

Research Article

Assessment of Depression and Disability in Lung Cancer Patients in a Nigerian De-Addiction Unit

Lasebikan Victor Olufolahan PhD, MPH, MSc, MBCHB, FWACP

Consultation Liaison Psychiatric Unit, Department of Psychiatry, University College Hospital, Ibadan, Nigeria

Ola Bolanle Adeyemi, PhD, MSc, MBCHB, FWACP, FMCPsych

Department of Behavioural Sciences, Lagos State, University Teaching Hospital, Lagos, Nigeria

ABSTRACT

Introduction: Depression and lung cancers both independently result in disability. Depression has been documented to worsen the quality of life in patients with lung cancers and this co-morbidity could result in more disability. The relationship between depression, lung cancer and disability has only been explored in high income countries and there could be cross-cultural variation in low and middle income countries. There is a lack of data on this relationship in Nigeria.

Objectives: The objectives of this study were to determine the prevalence of depression and disability in patients with lung cancer in a teaching hospital.

Method: Eighty patients with lung cancer aged 35 to 80 years, attending a tobacco-cessation program were matched by age and gender with 80 patients without lung cancer attending the study center for simple ailments. Depression was assessed using the Mini International Neuropsychiatry Interview (MINI),

information on lung cancer was by self-report corroborated by physician written medical report, while the World Health Organization Disability Assessment Schedule 2.0 (WHODAS 2.0), was used to assess disability. All analyses were carried out using SPSS version 16.0.

Results: Fifty one percent of patients with lung cancer had depression compared to 6.3% in the matched control. Among patients with lung cancer, disability was significantly associated with depression after controlling for smoking OR = 9.1, 95% CI (2.5-28.5), and stage of lung cancer OR = 2.1, 95% CI (1-13-9.42).

Conclusion: There is a critical need to screen for and manage depression in lung cancer patients in order to reduce disability.

MeSH Headings/Keywords: Depression; Disability; Lung Cancer; Early Detection

Introduction

Both depression and lung cancer are significant public health issues. Depression is a leading cause of disease burden worldwide and lung cancer, one of the commonest cancer worldwide [1], is a leading cause of functional impairment [2] as well as psychological distress [3,4]. While depression co-occurs with many other illnesses, it is particularly important in patients with lung cancer. First, these persons are at increased risk for depression. There are evidences that shortly after diagnosis, individuals living with lung cancer develop high rates of clinically significant depression [5]. Secondly, evidence suggests that clinically significant depressive symptoms may remain after completion of treatment [5]. Thirdly, in comparison with other individuals with other types of cancer, the prevalence of depression is higher in people who have lung cancer. For example, pooled prevalence rates of depression in lung cancer in a meta-analysis ranges from 11% to 44% [6] compared to about 10 to 25% in patients with other malignancies [7]. Fourthly, depression correlates significantly with mortality in lung cancer [8].

In developed countries, certain factors have been found to be associated with depression in lung cancer. These include functional impairments [2], severe symptoms, education of the patients [5], coping style, anxiety preoccupation [9], low socioeconomic status and racial disparity [10]. Some studies have also highlighted some risk factors for lung cancer that are also risk factors for depression such as smoking [11], HIV [12]

and chronic alcohol abuse [13]. Of utmost importance is the complex relationship between depression, smoking and lung cancer. While smoking is a risk factor for depression, smoking cessation which often is a major objective in a patient with lung cancer is also a risk factor for depression [14]. Major depression is also associated with higher rates of smoking and nicotine dependence [15] and smokers are not only likely to be diagnosed as major depression, they are also more likely to report more severe symptoms and more frequent episodes of depression [16]. Research evidence in the Western World suggests that the detection rate of depression in lung cancer is low because depression is often ignored in patients with lung cancer given that it could be adduced to the normal psychological response to the illness [17]. There is a need for the more studies, particularly in developing countries where there is a lack of data.

In Nigeria, a country with a population of over 160 million people [18], there is a dearth of data on possible determinants of psychological problems in lung cancers, particularly depression. This is important given that the recognition of depression among general physicians is low [19].

Therefore, this study's objective was to determine the prevalence, and correlates of depression in patients with lung cancer in a Nigerian hospital.

Methodology

Study design and location

We compared 80 patients with lung cancer who attended

the de-addiction unit of a Nigerian Private Psychiatric Hospital between January 2009 and December 2013 for tobacco cessation.

Location of the study

The study location was at the de-addiction unit of the New World Specialist Hospital, Ibadan, Nigeria, a city with a population of about 3.5 million people [18].

The de-addiction unit attends to all patients with alcohol and drug problems. The unit runs both in-patient and out-patient services by psychiatrists who are also qualified addiction specialists. In addition, there are other departments, including a walk-in clinic, the general out-patient unit (GPU) where patients with simple ailments are attended to. The GPU is a walk in clinic and the first port of call for all patients attending the hospital. In this unit, patients with simple ailments are attended to, while those who require specialists' attention are referred to various specialized departments.

Sample Size Determination

We utilized a total sampling method for all patients that were in treatment for tobacco cessation with self-reports of lung cancer, supplemented by physician written medical reports, confirming the diagnosis and stating the stage of the disease.

Inclusion Criteria

We recruited 80 patients as cases and control, respectively; and they were matched for age and sex. Inclusion criteria were: 1) Participants are on tobacco cessation program and have been abstinent for at least 6 months; 2) Diagnosis of lung cancer by self-reports, supplemented with reports of radiological investigations, sputum cytology or lung biopsy and physician's report; 3) receiving chemotherapy for stage II, III, or IV non-small cell lung cancer; 4) 18-70 years of age; 5) able to understand, speak, and read English, 6) no history of other cancers; 7) Absence of an additional severe general medical condition 8) and able to provide informed consent.

Exclusion Criteria were 1) Failure to obtain consent; 2) Presence of any additional DSM IV axis I disorder; 3) Presence of any other severe general medical condition; 4) Inability to participate because of severity of illness; 5) Inability to corroborate self-report of lung cancer with reports of radiological investigations, sputum cytology or lung biopsy and physician's report.

Sampling method / procedure

Study eligibility was determined via consultation with clinical team in Oncology. Potential participants were approached during a routine outpatient visit and had the study protocol explained. Those eligible and interested provided written informed consent. Participants were given tallies for the ease of identification and were interviewed confidentially after being attended by their primary physicians. Efforts were made to ensure that the research protocol did not interfere with their medical care. Data on patients with lung cancer were collected which included sociodemographic information, clinical history of patients and stage of the disease.

Measures

- 1. Sociodemographic Questionnaire:** We collected information on the age, gender, marital status, highest level of education, religion, employment status, ethnicity, duration of illness, type of treatment (medications and or chemotherapy or radiotherapy), cost of care in a 28 day period.
- 2. The Mini International Neuropsychiatry Interview (MINI):** We obtained the prevalence of depression using the MINI International Neuropsychiatry Interview (MINI). The MINI was also used to obtain both lifetime and 12-month history of smoking. The MINI is a brief structured interview that generates Axis I psychiatric diagnoses DSM-IV and ICD10 criteria [20,21]. The MINI has cross cultural validity and has been used in several studies in Nigeria.
- 3. World Health Organization Disability Assessment Schedule 2.0 (WHODAS 2.0):** Disability was assessed using the 12 item World Health Organization Disability Assessment Schedule. This instrument has been used in several studies in Nigeria and is also applicable in non-mental health setting. Each question of the WHO-DAS 2.0 is usually rated from 1 to 5. No difficulty (1), mild difficulty (2), moderate difficulty (3), severe difficulty (4), extreme difficulty (5). We used the simple scoring method in this study in which scores ranging from 1 to 5 were assigned to each item and computed by simple addition. The degree of disability was obtained by simple sum of the items in each domain.

Ethical Consideration

We obtained ethical approval for the study from the Ethical Review Committee of the Oyo State Ministry of Health in accordance with the ethical standards laid down in the 1964 Declaration of Helsinki and its later amendments. Respondents who had depression and consented were referred for further evaluation and treatment.

Pilot Study

A pilot study was carried out among 30 patients attending the chest unit of the medical outpatients department of the State Hospital Ibadan prior to the commencement of the study. During this pilot study, we determined the inter-rater reliability of the interviewers, possible clinical dilemma of the research work could pose and administration time of all research instruments. All interviewers had significant inter-rater reliability, $r = 0.85-0.93$.

Statistical analysis

Data were cleaned and serialized, and descriptive statistics such as means, frequency tables and standard deviations were generated. The hand-scoring method was used to compute the WHODAS scores. Both parametric and non-parametric approaches were used to analyze the WHODAS scores. The Mann-Whitney U test and the independent t test/ANOVA were used to compare the median and the mean WHODAS scores respectively. Post hoc multiple pairwise comparisons were also carried out for exploration of significant associations after the ANOVA. The MCNemar test was used in comparing

sociodemographic data and disability scores between the lung cancer group and the control group, while the Chi square statistics were used to analyze the clinical correlates of patients in the lung cancer group. In order to determine the effects of multiple confounding variables on disability in lung cancer, a multivariate analysis were carried using binary logistic regression analysis.

All analyses were set at 95% CI, $p < 0.05$ and were carried out using (SPSS version 16.0) [22].

Results

The results show that the two groups were well matched in all demographic characteristics except for the employment status, where patients with lung cancer were significantly less likely to be in employment, $p < 0.01$. Among patients with lung cancer, prevalence of depression was 51.3% and 6.3% among the control group, $p < 0.001$. The prevalence of depression among those with disability was significantly higher among the lung cancer group than in the control group, $p = 0.01$ (Table 1). There was no significant sociodemographic correlate of depression in lung cancer.

WHODAS scores were significantly higher among the lung cancer group compared with the control group in

patients with depression, $p < 0.001$ and also among those without depression, $p = 0.01$ (Table 2).

Of the 80 patients with lung cancer, none has had surgery, 26 (32.5%) were on chemotherapy, the remaining 54 (67.5%) were on both chemotherapy and radiotherapy. The prevalence of depression among those on chemotherapy only was 8/26 (34.6%) and 33/54 (59.3) among those who were on both chemotherapy and radiotherapy, $X^2 = 5.3$, $p = 0.02$.

Mean WHODAS score was significantly higher among the older patients with lung cancer, $F = 4.5$, $p = 0.003$. Post hoc test shows that the difference was due to higher disability among respondents who were older than 74 years compared with those between 65-74 years $p = 0.01$, 55-64 years, 45- 54 years, 35-44 years, <35 years, $p < 0.001$ respectively (Post-Hoc results). Mean WHODAS score was also significantly higher among past 12 month smokers, $p = 0.001$ (Table 3).

Prevalence of depression was not significantly associated with stages of lung cancer. However, level of disability (WHODAS Scores) increases with stage of lung cancer, $F = 6.1$, $p = 0.001$ (Table 4). Post hoc tests show that this difference was due to a higher mean disability score in stage 3 and 4 of lung cancer compared with stage 2, $p = 0.001$ respectively.

Table 1: Sociodemographic Characteristics of the Case and Control Groups.

Demography	CA Lungs		Control		OR	95% CI	P
	N (80) N	%	N (80) N	%			
Age							
<35	3	3.7	3	3.7	1.0	0.15-5.11	1.00
35-54	3	2.7	3	3.7	1.0	0.15-5.11	1.00
45-54	10	12.5	9	11.3	1.12	0.43-2.94	1.00
55-64	17	21.3	16	20.0	1.07	0.50-2.35	1.00
>64	45	58.8	49	61.3	0.81	0.43-1.54	0.63
Gender							
Male	48	60.0	48	60.0	1.0	0.50-1.98	1.00
Female	32	40.0	32	40.0			
Years of Education							
Nil	7	8.8	8	10.0	0.86	0.29-2.58	0.81
1-6	26	32.5	22	27.5	1.27	0.64-2.52	0.60
7-12	32	40.0	30	37.5	1.11	0.59-2.11	0.87
<12	15	18.7	20	25.0	0.69	0.32-1.48	0.44
Marital status							
Married	54	67.5	50	62.5	1.2	0.62-2.52	0.62
Unmarried	26	32.5	30	37.5			
Employment							
In Employment	30	37.5	48	60.0	0.42	0.21-0.79	<0.01
Unemployed	50	62.5	32	40.0			
Religion							
Islam	25	31.3	33	41.3	0.65	0.34-1.24	0.25
Christianity	55	68.7	47	58.7			
Lifetime Smokers							
Yes	48	60.0	30	37.5	0.42	0.21-0.79	<0.01

No	32	40.0	50	62.5			
12 Months Smokers							
Yes	24	30.0	9	11.3	3.38	1.46-7.85	<0.01
No	56	70.0	71	88.7			
Depression (Yes)	41	51.3	5	6.3	15.8	6.0 -47.4	<0.001
(No)	39	48.7	75	93.7			
Depression + Disability (Yes)	14	15.5	4	5.0	4.2	1.27-12.86	0.01
(No)	66	84.5	76	75.5			

Table 2: WHODAS Scores in Depression and Disability in Depression.

Clinical Description	Lung Cancer N (80)		Control N (80)		Statistics	P
Depression						
Median WHODAS	23		13		8.9 ^Z	<0.001
Mean (SD) WHODAS	25.62	(13.74)	14.21	2.42	8.8 ^t	<0.001
Disability in Depression						
Median WHODAS	32		20		2.4 ^Z	0.01
Mean (SD) WHODAS	32.91	(9.68)	21.43	(6.11)	2.7 ^t	0.01

Table 3: Sociodemographic Correlates of Disability in Lung Cancer.

Demography and Clinical Variable	N	Mean WHODAS	SD	Statistics	P
Age					
<35	3	20.52	7.35	4.5 ^F	0.003
35-54	3	21.62	5.92		
45-54	10	23.71	9.33		
55-64	17	25.13	9.12		
65-74	26	28.87	10.66		
>74	21	31.38	11.49		
Gender	Not	Significant			
Education	Not	Significant			
Marital status	Not	Significant			
In Employment	Not	Significant			
Religion	Not	Significant			
Ethnicity	Not	Significant			
12 Months Smoking					
Yes	24	28.54	10.12	4.5 ^t	0.001
No	56	24.46	4.92		

F: ANOVA; t: independent t test

Table 4: Association between Stages of Lung Cancer and Disability (WHODAS Scores).

Stage	N	WHODAS		F	P
		Mean	SD		
1	1	-	-	6.1	0.001
2	29	21.80	7.85		
3	30	22.56	9.99		
4	20	25.15	9.53		

of age, with the peak age bracket of between 65 and 74 years followed by those above 74 years of age. This could be adduced to the tendency of cancer of the lungs to be commoner in the seventh decade of life [23]. About two-thirds of the lung cancer patients were men. This is not unexpected, given research

Predictors of disability were stages 3 and 4 of lung cancer, OR = 2.1, 95% CI (1.1-9.4) and depression OR = 9.1, 95% CI (2.5-28.5) (Table 5).

Discussion

In this study, we aimed at assessing the prevalence of depression and disabilities and their correlates among patients with lung cancer compared to patients in a walk in clinic of the specialist study center. Briefly stated, we found that depression was more prevalent among patients with lung cancer. We also found that stages of lung cancer were associated with disability.

Our results are discussed based on available literature and is presented therein.

Sociodemographic Characteristics

More the three-fourths of the sample were over 54 years

Table 5: Predictors of Disability among Respondents.

Prediction	OR	95% CI		Sig.
		Lower	Upper	
Age				
≤35 Years	1			
>35 Years	1.13	0.78	2.11	0.093
12 Months Smoking				
No	1			
Yes	1.23	0.91	1.97	0.088
Stage of CA				
Stages 1 and 2 (Ref)	1			
Stages 3 to 5	2.11	1.13	9.42	0.031
Depression				
No (Ref)	1			
Yes	9.13	2.48	28.45	<0.001

evidences that lung cancer is largely associated with smoking [24], and smoking. [25] and other risk factors for malignancies such as chronic alcohol abuse [26] are commoner in men.

We observed that the majority of the respondents were Christians. This trend was similarly noted in a recent study in Ibadan, Nigeria [27]. Although religion was not included as part of data in the national census of 2006 [18], the sudden springing of churches, coupled with the mindset chronically ill persons seeking miraculous healing could account for this.

Smoking and Lung Cancer

We also found high rates of past 12 month smoking among patients with lung cancer. This finding corroborates previous ones from other part of the world [11,28,29]. Given the association of smoking with the development of lung cancer, our study highlights the importance of early screening for lung cancer among smokers. The development of the low dose computerized tomography scan that screens for the presence of lung cancer, although controversial, may increase the chances of smoking cessation [30]. This is very crucial considering our finding that smoking was associated with disability in lung cancer and disability from lung cancer was a predictor of depression.

Prevalence of depression

We found that depression was present in over half of the patients with lung cancer and was over 8 times more prevalent than among attendees of GOPU. This is a higher rate compared with previous reports. A pooled prevalence of depression in lung cancer in a meta-analysis ranges from 11% to 44% [6]. The disparity in the prevalence rate of depression could be as a result of differences in the instrument employed in diagnosing depression and differences in the sample population.

Another potential explanation for the high rate of depression in our sample is that majority of them are on treatment and it has been reported patients in treatment are more likely to have depression than those not in treatment because of the side effects of anti-cancer drugs. This could have accounted for the higher prevalence of depression among those who were on both chemotherapy and radiotherapy compared with those on only

chemotherapy. The consequences of high prevalence of depression in lung cancer include high costs of medical treatment, accentuation of both psychiatric and physical symptoms, difficulties with self-management and adherence to medical treatment.

We also found a depression rate of 6.3% among the control group. This rate is within range, given reports of the prevalence of depression of about 4.4% of patients in primary care [31]. The lifetime prevalence of depression has been estimated in another report to be between 3% in Japan to 16.9% in the US [32].

A potential reason for the low prevalence of depression in this sample is the way depression is perceived in the Nigerian context, there by making suffers to conceal their symptoms [33].

Disability in Lung Cancer

We found that a high level of disability among patients with lung cancer and was associated with older age, 12 months smoking, and stage of the lung cancer. This is not unexpected given the degree associated functional impairment found in patients with lung cancer, specifically, non-small cell lung cancer, who experience fatigue [2], or cognitive dysfunction associated with most anticancer drugs [34].

The high level of disability in patients with lung cancer can also be attributed to considerably lower exercise tolerance, functional capacity and medical comorbidity.

Disability in comorbid Lung Cancer and depression

We also found that subjects who had comorbid depression and lung cancer were more disabled than those who had lung cancer without depression. This implies that depression is an independent factor in disability [35], and is a significant contributory factor to disability when associated with lung cancer. By implication, it is likely that the mechanism underlying depression in lung cancer could have commenced before the diagnosis of lung cancer was established, perhaps while the patient was having the symptoms. Thus, our findings suggest the need for routine screening for depression in patients in the GOPU when they present with somatic symptoms suggestive of simple ailments, because it could be suggestive of depression. Identifying depression in early lung cancer is likely to reduce the degree of disability emanating from the illness, because depression is an important risk factor for disability [36]. This is pertinent considering that our present sample was drawn from a tobacco cessation program and tobacco cessation itself is a recognized risk factor for depression [14].

Unfortunately, the detection rate of depression is very low among general physicians and is also poorly treated [37]. This is very relevant taking into cognizance the huge public health burden of depression and its complications especially suicide.

Stages of Lung Cancer and Depression

Given depression as present irrespective of the stage of the lung disease, this finding may suggest the role psychological factors in the etiology of depression in lung cancer [17]. This has a number of potential fallouts including non-adherence to medical instructions and treatment as well as poor coping styles such as substance use, which consequently may lead to decreased survival [38].

Our findings suggest that treating depression has the potential of modifying the prognosis and outcome of individuals with lung cancer.

Clinical Implication of the Findings

Significant association occurs between disability in patients with lung cancer together with depression, medical co-morbidity and advanced cancer. It is conceivable, therefore that in the context of lung cancer diagnosis, understanding depression prevalence and risk factors for depression is important for several reasons. First, depression has been documented to predict a small, significant mortality risk in lung cancer, above and beyond other prognostic factors [39]. Secondly, lung cancer patients with untreated depression have several risks for poorer lung cancer outcomes [40]. The consequences of high prevalence of depression in lung cancer might include high costs of medical treatment, accentuation of both psychiatric and physical symptoms, difficulties with self-management and adherence to medical treatment. Thirdly, as depression affects cognitive functioning and interferes with a patient's ability to understand health provider's explanations and recommendations [41], lung cancer patients with untreated depression might face barriers to cancer care and have disproportionate disease burden including disability [42]. Fourthly, because depression is treatable in patients with cancer [41], there is a need for early recognition and management of depression among patients with lung cancer that could ameliorate the burden of disease or disability in this sub-group of patients with lung cancer.

The findings from the current study have implications for physical rehabilitation of patients with lung cancer. These approaches have the potentials of improving the symptoms of depression [42]. As a first line method of treatment, physical exercise brings about remission in a substantial number of patients with depression, and its efficacy increases when used as an adjunctive method of treatment to anti-depressants. In patients with lung cancer, standard resistance training also has the potentials of improving skeletal muscle functions and higher cardiovascular oxygen delivery, thereby leading to reduced fatigue and improved physical function in patients with lung cancer [43]. The development of a 2-item patients' health questionnaire, that screen for depression [44] and a short screening tool capable of assessing physical activity [45] may be incorporated into the clinical care of patients with lung cancer. The current study has a number of limitations; diagnosis and staging of lung cancer were by self-reports, thus, the possibility of an initial under-reported cannot be ignored. The physical state of the patients could also have affected their interpretation of the symptoms of depression. The non-blinded nature of the study could have introduced bias in the symptom ratings of the patients. Other potential risk factors for lung cancer, such as occupation, environmental pollution were also not studied. We also did not analyze the effect or effects of the particular treatment modality among these subjects. The cross sectional nature of the illness also limits the interpretation of the findings.

Key Points

- Depression is highly prevalent among patients with lung cancer.

- Depression is a strong predictor of disability in lung cancer.
- Depression in lung cancer is not related to the stage of the disease.
- Disability in lung cancer is related to the stage of the disease.

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Conflict of Interest

Nil

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Address for correspondence: Lasebikan Victor Olufolahan, Department of Psychiatry, College of Medicine, University of Ibadan, PMB 5116, Ibadan, Nigeria, Tel: +2348060733382; E-mail: victorlash@yahoo.com

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