This study was able to identify five significant socio-demographic predictors of QoL in this cohort of cancer patients. For occupation, being a trader or an artisan significantly predicted a good QoL in the physical and psychological domains while being a professional significantly predicted a poor QoL in both domains. Having a prior hospitalization predicted poor QoL for the physical domain and having no education predicted poor QoL for the environmental domain, while the presence of comorbidities was a significant predictor of poor QoL in the psychological domain. While a higher quality of life in the social domain occurred in patients younger than 25 years, and a lack of formal education was associated with a higher QoL in the environmental domain, these two socio-demographic variables of age and education have been known to have conflicting associations with QoL [23]. Awadalla et al [23] found that higher QoL scores were associated with being married, having medium skill/high skill job and having a minimum of high school education, an outcome that is at divergence with findings from this study where marital status had no influence on QoL and higher educational levels reported lower QoL. Being young was a significant predictor of a better QoL in this study and this agrees with findings by Lindskog et al [24] who found that old age negatively predicted QoL in cancer survivors.

Of the four domains of the WHOQoL-BREF, the psychological domain had the greatest number of predictors of a poor QoL. This finding may imply that respondents have some form of psychological distress, but this was not assessed in this cohort of patients. Psychological distress in the form of anxiety or depression is prevalent among cancer patients and is known to negatively affect the quality of life, treatment adherence and survival [25]. This underscores the need for assessment for psychological distress and psychiatric morbidity in cancer patients intending to provide psychological counselling. Considering that a HRQoL study of a healthy population of South-West Nigeria [26] established a mean score of 78 and more as indicative of a good quality of life, one can infer that the patients with sarcoma, respiratory cancers and reproductive system cancers in this cohort appear to have a better QoL in the psychological domain when compared to other cancer types. The results of this study have added to the growing data on predictors of HRQoL in cancer outpatients in South east Nigeria and this is expected to impact clinical

practice. These findings also support the cogency of WHOQoL-BREF as a QoL assessment tool.

5. STUDY LIMITATIONS

This is a single centre study. It will be desirable to undertake a multi-centre nationwide similar study to determine whether the results can be generalised across the country.

The small sample size for the different cancer groups may not be reflective of the prevalence of each cancer type in the study country. However, these limitations do not invalidate the results of the study.

The WHOQoL-BREF is a generic instrument used for the assessment of the quality of life and not specific for cancer types. However, this instrument is known to have adequate psychometric properties, documented among a general Nigerian population [26]. Nigeria was one of the sites for the development and field trial of the WHOQoL-BREF and the questionnaire has been cross-validated across several cultures and utilized for several disease types [16].

6. CONCLUSION

This study found a fairly good QoL across cancer types in a single centre in a low-resource setting. The findings show that the socio-demographic variables of age, number of hospitalizations, presence of comorbidities, education and occupation are significant predictors of QoL among this group of cancer patients. The study did not find any appreciable relationship between the cancer types and the overall quality of life of the respondents. These findings recommend regular assessment of patients' HRQoL and early integration of palliative care in the management of cancer patients.

CONSENT AND ETHICAL APPROVAL

The authors obtained written informed consent from the participants prior to their recruitment into the study. They also duly sought and received ethical clearance from the University of Nigeria Teaching Hospital's Health Research Ethics Committee before this study was commenced

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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