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Epidemiology and determinants of Depression and Anxiety among Cancer patients in Southern Ethiopia : A Cross-sectional study

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Epidemiology and determinants of Depression and Anxiety among Cancer patients in Southern Ethiopia : A Cross-sectional study

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Abstract

Objective: The study aimed to assess the prevalence of depression and anxiety and its determinants among cancer patients attending at Hawassa University Comprehensive Specialized Hospital (HUCSH), Ethiopia.

Methods: Institution based cross-sectional study design was implemented on 423 randomly selected cancer patients at HUCSH. Anxiety and depression were assessed, and descriptive and logistic regression analyses with 95% CI statistics were done.

Result: the prevalence of depression and anxiety were found to be 244(58.8%) and 249(60.0%), respectively. Older age (>50 years) (AOR= 2.24, CI= 1.14, 4.40), being unemployed (AOR=1.96, CI= 1.08, 3.56), advanced stage of cancer (stage-III (AOR= 5.37, CI= 1.34, 21.45) and stage-IV (AOR=4.55, CI=1.12, 18.44)), comorbid psychotic symptoms (AOR= 1.67, CI= 1.07, 2.61) and problem of eating in the past two weeks (AOR=6.16, CI=1.98, 19.11) were independent factors of depression among cancer patients. In addition, cancer stage (stage-II (AOR=3.92, CI=1.07, 14.36) and stage-IV (AOR=5.04, CI=1.44, 17.59)) and comorbid psychosis (AOR= 1.73, CI= 1.12, 2.66) were associated with anxiety.

Conclusion: Depression and anxiety amongst cancer patients were considerably high. Age, occupation, stage of cancer, comorbid psychotic symptoms, and problem of eating were determinant factors of depression among cancer patients. Besides, stage of cancer and comorbid psychosis were determinants of anxiety. Health care professional working in the oncology unity need to conduct routine screening of depression and anxiety symptoms for cancer patients.

Strengths and Limitations of the study

- The study is cross-sectional and direction of association between depression and anxiety and related factors could not be established.
- Some of the physical symptoms due to the cancer itself or its treatment may have an impact on the magnitude of depression or anxiety.
- The study is an important contribution to our knowledge regarding the potential role of depression and anxiety in the treatment of cancer in these area.

Keywords: Prevalence, Anxiety, Depression, Cancer, HADS, Hawassa, Ethiopia

INTRODUCTION

Now a days cancer is one of the most important public health problem globally. Cancer is the second leading cause of mortality worldwide (1). In 2018 World Health Organization (WHO) estimated that about 18 million new cases and 9.6 million deaths due to cancer in the global community (2). Diagnosis with cancer is increased risk of adverse mental health outcomes such as depression and anxiety, that may perhaps negatively have an effect on cancer treatment, recovery, quality of life and survival (3,4).

Depression and anxiety are the two common and most burdensome forms of neuropsychiatric disturbances. Some chronic physical diseases such as cancer have previously been reported to cause these neuropsychiatric disturbances (5). Depression and anxiety are disruptions of both psychological and physiological states characterized by a group of physical, emotional, and behavioral elements (6). They can mess up the health-related quality of life (including physical, emotional, and social dysfunction), considerably raise the mortality rate and lead to huge medical cost (7,8).

Anxiety is fearful expectation of future danger or catastrophe characterized by feelings of dysphoria or tension (9). Patients diagnosed with cancer initially experience shock or denial followed by emotional chaos, nervousness, lack of concentration, difficulty of falling asleep, loss of appetite, irritability, and intrusive thoughts about the future (10). On the other hand, depression is characterized by a low or sad mood, reduced concentration, sleep disturbance, change in appetite or weight, psychomotor disturbance, loss of energy, muscle tension and pain, social isolation, loss of interest in usual activities, crying, weeping, feelings of guilt, worthlessness, and suicidal ideation or behavior (11).

Anxiety and depression are common reactions to the diagnosis of cancer and considered a normal emotional response. However, some patients show an overwhelming response that impair their daily activities (12) and high levels of signs and symptoms may persist for weeks or months or even years (13). These is due to perceived threats like loss of body functions, changes in appearance, disruption of family and life plans, death, diminished quality of life, recurrence or progression of the disease and the occurrence of unpleasant symptoms, including pain, nausea, and fatigue (10,14).

A recent review in UK reported that depression and anxiety affect about 20% and 10% of cancer patients, as compared to 5% and 7% in the general population, respectively (15). Furthermore, depression is the most investigated psychiatric disorder in cancer, it varies

1 considerably, from about 3% to 58% (16–19). However, previous study conducted in
2 England nearly three-fourth (73%) of these depressed patients with cancer do not receive
3 proper psychiatric intervention, and only 5% visit mental health professional (20). On the
4 other hand, identification and treatment of depression and anxiety in patients diagnosed with
5 cancer results in decline in disease progression, increased in survival rates, decreased in
6 medical costs and betterment in quality of life (21,22).

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12 Almost two-third of the patients with cancer have significant levels of anxiety and depression
13 which compromises quality of life (QOL) of individuals (23) and increase risk of suicide
14 (24). In addition, untreated depression and anxiety causes remarkable negative consequences
15 such as altered decision-making regarding treatment (25), non-compliance with treatment,
16 extended recovery times (13), increases the intensity of pain and reduces rate of patients
17 survival (26) and increased desire for death (27).

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23 In clinical practice, depression was indicated to be under-diagnosed and under-recognized
24 (28), due to the complex nature and inter-relationship between cancer and depression in
25 patients diagnosed with cancer (29,30). Psychological treatments, like cognitive behavioral
26 therapy (CBT) were also effective against anxiety and depression in advanced cancer patients
27 (31) by improving physical and mental condition (32).

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33 Even though, depression and anxiety are the most common complications in patients
34 diagnosed with cancer, it is often neglected (33). Also, the psychosocial needs of cancer
35 patients, with or without a previous psychiatric history, are often given not much emphasis
36 during the course of cancer treatment, which is mostly focused on managing the somatic
37 symptoms and side effects. Earlier detection and improved treatment of cancer makes people
38 to live longer with cancer, given away a major global challenge (34). There is no explicit data
39 showing little evidence in Ethiopia context in general and in the study area in particular
40 regarding to the mental condition of peoples' living cancer. Therefore, the objective of this
41 research is to assess the prevalence of depression and anxiety in Ethiopian cancer patients and
42 to identify various influencing factors for depression and anxiety.

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51 **Methods and Materials**

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53 **Study design and setting**

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55 Institution based cross-sectional study design was employed in Hawassa university
56 comprehensive specialized hospital (HUCSH) cancer treatment center from October 2018 to
57 December 2019. The hospital is the only hospital that provides cancer treatment in the region
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currently the hospital is on the way of finalizing one of the biggest cancer treatment centers in Ethiopia.

Study subjects

All patients with Cancer who have follow up at Hawassa University comprehensive specialized hospital oncology unit during the study period were included in the study. Patients who are unable to give proper information or critically ill patients and patients age <18 years were excluded from the study.

Sampling and data collection

The required sample size was determined using single population proportion formula $n = (z^2 \cdot P(1-P) / d^2)$, where n is the sample size, z is the standard normal score set at 1.96, d is the desired degree of accuracy and p is the estimated proportion of the target population. By taking P=50%. Z= 1.96 and w=5%, the computed sample size was 384 and by taking 10 % non response rate, the total sample size computed was 422. Systematic random sampling technique was used for this study. Cancer patients who were visiting HUCSH cancer clinic during the study period; and who fulfilled the inclusion criteria were included in the study until the final study sample size was reached.

Three oncology nurses who received a two days intensive training on data collection techniques and instrument were involved in data collection. Pre-test was done in 5% of sample to identify impending problems on data collection instruments and to check consistency of the questionnaires, and the performance of the data collectors. Supervision was held during data collection and each questionnaire were checked for completeness by supervisor on daily basis.

Variables and Measurements

Data were collected by using interviewer administered structured questionnaire. It consists independent variables such as sociodemographic characters, clinical related factors of patients, and healthy life style related related factors (nutritional status, BMI, substance use, etc.) and dependent variables (depression and anxiety). The questionnaire is developed in English and transated to local language (Amharic) and the Amharic version was used to collect the data.

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The Hospital Anxiety and Depression Scale (HADS) is a frequently used to assess the dependent variables anxiety and depression. It consists of two subscales, Anxiety and Depression (35). The HADS Consists of 14 items, seven items for the anxiety subscale (HADS Anxiety) and seven for the depression subscale (HADS Depression). Each item is scored on a response-scale with four alternatives ranging between 0 and 3 (36). Item scores were summed to provide subscaled scores of anxiety and depression, ranged between 0 and 21, and total summed score ranged from 0 to 42. A higher score represents higher anxiety or depression (37). Recommended cut-off scores are 8–10 for doubtful cases and ≥ 11 for definite cases (35).

The Eastern Cooperative Oncology Group Scale (ECOG) was used to measure the patient's performance status. This scale captures patient-derived functional status data on a scale of 0 to 4. An ECOG score of 2 to 4 indicates a poor performance status, whereas a score of 0 to 1 indicates a good performance status. Researchers have confirmed the validity of the ECOG Chinese version in assessing the performance status of Chinese cancer patients (38).

The five item Psychosis Screening Questionnaire (PSQ-5) was used to assess the presence of psychotic symptoms in the past year (39). The PSQ has five probe questions enquiring about mania, thought insertion, paranoia, strange experiences and hallucinations (40). Individuals who endorsed one or more psychotic symptom on the PSQ were considered to have psychosis.

To assess suicide behaviour a 4 items suicidal behaviour questionnaire revised (*SBQ-R*) was used. SBQ-R item 1 taps in to life time suicidal ideation and attempt; item 2 assesses the frequency of suicidal ideation over the past twelve months; item 3 taps into the threat of suicide behaviour; and item 4 evaluates self-reported likelihood of suicidal behaviour. The sensitivity 80%, specificity 91% with a score of 3-18 and cut-off point ≥ 8 for adult clinical population (41).

Level of social support among patients with schizophrenia was assessed using the 3 item Oslo social support scale (OSSS) and the scores range from 3-14. It is categorized as poor (3-8), moderate (9-11) and strong (12-14) social support (42).

Intensity of cancer pain was assessed using universal pain screening with a 0-10 pain intensity numeric rating scale (NRS). Pain intensity categorized as “none” for a score of 0, “mild” for a score of 1 to 3, “moderate” for a score of 4 to 6, and “severe” for a score of 7 to 10) as reported by the patient (43,44).

Nutritional status was assessed using Mini-nutritional Assessment Short-Form (MNA®-SF) scale. It is a screening tool to assess malnutrition or risk of malnutrition and consists of 6 items related to appetite, loss of weight, mobility, mental distress or acute disease, presence of cognitive impairment, and body mass index (BMI) (45). A score of 12-14 are considered normal nutritional status and a score of ≤ 11 indicates risk of malnutrition or malnutrition (46).

Data Processing and Analysis

Data were entered to Epi-data version 3.1 and exported to SPSS version 24 for windows for analysis. Descriptive statistics were used to identify distributions of socio-demographic characteristics of study participants. Prevalence of Anxiety and depression were calculated by summing up the HADS and dichotomizing the total score in to positive or negative for presence of depression or anxiety. Both bivariate multivariable logistic regression analyses with 95% CI was used to see the association between each independent and outcome variables. During the bivariate analyses variables with p-value less than 0.20 entered into a multivariable logistic regression model using a enter method. Finally those variables which showed statistical significance at $P < 0.05$ and 95% CI in the final model were reported as independently associated with anxiety and depression. The model fitness test was conducted using the Hosmer and Lemeshow goodness of fit test.

Patients and public involvement

Patients and the public were not involved in this study, including the recruitment, data collection, analysis, interpretation and dissemination of the results.

RESULT

Socio-demographic characteristics of the patients

From a total of 423 cancer patients targeted for the study, 415 participated in the study with a response rate of 98.3%. The mean age of patients is 42.51 (SD \pm 14.24) years. The study participants were dominantly Protestant 146(35.2%) by religion followed by Orthodox Christianity 136(32.8%). The majority, 339(81.7%) of study subjects were married. From a total participants 160 (38.6%) were unable to read and write, 346(83.4%) have no formal employment or unemployed and nearly one-third 133(32.0%) were rural residents (Table 1).

Table 1: Socio-demographic characteristics of cancer patients at HUCSH, 2019 (N=415)

Variables	Category	Frequency	Percentage
Mean (±SD) Age in Years		42.51 (±14.24)	
Gender	Male	144	34.7
	Female	271	65.3
Religion	Protestant	146	35.2
	Orthodox	136	32.8
	Muslim	125	30.1
	Other	8	1.9
Educational status	Unable to read and write	160	38.6
	Primary Education	125	30.1
	Secondary Education	79	19.0
	College and above	51	12.3
Marital Status	Married	339	81.7
	Single	44	10.6
	Widowed	28	6.7
	Divorced	4	1
Occupation	Employed	69	16.6
	Unemployed	346	83.4
Residence	Urban	282	68.0
	Rural	133	32.0

Clinical characteristics of the patients

The median time since the diagnosis of cancer and time to start treatment is 5 and 3 months, respectively. More than one-third 148(35.7%) have breast cancer, 173(41.7%) were stage-III, 180(43.4%) have moderate level of pain, 66(64.1%) of the patients were on chemotherapy and nearly half 195(47.0%) had moderate social support (table 2).

Table 2: Clinical characteristics of cancer patients at HUCSH, 2019 (N=415)

Variables	Category	Frequency	Percentage
Type of Ca	Breast Cancer	148	35.7
	Cervical Cancer	7	1.7
	Genitourinary Cancer	31	7.5
	Gastrointestinal Cancer	84	20.2
	Lung Cancer	13	3.1
	Lymphoma	51	12.3
	Other	81	19.5
WHO Ca Staging (I-IV)	I	15	3.6
	II	54	13.0
	III	173	41.7
	IV	129	31.1
	Unknown	44	10.6
Intensity of Pain	None	48	16.6
	Mild	58	14.0
	Moderate	180	43.4
	Severe	129	31.0
Type of Treatment	Chemotherapy only	266	64.1
	Surgery only	15	3.6
	Combination therapy	134	32.3
Take corticosteroid medication	Yes	350	84.3
	No	65	15.7
Comorbid Chronic medical illness	Yes	65	15.7
	No	350	84.3
Use of substance over the last 3 months	Yes	17	4.1
	No	398	95.9
Performance status (ECOG scale)	Good	364	87.7
	Poor	51	12.3
Duration of illness	<12 months	355	85.5
	13-36 months	48	11.6
	>37 months	12	2.9
Duration of treatment	<12 months	375	90.4
	13-36 months	31	7.5
	>37 months	9	2.2
Malnutrition	Yes	303	27.0
	No	112	73.0
BMI	Under weight	71	17.1
	Normal weight	282	68.0
	Over weight	46	11.1
	Obese	16	3.9
Problem of eating	Yes	393	94.7
	No	22	5.3
Psychosis	Yes	236	56.9
	No	179	43.1
Suicide behavior	Yes	32	7.7
	No	383	92.3
Social support	Poor	124	29.9
	Moderate	195	47.0
	Strong	96	23.1

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Prevalence of Depression and Anxiety

Our study found that, the prevalence of depression and anxiety among cancer patients was 58.8% (n=244) and 60% (n=249) respectively as indicated in figure 1.

Independent Predictors of Depression and Anxiety among Cancer Patients

Among many variables included in the bivariate analysis, those variables (occupation, type of Ca, stage of Ca, intensity of pain, type of Ca treatment, taking of corticosteroid medication, comorbid medical illness, anxiety, psychosis, malnutrition, problems of eating, age and BMI) with p-value <0.25 was included in multivariate logistic regression analysis. Only five variables i.e. age >50 years (AOR= 2.24, CI= 1.14, 4.40), being unemployed (AOR=1.96, CI= 1.08, 3.56), stage of cancer (stage-III (AOR= 5.37, CI= 1.34, 21.45) and stage-IV (AOR=4.55, CI=1.12, 18.44)), comorbid psychotic symptoms (AOR= 1.67, CI= 1.07, 2.61) and problem of eating in the past two weeks (AOR=6.16, CI=1.98, 19.11) were independent factors of depression among cancer patients (table 3).

Table 3: bivariate and multi-variate regression on Depression and associated factors among cancer patients

Variables	Category	Depression		COR (95% CI)	AOR (95% CI)
		Yes	No		
Age	<30 Years	45	43	1	1
	31-50 years	130	99	1.19(0.73, 1.96)	1.02(0.58, 1.77)
	>50 years	69	29	2.66(1.46, 4.84)***	2.24(1.14, 4.40)*
Occupation	Employed	34	35	1	1
	Unemployed	210	136	1.59(0.95, 2.67)***	1.96(1.08, 3.56)*
Type of cancer	Breast cancer	93	55	1	1
	Cervical cancer	3	4	0.44(0.09, 2.05)	0.42(0.08, 2.21)
	Genitourinary Ca	19	12	0.93(0.42, 2.07)	0.95(0.39, 2.31)
	Gastrointestinal Ca	47	37	0.75(0.43, 1.29)	0.70(0.36, 1.36)
	Lung Ca	12	1	7.09(0.89, 56.07)***	7.61(0.90, 64.32)
	Lymphoma	29	22	0.78(0.40, 1.48)	0.74(0.34, 1.63)
	Others	41	40	0.60(0.35, 1.04)***	0.72(0.38, 1.34)
WHO Stage of Ca	Stage-I	5	10	1	1
	Stage-II	30	24	2.50(0.75, 8.30)***	2.87(0.69, 11.95)
	Stage-III	102	71	2.87(0.94, 8.76)***	5.37(1.34, 21.45)*
	Stage-IV	77	52	2.96(0.65, 9.16)***	4.55(1.12, 18.44)*
	Unknown	30	14	4.28(1.23, 14.91)***	2.11(0.49, 8.95)
Intensity of pain	None	32	16	1	1
	Mild	36	22	0.81(0.36, 1.82)	0.76(0.23, 2.55)
	Moderate	104	76	0.68(0.35, 1.33)	0.59(0.16, 2.12)
	Severe	72	57	0.63(0.31, 1.26)***	0.54(0.15, 1.98)
Type of treatment	Chemotherapy	154	112	1	1
	Surgery	11	4	2.00(0.62, 6.44)***	2.18(0.058, 8.29)
	Combination	79	55	1.04(0.68, 1.59)	1.01(0.59, 1.71)
Take corticosteroid	Yes	198	46	0.54(0.30, 0.96)	0.42(0.14, 1.21)
	No	152	19	1	1
Comorbid medical illness	Yes	43	22	1.45(0.83, 2.53)	1.13(0.59, 2.16)
	No	201	149	1	1
Anxiety	Yes	154	95	1.37(0.92, 2.04)***	1.29(0.83, 2.03)
	No	90	76	1	1
Psychosis	Yes	149	87	1.51(1.02, 2.24)***	1.67(1.07, 2.61)*
	No	95	84	1	1
Malnutrition	Yes	185	118	0.71(0.45, 1.09)***	1.42(0.81, 2.47)
	No	59	53	1	1
Problem of eating	Yes	236	157	2.63(1.07, 6.41)***	6.16(1.98, 19.11)**
	No	8	14	1	1
BMI	Under weight	42	29	0.48(0.14, 1.64)***	0.63(0.15, 2.62)
	Normal weight	162	120	0.45(0.14, 1.43)***	0.47(0.13, 1.75)
	Over weight	28	18	0.51(0.14, 1.86)	0.52(0.12, 2.20)
	Obese	12	4	1	1

Ca- cancer; BMI- Body mass index; *p-value <0.05; **p-value <0.01; *** p-value <0.001;
COR- Crude odds ratio; AOR- Adjusted odds ratio

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Therefore, older patients (>50 years) were 2 times more likely to be affected by depression than younger age groups (<30 years) and unemployed patients were nearly two times more likely to be affected by depression than those who were employed. Those patients with advanced stage of cancer (stage-III were 5.3 times and stage-IV were 4.5 times) affected by depression than those who were Stage-I. Furthermore, cancer patients with comorbid psychotic symptoms and eating problems in the past two weeks were 1.6 and 6.1 times more likely to be affected by depression than their counter parts. In addition, patients with cancer stage of II and IV are 4 and 5 times more likely to be affected by anxiety, respectively than those patients with cancer Stage-I. Cancer patients with comorbid psychosis were 1.7 times to be affected by anxiety as shown in table 4.

Table 4: bivariate and multi-variate regression on anxiety and associated factors among cancer patients

Variables	Category	Anxiety		COR (95% CI)	AOR (95% CI)
		Yes	No		
Educational status	Illiterate	91	69	1.17(0.62, 2.20)	0.98(0.48, 1.99)
	Primary	81	44	1.63(0.84, 3.17)**	1.31(0.64, 2.68)
	Secondary	50	29	1.53(0.75, 3.13)**	1.60(0.73, 3.46)
	College or above	27	24	1	1
Residence	Urban	177	105	1	1
	Rural	72	61	0.70(0.46, 1.06)**	0.70(0.43, 1.12)
Type of cancer	Breast cancer	92	56	1	1
	Cervical cancer	4	3	0.81(0.17, 3.76)	0.69(0.13, 3.42)
	Genitourinary Ca	21	10	1.27(0.56, 2.91)	1.16(0.47, 2.84)
	Gastrointestinal Ca	42	42	0.60(0.35, 1.04)**	0.55(0.30, 1.02)
	Lung Ca	6	7	0.52(0.16, 1.63)	0.38(0.11, 1.29)
	Lymphoma	36	15	1.46(0.73, 2.90)	1.37(0.62, 2.98)
	Others	48	33	0.88(0.50, 1.54)	0.84(0.45, 1.56)
Stage of Ca	Stage-I	5	10	1	1
	Stage-II	33	21	3.14(0.94, 10.48)**	3.92(1.07, 14.36)*
	Stage-III	100	73	2.74(0.89, 8.35)**	3.29(0.97, 11.09)
	Stage-IV	86	43	4.00(1.28, 12.43)**	5.04(1.44, 17.59)*
	Unknown	25	19	2.36(0.77, 8.98)**	3.35(0.89, 12.63)
Take corticosteroid	Yes	215	31	1	1
	No	135	34	0.68(0.40, 1.17)**	0.66(0.33, 1.31)
Medical illness	Yes	33	32	0.64(0.37, 1.08)**	0.61(0.33, 1.11)
	No	216	134	1	1
Social support	Poor	77	47	1.44(0.84, 2.48)**	1.68(0.90, 3.13)
	Moderate	121	74	1.44(0.88, 2.36)**	1.52(0.89, 2.62)
	Strong	51	45	1	1
Depression	Yes	95	76	1.36(0.91, 2.03)**	1.34(0.86, 2.09)
	No	154	90	1	1
Psychosis	Yes	152	84	1.53(1.02, 2.27)**	1.73(1.12, 2.66)*
	No	97	82	1	1
Age	<30 Years	58	30	1	1
	31-50 years	132	97	0.70(0.42, 1.17)**	0.87(0.49, 1.54)
	>50 years	59	39	0.78(0.43, 1.42)	1.12(0.55, 2.29)
Problem of eating	Yes	239	154	1.86(0.78, 4.41)**	1.92(0.73, 5.00)
	No	10	12	1	1

*p-value <0.05, **p-value <0.25; Ca- cancer, COR- Crude odds ratio, AOR- Adjusted odds ratio

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DISCUSSION

In our study the prevalence of depression and anxiety among cancer patients was found to be 58.8% (95% CI: 54.0, 63.6) and 60% (95% CI: 55.4, 64.6) respectively. These findings are similar to results from a study conducted in Gondar on patients with cancer (47). The prevalence of depression in our study is almost similar with the pooled prevalence (54.9%) in China (13). However, depression is slightly lower and anxiety is somewhat lower than the study conducted in Rwandan study 67.7% and 52.1%, respectively (33). The results presented in this study confirm that cancer patients suffer from psychological or psychiatric complications.

Similar to previous studies (48) the finding of this study showed that, older age groups were more prone to depression. Old age increases the duration of disease, high probability of cancer metastasis and more disability and these conditions increase depression in older patients (49). The other possible reason might be older patients have poor abilities to ask for help and to communicate with others. Besides, worrying about too much treatment cost and family financial difficulties may be causes for psychological distress also.

Findings from previous studies indicated that depressive symptoms are more common in unemployed individuals (50). Similarly, our result underlined that unemployed cancer patients are more likely to be affected by depression than their counterparts. Hence, unemployment in combination with cancer exerts overwhelming physical and psychological strain such as depression in an individual (51). On the other hand, substantial number of cancer patients suffer from psychosomatic and social problems such as tiredness, pain, cognitive deficits, anxiety, and depression (52). These enduring physical and psychological effects of cancer or its treatment may be a reason for social and occupational dysfunction including the withholding of employment (53).

High magnitude of anxiety and depression can be related to end-stage of cancer (49). In line with this, our study also showed that cancer patients with advanced disease stages are vulnerable for anxiety. This might be related to the higher levels of physical debilitation and advanced illnesses (54). Prevalence of psychiatric disorders mostly varies at different stages of cancer. Despite the fact that adjustment disorders with depressed or anxious moods are more frequent at early stage of the disease; severe psychiatric complications such as very severe anxiety and major depression are more common in late stages of cancer (55). Hence, patients in late stages of the disease are more likely to be exposed to high doses of chemotherapy or any anticancer treatment, leading to their reduced appetite. While it

frequently increases survival rates, chemotherapy in cancer patients has been found to exert significant depression, anger, anorexia, and anxiety. In addition, in advanced cancer stage patients experience increased pain intensity and decreased performance status (54).

Even though, depression and psychosis are considered as a separate concept, this study showed that cancer patients with comorbid psychotic symptoms are more prone to depression. Clinically, this suggests diagnoses such as schizoaffective or mood disorders with psychotic features, in which depressive and psychotic symptoms co-occur. The comorbidity between depression and psychotic disorders is very high, too (56). Experiencing psychotic symptoms such as hallucination and delusion induce feelings of fear, hopelessness and helplessness which ends up with depression (57). Conversely, depression could have an impact on psychotic symptoms by provoking negative appraisal of external stimuli, consequently increasing psychotic symptoms (58). Also, psychosis and depression may result from shared liability that leads both to exist on the same continuum (59). However, further research is needed to clarify this complex relationship.

We also found out that depression is more experienced by patients with eating problems such as nausea and vomiting. Because patients may feel nauseous or vomit the week or day before treatment, as they approach the clinic, or even just thinking about chemotherapy (10). Besides, exposure to high doses of chemotherapeutic and steroid agents induce depressive symptoms such as reduced appetite caused by gastro-intestinal side effects like nausea and vomiting (60,61).

Symptoms and syndromes of anxiety are present in the majority of patients with psychotic illness (62) and psychotic symptoms are often reported in patients with affective disorders like anxiety disorders, too (63). Similar to these findings in our study patients with comorbid psychotic symptoms are more likely to develop anxiety than their counterparts. As a result, affective dysregulation (anxiety) and reality distortion are coexisted within the range of subclinical and clinical expression (64).

Despite providing valuable baseline data, this study has also some limitations encountered. The study is cross-sectional and direction of association between depression and anxiety and related factors could not be established. Some of the physical symptoms, which are part of the HADS symptom list, may have been due to the cancer itself or its treatment rather than due to depression or anxiety. These may have an impact on the magnitude of depression or anxiety in this study. This is the first study of its kind in Ethiopia and one of the very few in

Africa. Therefore, the study is an important contribution to our knowledge regarding the potential role of depression and anxiety in the treatment of cancer in these area.

CONCLUSIONS

The prevalence of depression and anxiety amongst cancer patients was considerably high. Occupation, stage of cancer, comorbid psychotic symptoms, problem of eating in the past two weeks and age of the patients were independent factors of depression among cancer patients. In addition, cancer stage and comorbid psychosis were associated with anxiety. Perhaps more attention is needed to detect changes in the psychological status of cancer patients in an effort to reduce the occurrence of depression and anxiety. Continuous screening for anxiety and depression is recommended as a necessary approach for good cancer care; on the other hand, after the diagnosis of clinically important psychological disorders, proper treatment interventions must be performed to improve the quality of life in these patients. Also, special attendtion should be given for cancer patients with the mentioned risk factors of depression and anxiety.

Abbreviations

- AOR – Adjusted Odd Ratio
- APA - American Psychiatry Association
- CI – Confidence Interval
- COR – Crude Odd Ratio
- ECOG - Eastern Cooperative Oncology Group Scale
- IRB - Institutional Review Board
- HADS - Hospital Anxiety And Depression Scale
- HUCSH - Hawassa University Comprehensive Specialized Hospital
- OR- Odd Ratio
- OSSS- Oslo Social Support Scale
- PSQ-5 - Psychosis Screening Questionnaire
- SBQ-R - Suicidal Behavior Questioner Revised
- SPSS- Statistical Package for Social Science
- WHO-World Health Organization

Declarations

Consent for publication

Not applicable

Availability of data and material

All the datasets used and analyzed during the current study are available on this manuscript.

Competing interests

The authors declare no competing interests.

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Authors Contribution

MA, AB, BD, BDu, DG, NB and AG involved in the design and data collection of the study. MA and BD performed the analysis and write up of the study. MA prepare the manuscript for publication and all authors critically reviewed the manuscript. All authors read and approved the final manuscript.

Ethics Statement

This study was approved by the Institutional Review Board at the College of Medicine and Health Sciences of Hawassa University (No. IRB/047/11, on date 26/02/2019). Permission was also obtained from administrative bodies HUCSH. Patients were enrolled into the study on a voluntary basis after a thorough explanation about the study. They were informed and obtained verbal consent and interviewed during their visits to the cancer treatment center. Any information obtained from the patients was kept confidential.

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Figure Legend

Figure 1: Prevalence of depression and anxiety among cancer patients attending Oncology unit at Hawassa University Comprehensive Specialized Hospital, Southern Ethiopia, 2019 (N=415)

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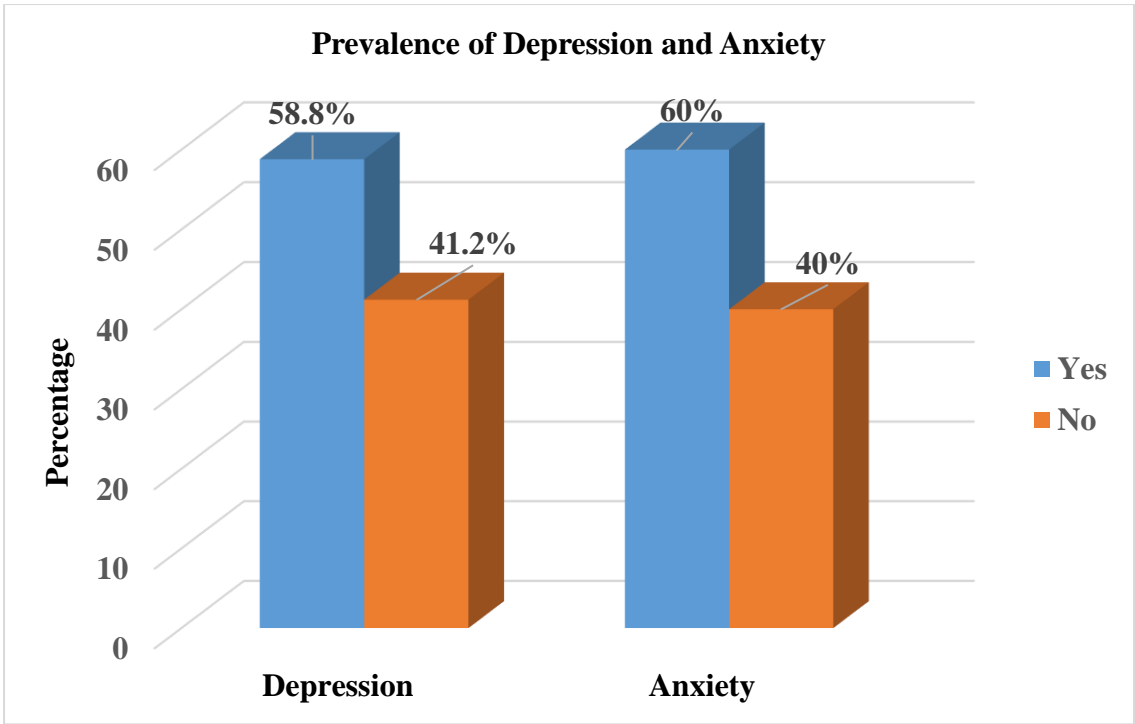


Figure 1: Prevalence of depression and anxiety among cancer patients attending Oncology unit at Hawassa University Comprehensive Specialized Hospital, Southern Ethiopia, 2019 (N=415)

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Epidemiology and determinants of Depression and Anxiety among Cancer patients in Southern Ethiopia : A Cross-sectional study

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Epidemiology and determinants of depression and anxiety among cancer patients in southern Ethiopia : a cross-sectional study

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Abstract

Objective: The study was aimed to assess the prevalence of depression and anxiety symptoms and its determinants among cancer patients attending at Hawassa University Comprehensive Specialized Hospital cancer treatment center, Ethiopia.

Design: Institution based cross-sectional study design was implemented.

Setting: Cancer patients at Hawassa University Comprehensive Specialized Hospital cancer treatment center from October 2019 to December 2019.

Participants: Randomly selected 415 cancer patients who had follow up at cancer treatment center.

Main outcome measures: Anxiety and depression symptoms were assessed using Hospital Anxiety and Depression Scale (HADS).

Result: The prevalence of depression and anxiety symptoms were found to be 244(58.8%) and 249(60.0%), respectively. Older age (>50 years) (AOR (adjusted odds ratio) = 2.24, 95% CI (confidence interval) = 1.14, 4.40), being unemployed (AOR=1.96, 95% CI= 1.08, 3.56), advanced stage of cancer such as stage-III (AOR= 5.37, 95% CI= 1.34, 21.45) and stage-IV (AOR=4.55, 95% CI=1.12, 18.44), comorbid psychotic symptoms (AOR= 1.67, 95% CI= 1.07, 2.61) and problem of eating in the past two weeks (AOR=6.16, 95% CI=1.98, 19.11) were independent factors of depressive symptoms among cancer patients. In addition, cancer stage such as stage-II (AOR=3.92, 95% CI=1.07, 14.36) and stage-IV (AOR=5.04, 95% CI=1.44, 17.59) and comorbid psychotic symptoms (AOR= 1.73, 95% CI= 1.12, 2.66) were associated with symptoms of anxiety.

Conclusion: Depression and anxiety symptoms amongst cancer patients were considerably high. Age, occupation, stage of cancer, comorbid psychotic symptoms, and problem of eating were determinant factors of depression among cancer patients. Besides, stage of cancer and comorbid psychosis were determinants of anxiety. Health care professionals working in the oncology unity need to conduct routine screening of depression and anxiety symptoms for cancer patients.

Keywords: Prevalence, Anxiety, Depression, Cancer, HADS, Hawassa, Ethiopia

Strengths and limitations of the study

- We use standardized questionnaires to assess dependent variables and this study also provide valuable baseline data in the area.
- The study is cross-sectional and direction of association between depression and anxiety and related factors could not be established.
- Some of the physical symptoms due to the cancer itself or its treatment may have an impact on the magnitude of depression or anxiety.
- Risk of biased responses such as social desirability bias by which patients either exaggerate or minimize the symptoms anxiety and depression for some reason.

Introduction

Now a days, cancer is one of the world's most serious public health agenda and it is second leading cause of death (1). In 2018, the World Health Organization (WHO) estimated that cancer caused approximately 18 million new cases and 9.6 million deaths worldwide (2). Breast, lung, colorectal, prostate, and skin cancer are the most common causes of cancer death. According to their diagnosis, cancer patients undergo a unique treatment modalities, such as surgery, radiation, and chemotherapy (3).

When a person is diagnosed with cancer, they are more likely to experience adverse mental health outcomes such as depression and anxiety (4,5). Depression and anxiety are the two most prevalent and debilitating neuropsychiatric disorders caused by physical illnesses like cancer (6). Depression and anxiety are both psychological and physiological disturbances characterized by a set of physical, emotional, and behavioral elements (7).

Cancer patients initially experience shock or denial, followed by emotional chaos, nervousness, lack of concentration, difficulty falling asleep, loss of appetite, irritability, and intrusive thoughts about the future (8). Anxiety and depression are frequent emotional reactions to a cancer diagnosis and are deemed normal. Some patients, however, have an overpowering reaction that interferes with their everyday activities, (9) and high levels of signs and symptoms can last for weeks, months, or even years (10). These are due to perceived threats such as loss of body functions, changes in appearance, disruption of family and life plans, death, diminished quality of life, recurrence or progression of the disease, and the occurrence of unpleasant symptoms such as pain, nausea, and fatigue (8,11).

According to a recent study conducted in the United Kingdom, depression and anxiety affect approximately 20% and 10% of cancer patients, respectively, compared to 5% and 7% of the general population (12). Furthermore, depression is the most studied psychiatric disorder in cancer patients, with prevalence ranging from 3% to 58% (13–16). However, according to a previous studies, nearly three-fourths (73%) of these depressed cancer patients do not receive appropriate psychiatric intervention, and only 5% seek mental health professional help (17). Early detection and treatment of depression and anxiety in cancer patients, on the other hand, results in a reduction in disease progression, increased survival rates, lower medical costs, and improved quality of life (18,19).

Almost two-third of patients with cancer have significant levels of anxiety and depression, which impairs individuals quality of life (QOL) (20), and increases their risk of suicide (21). Furthermore, untreated depression and anxiety have significant negative consequences,

including altered treatment decision-making (22), non-compliance with treatment, extended recovery times (10), increases the intensity of pain (23). Depression has been shown to be under-diagnosed and under-recognized in clinical practice (24), owing to the complex nature and inter-relationship between cancer and depression in cancer patients (25,26).

Despite the fact that depression and anxiety are the most common complications in cancer patients, they are frequently overlooked (27). Furthermore, the psychosocial requirements of cancer patients, whether they have a prior mental history or not, are frequently overlooked during cancer therapy, which is primarily focused on addressing somatic symptoms and side effects. Earlier detection and improved treatment of cancer makes people to live longer with cancer, given away a major global challenge (28). As far as our knowledge, there is a scarcity of explicit data showing evidence in the Ethiopian context in general, and in the study area in particular, regarding the mental health problems of people living with cancer. Therefore, the objective of this study is to assess the prevalence of depression and anxiety symptoms in Ethiopian cancer patients, as well as to identify various influencing factors for depression and anxiety.

Methods and Materials

Study design and setting

From October to December 2019, an institution-based cross-sectional study design was used at Hawassa University Comprehensive Specialized Hospital (HUCSH) cancer treatment center. The hospital is the only one in the region that provides cancer care, and it is now constructing one of Ethiopia's largest cancer treatment centers.

Study subjects

Randomly selected patients diagnosed with cancer and who have follow up at out patient department of oncology unit.

Inclusion and exclusion criteria

Those adult (≥ 18 years) patients diagnosed with any form or type of cancer included in the study. However, patients who are unable to give proper information or critically ill patients at the time of interview and those with prior history of mental disorder were excluded from the study.

Sampling and data collection

The required sample size was determined using single population proportion formula

$n = (z^2 \cdot P(1-P) / d^2)$, where n is the sample size, z is the standard normal score set at 1.96, d is the desired degree of accuracy and p is the estimated proportion of the target population. By taking $P=50\%$, $Z= 1.96$ and $w=5\%$, the computed sample size was 384 and by

taking 10 % non response rate, the total sample size computed was 422. Systematic random sampling technique was used for this study. Cancer patients who were visiting HUCSH cancer clinic during the study period; and who fulfilled the inclusion criteria were included in the study until the final study sample size was reached.

Data was collected by three oncology nurses who had received two days of intense training on data collection methodologies and instruments. In 5% of the sample, a pre-test was conducted to identify potential problems with the data collecting tools, as well as to assess the consistency of the questionnaires and the performance of the data collectors. During data collection, supervision was maintained, and each questionnaire was checked for completeness on a daily basis by the supervisor.

Variables and measurements

Data were collected by using interviewer administered structured questionnaire. It consists independent variables such as sociodemographic characters, clinical related factors of patients, and healthy life style related related factors (nutritional status, BMI, substance use, etc.) and dependent variables (depression and anxiety). The questionnaire is developed in English and transated to local language (Amharic) and the Amharic version was used to collect the data.

The Hospital Anxiety and Depression Scale (HADS) was used to assess the dependent variables anxiety and depression. It consists of two subscales, anxiety and depression (29). The HADS consists of 14 items, seven items for the anxiety subscale (HADS anxiety) and seven for the depression subscale (HADS depression). Each item is scored on a response-scale with four alternatives ranging between 0 and 3 (30). Item scores were summed to provide subscaled scores of anxiety and depression, ranged between 0 and 21, and total summed score ranged from 0 to 42. A higher score represents higher symptoms of anxiety or depression (31). Recommended cut-off scores are 8–10 for doubtful cases and ≥ 11 for definite cases (29).

The Eastern Cooperative Oncology Group Scale (ECOG) was used to measure the patient's performance status. This scale captures patient-derived functional status data on a scale of 0 to 4. An ECOG score of 2 to 4 indicates a poor performance status, whereas a score of 0 to 1 indicates a good performance status. Researchers have confirmed the validity of the ECOG Chinese version in assessing the performance status of Chinese cancer patients (32).

The five item Psychosis Screening Questionnaire (PSQ-5) was used to assess the presence of psychotic symptoms in the past year (33). The PSQ has five probe questions enquiring about mania, thought insertion, paranoia, strange experiences and hallucinations. Individuals with psychosis were those who answered yes to one or more psychotic symptoms on the PSQ (34).

To assess suicide behaviour a 4 items suicidal behaviour questionnaire revised (SBQ-R) was used. SBQ-R item 1 taps in to life time suicidal ideation and attempt; item 2 assesses the frequency of suicidal ideation over the past twelve months; item 3 taps into the threat of suicide behaviour; and item 4 evaluates self-reported likelihood of suicidal behaviour. The sensitivity 80%, specificity 91% with a score of 3-18 and cut-off point ≥ 8 for adult clinical population (35).

Level of social support among cancer patients was assessed using the 3 item Oslo social support scale (OSSS) and the scores range from 3-14. It is categorized as poor (3-8), moderate (9-11) and strong (12-14) social support (36).

Intensity of cancer pain was assessed using universal pain screening with a 0-10 pain intensity numeric rating scale (NRS). Pain intensity categorized as “none” for a score of 0, “mild” for a score of 1 to 3, “moderate” for a score of 4 to 6, and “severe” for a score of 7 to 10) as reported by the patient (37,38).

Nutritional status was assessed using Mini-nutritional Assessment Short-Form (MNA®-SF) scale. It is a screening tool to assess malnutrition or risk of malnutrition and consists of 6 items related to appetite, loss of weight, mobility, mental distress or acute disease, presence of cognitive impairment, and body mass index (BMI) (39). A score of 12-14 are considered normal nutritional status and a score of ≤ 11 indicates malnutrition or risk of malnutrition (40).

Data processing and analysis

Data were entered to Epi-data version 3.1 and exported to SPSS version 24 for windows for analysis. Descriptive statistics were used to identify distributions of socio-demographic characteristics of study participants. Prevalence of anxiety and depression symptoms were calculated by summing up the HADS and dichotomizing the total score in to positive or negative for presence of depression or anxiety. Both bivariate multivariable logistic regression analyses with 95% CI was used to see the association between each independent and outcome variables. During the bivariate analyses variables with p-value less than 0.20 entered into a multivariable logistic regression model using a enter method. Finally those variables which showed statistical significance at $P < 0.05$ and 95% CI in the final model were reported as independently associated with anxiety and depression. The model fitness test was conducted using the Hosmer and Lemeshow goodness of fit test.

Patients and public involvement

Patients and the public were not involved in this study, including the recruitment, data collection, analysis, interpretation and dissemination of the results.

RESULT

Socio-demographic characteristics of the patients

A total of 423 cancer patients were targeted for the study, with 415 participating at a response rate of 98.3%. The mean age of patients is 42.51 (SD±14.24) years. The study participants were dominantly Protestant 146(35.2%) by religion followed by Orthodox Christianity 136(32.8%). The majority of study subjects 339(81.7%) were married. From a total participants 160(38.6%) were unable to read and write, 346(83.4%) were unemployed and nearly one-third 133(32.0%) were rural residents (Table 1).

Table 1: Socio-demographic characteristics of cancer patients at HUCSH, 2019 (N=415)

Variables	Category	Frequency	Percentage
Mean (±SD) Age in Years		42.51 (±14.24)	
Gender	Male	144	34.7
	Female	271	65.3
Religion	Protestant	146	35.2
	Orthodox	136	32.8
	Muslim	125	30.1
	Other	8	1.9
Educational status	Unable to read and write	160	38.6
	Primary education	125	30.1
	Secondary education	79	19.0
	College and above	51	12.3
Marital Status	Married	339	81.7
	Single	44	10.6
	Widowed	28	6.7
	Divorced	4	1
Occupation	Employed	69	16.6
	Unemployed	346	83.4
Residence	Urban	282	68.0
	Rural	133	32.0

Clinical characteristics of the patients

The median time since cancer diagnosis and time to begin treatment are 5 and 3 months, respectively. More than one-third 148(35.7%) have breast cancer followed by gastrointestinal related cancer 84(20.2%), 173(41.7%) were stage-III, 180(43.4%) have moderate level of pain, 66(64.1%) of the patients were on chemotherapy and nearly half 195(47.0%) had moderate social support (table 2).

Table 2: Clinical characteristics of cancer patients at HUCSH, 2019 (N=415)

Variables	Category	Frequency	Percentage
Type of Ca	Breast Cancer	148	35.7
	Cervical Cancer	7	1.7
	Genitourinary Cancer	31	7.5
	Gastrointestinal Cancer	84	20.2
	Lung Cancer	13	3.1
	Lymphoma	51	12.3
	Other	81	19.5
WHO Ca Staging (I-IV)	I	15	3.6
	II	54	13.0
	III	173	41.7
	IV	129	31.1
	Unknown	44	10.6
Intensity of Pain	None	48	16.6
	Mild	58	14.0
	Moderate	180	43.4
	Severe	129	31.0
Type of Treatment	Chemotherapy only	266	64.1
	Surgery only	15	3.6
	Combination therapy	134	32.3
Take corticosteroid medication	Yes	350	84.3
	No	65	15.7
Comorbid Chronic medical illness	Yes	65	15.7
	No	350	84.3
Use of substance over the last 3 months	Yes	17	4.1
	No	398	95.9
Performance status (ECOG scale)	Good	364	87.7
	Poor	51	12.3
Duration of illness	<12 months	355	85.5
	13-36 months	48	11.6
	>37 months	12	2.9
Duration of treatment	<12 months	375	90.4
	13-36 months	31	7.5
	>37 months	9	2.2
Malnutrition	Yes	303	27.0
	No	112	73.0
BMI	Under weight	71	17.1
	Normal weight	282	68.0
	Over weight	46	11.1
	Obese	16	3.9
Problem of eating	Yes	393	94.7
	No	22	5.3
Psychosis	Yes	236	56.9
	No	179	43.1
Suicide behavior	Yes	32	7.7
	No	383	92.3
Social support	Poor	124	29.9
	Moderate	195	47.0
	Strong	96	23.1

Prevalence of depression and anxiety symptoms

The prevalence of depression and anxiety symptoms among cancer patients was found to be 58.8% (n=244) and 60% (n=249), respectively, in our study as indicated in figure 1.

Independent predictors of depression and anxiety among cancer patients

Among many variables included in the bivariate analysis, those variables (occupation, type of Ca, stage of Ca, intensity of pain, type of Ca treatment, taking of corticosteroid medication, comorbid medical illness, anxiety, psychosis, malnutrition, problems of eating, age and BMI) with p-value <0.25 was included in multivariate logistic regression analysis. Only five variables i.e. age >50 years (AOR= 2.24, 95% CI= 1.14, 4.40), being unemployed (AOR=1.96, 95% CI= 1.08, 3.56), stage of cancer (stage-III (AOR= 5.37, 95% CI= 1.34, 21.45) and stage-IV (AOR=4.55, 95% CI=1.12, 18.44)), comorbid psychotic symptoms (AOR= 1.67, 95% CI= 1.07, 2.61) and problem of eating in the past two weeks (AOR=6.16, 95% CI=1.98, 19.11) were independent factors of depression symptoms among cancer patients (table 3).

Table 3: bivariate and multi-variate regression on depressive symptoms and associated factors among cancer patients

Variables	Category	Depression				COR (95% CI)	AOR (95% CI)
		Yes		No			
		N	%	N	%		
Age	<30 Years	45	51.1	43	48.9	1	1
	31-50 years	130	56.8	99	43.2	1.19(0.73, 1.96)	1.02(0.58, 1.77)
	>50 years	69	70.4	29	29.6	2.66(1.46, 4.84)***	2.24(1.14, 4.40)*
Occupation	Employed	34	49.3	35	50.7	1	1
	Unemployed	210	60.7	136	39.3	1.59(0.95, 2.67)***	1.96(1.08, 3.56)*
Type of cancer	Breast cancer	93	62.8	55	37.2	1	1
	Cervical cancer	3	42.9	4	57.1	0.44(0.09, 2.05)	0.42(0.08, 2.21)
	Genitourinary Ca	19	61.3	12	38.7	0.93(0.42, 2.07)	0.95(0.39, 2.31)
	Gastrointestinal Ca	47	56.0	37	44.0	0.75(0.43, 1.29)	0.70(0.36, 1.36)
	Lung Ca	12	92.3	1	7.7	7.09(0.89, 56.07)***	7.61(0.90, 64.32)
	Lymphoma	29	56.9	22	43.1	0.78(0.40, 1.48)	0.74(0.34, 1.63)
	Others	41	50.6	40	49.4	0.60(0.35, 1.04)***	0.72(0.38, 1.34)
	WHO Stage of Ca	Stage-I	5	33.3	10	66.7	1
WHO Stage of Ca	Stage-II	30	55.6	24	44.4	2.50(0.75, 8.30)***	2.87(0.69, 11.95)
	Stage-III	102	62.0	71	38.0	2.87(0.94, 8.76)***	5.37(1.34, 21.45)*
	Stage-IV	77	60.6	52	39.4	2.96(0.65, 9.16)***	4.55(1.12, 18.44)*
	Unknown	30	53.5	14	46.5	4.28(1.23, 14.91)***	2.11(0.49, 8.95)
	Intensity of pain	None	32	66.7	16	33.3	1
Mild		36	62.1	22	37.9	0.81(0.36, 1.82)	0.76(0.23, 2.55)
Moderate		104	57.8	76	42.2	0.68(0.35, 1.33)	0.59(0.16, 2.12)
Severe		72	55.8	57	44.2	0.63(0.31, 1.26)***	0.54(0.15, 1.98)
Type of treatment	Chemotherapy	154	57.9	112	42.1	1	1
	Surgery	11	73.3	4	26.7	2.00(0.62, 6.44)***	2.18(0.058, 8.29)
	Combination	79	59.0	55	41.0	1.04(0.68, 1.59)	1.01(0.59, 1.71)
Take corticosteroid	Yes	198	56.6	46	43.4	0.54(0.30, 0.96)	0.42(0.14, 1.21)
	No	152	70.8	19	29.2	1	1
Comorbid medical illness	Yes	43	66.2	22	33.8	1.45(0.83, 2.53)	1.13(0.59, 2.16)
	No	201	57.4	149	42.6	1	1
Anxiety	Yes	154	54.2	95	45.8	1.37(0.92, 2.04)***	1.29(0.83, 2.03)
	No	90	61.8	76	38.2	1	1
Psychosis	Yes	149	53.1	87	46.9	1.51(1.02, 2.24)***	1.67(1.07, 2.61)*
	No	95	63.1	84	36.9	1	1
Malnutrition	Yes	185	52.7	118	47.3	0.71(0.45, 1.09)***	1.42(0.81, 2.47)
	No	59	61.1	53	38.9	1	1
Problem of eating	Yes	236	36.4	157	63.6	2.63(1.07, 6.41)***	6.16(1.98, 19.11)**
	No	8	60.1	14	39.9	1	1
BMI	Under weight	42	59.2	29	40.8	0.48(0.14, 1.64)***	0.63(0.15, 2.62)
	Normal weight	162	57.4	120	42.6	0.45(0.14, 1.43)***	0.47(0.13, 1.75)
	Over weight	28	60.9	18	39.1	0.51(0.14, 1.86)	0.52(0.12, 2.20)
	Obese	12	75.0	4	25.0	1	1

N- number; Ca- cancer; BMI- Body mass index; *p-value <0.05; **p-value <0.01; *** p-value <0.001; COR- Crude odds ratio; AOR- Adjusted odds ratio

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Therefore, older patients (>50 years) were 2 times more likely to be affected by depression than younger age groups (<30 years) and unemployed patients were nearly two times more likely to be affected by depression than those who were employed. Those patients with advanced stage of cancer (stage-III were 5.3 times and stage-IV were 4.5 times) more likely to develop depression than those who were Stage-I. Furthermore, cancer patients with comorbid psychotic symptoms and eating problems in the past two weeks were 1.6 and 6.1 times more likely to be affected by depression than their counter parts.

In addition, patients with cancer stage of II (AOR= 3.92, 95% CI= 1.07, 14.36) and IV (AOR= 5.04, 95% CI= 1.44, 17.59) are 4 and 5 times more likely to be affected by anxiety, respectively, than those patients with cancer Stage-I. Cancer patients with comorbid psychosis (AOR= 1.73, 95% CI= 1.12, 2.66) were 1.7 times to be affected by anxiety as shown in table 4.

Table 4: bivariate and multi-variate regression on anxiety symptoms and associated factors among cancer patients

Variables	Category	Anxiety		COR (95% CI)		AOR (95% CI)	
		Yes		No			
		N	%	N	%		
Educational status	Not able to read and write	91	56.9	69	43.1	1.17(0.62, 2.20)	0.98(0.48, 1.99)
	Primary	81	64.8	44	35.2	1.63(0.84, 3.17)**	1.31(0.64, 2.68)
	Secondary	50	63.3	29	36.7	1.53(0.75, 3.13)**	1.60(0.73, 3.46)
	College or above	27	52.9	24	47.1	1	1
Residence	Urban	177	62.8	105	37.2	1	1
	Rural	72	54.1	61	45.9	0.70(0.46, 1.06)**	0.70(0.43, 1.12)
Type of cancer	Breast cancer	92	62.2	56	37.8	1	1
	Cervical cancer	4	57.1	3	42.9	0.81(0.17, 3.76)	0.69(0.13, 3.42)
	Genitourinary Ca	21	67.7	10	32.3	1.27(0.56, 2.91)	1.16(0.47, 2.84)
	Gastrointestinal Ca	42	50.0	42	50.0	0.60(0.35, 1.04)**	0.55(0.30, 1.02)
	Lung Ca	6	46.2	7	53.8	0.52(0.16, 1.63)	0.38(0.11, 1.29)
	Lymphoma	36	70.6	15	29.4	1.46(0.73, 2.90)	1.37(0.62, 2.98)
	Others	48	59.3	33	40.7	0.88(0.50, 1.54)	0.84(0.45, 1.56)
Stage of Ca	Stage-I	5	33.3	10	66.7	1	1
	Stage-II	33	61.1	21	38.9	3.14(0.94, 10.48)**	3.92(1.07, 14.36)*
	Stage-III	100	57.3	73	42.7	2.74(0.89, 8.35)**	3.29(0.97, 11.09)
	Stage-IV	86	67.4	43	32.6	4.00(1.28, 12.43)**	5.04(1.44, 17.59)*
	Unknown	25	55.8	19	44.2	2.36(0.77, 8.98)**	3.35(0.89, 12.63)
Take corticosteroid	Yes	215	61.4	31	38.6	1	1
	No	135	52.3	34	47.7	0.68(0.40, 1.17)**	0.66(0.33, 1.31)
Medical illness	Yes	33	50.8	32	49.2	0.64(0.37, 1.08)**	0.61(0.33, 1.11)
	No	216	61.7	134	38.3	1	1
Social support	Poor	77	62.1	47	37.9	1.44(0.84, 2.48)**	1.68(0.90, 3.13)
	Moderate	121	62.1	74	37.9	1.44(0.88, 2.36)**	1.52(0.89, 2.62)
	Strong	51	53.1	45	46.9	1	1
Depression	Yes	95	55.6	76	44.4	1.36(0.91, 2.03)**	1.34(0.86, 2.09)
	No	154	63.1	90	36.9	1	1
Psychosis	Yes	152	54.2	84	45.8	1.53(1.02, 2.27)**	1.73(1.12, 2.66)*
	No	97	64.4	82	35.6	1	1
Age	<30 Years	58	65.9	30	34.1	1	1
	31-50 years	132	57.6	97	42.4	0.70(0.42, 1.17)**	0.87(0.49, 1.54)
	>50 years	59	60.2	39	39.8	0.78(0.43, 1.42)	1.12(0.55, 2.29)
Problem of eating	Yes	239	45.5	154	54.5	1.86(0.78, 4.41)**	1.92(0.73, 5.00)
	No	10	60.8	12	39.2	1	1

*p-value <0.05, **p-value <0.25; Ca- cancer, COR- crude odds ratio, AOR- adjusted odds ratio

DISCUSSION

The primary aim of this study was to look into the prevalence of anxiety and depression symptomatology among Ethiopian cancer patients, as well as the risk factors associated with them. In our study, the prevalence of depression symptoms among cancer patients was found to be 58.8% (95% CI: 54.0, 63.6). This finding is similar to the results of a study on cancer patients conducted in Gondar (58.4%) (41), Pakistan (61.6%) (42) and the pooled prevalence (54.9%) in China (10). However, compared with some previous literature, the reported rates of depression in our study were slightly lower from a study in Bahir Dar and Gonder, Ethiopia (70.8%) (43), Rwandan study (67.7%) (27), and another Chinese study (66.7%) (44). On the other hand, our finding is higher than studies by Naser A. et al., in Jordan (23.4%) (45). This disparity might be attributed to differences in the study populations in terms of cancer types, screening tools used, or other socio-demographic variations and severity of depression taken into account.

Regarding the prevalence of anxiety symptoms in Ethiopian cancer patients, our finding 60% (95% CI: 55.4, 64.6) is higher with studies in Gondar (51%) (41), China (43.5%) (46), Iran (43.2%) (47), Jordan (19.9%) (44), Rwanda (52.1%) (27), and Sudanese (26.7%) (48) studies. However, the results presented in this study confirm that cancer patients suffer from psychological or psychiatric complications. This variation could be due to differences in participants' place of residence, demographic characteristics of participants, methodological differences of the studies, and sample size.

Similar to previous studies (49) the finding of this study showed that, older age groups were more prone to depression. Older patients experience longer disease duration, a higher risk of cancer metastases, and more disability, all of which contribute to depression. (50). Another reason could be that older patients have difficulty asking for assistance and communicating with others. Furthermore, worrying about excessive treatment costs and family financial difficulties may be causes of psychological distress.

Findings from previous studies indicated that depressive symptoms are more common in unemployed individuals (51). Similarly, our result underlined that unemployed cancer patients are more likely to be affected by depression than their counter parts. Hence, unemployment in combination with cancer exerts overwhelming physical and psychological strain such as depression in an individual (52). On the other hand, substantial number of cancer patients suffer from psychosomatic and social problems such as tiredness, pain, cognitive deficits, anxiety, and depression (53). These enduring physical and psychological effects of cancer or

its treatment may be a reason for social and occupational dysfunction including the withholding of employment (54).

High magnitude of anxiety and depression can be related to end-stage of cancer (50). In line with this, our study also showed that cancer patients with advanced disease stages are vulnerable for anxiety. This might be related to the higher levels of physical debilitation and advanced illnesses (55). Prevalence of psychiatric disorders mostly varies at different stages of cancer. Despite the fact that adjustment disorders with depressed or anxious moods are more frequent at early stage of the disease; severe psychiatric complications such as very severe anxiety and major depression are more common in late stages of cancer (56). As a result, late-stage cancer patients are more likely to be subjected to high doses of chemotherapy or any other anticancer treatment, resulting in a loss of appetite. Chemotherapy has been reported to cause severe sadness, anger, anorexia, and anxiety in cancer patients, despite the fact that it frequently enhances survival rates (55).

Even though, depression and psychosis are considered as a separate concept, this study showed that cancer patients with comorbid psychotic symptoms are more prone to depression. Clinically, this suggests diagnoses such as schizoaffective or mood disorders with psychotic features, in which depressive and psychotic symptoms co-occur. The comorbidity between depression and psychotic disorders is very high, too (57). Experiencing psychotic symptoms such as hallucination and delusion induce feelings of fear, hopelessness and helplessness which ends up with depression (58). Conversely, depression could have an impact on psychotic symptoms by provoking negative appraisal of external stimuli, consequently increasing psychotic symptoms (59). Also, psychosis and depression may result from shared liability that leads both to exist on the same continuum (60). However, further research is needed to clarify this complex relationship.

We also found out that depression is more experienced by patients with eating problems such as nausea and vomiting. Because patients may feel nauseous or vomit the week or day before treatment, as they approach the clinic, or even just thinking about chemotherapy (8). Besides, exposure to high doses of chemotherapeutic and steroid agents induce depressive symptoms such as reduced appetite caused by gastro-intestinal side effects like nausea and vomiting (61,62).

Symptoms and syndromes of anxiety are present in the majority of patients with psychotic illness (63) and psychotic symptoms are often reported in patients with affective disorders like anxiety disorders, too (64). Similar to these findings in our study patients with comorbid

psychotic symptoms are more likely to develop anxiety than their counterparts. As a result, affective dysregulation (anxiety) and reality distortion are coexisted within the range of subclinical and clinical expression (65).

Despite providing valuable baseline data, this study has also some limitations encountered. The study is cross-sectional and direction of association between depression and anxiety and related factors could not be established. Some of the physical symptoms, which are part of the HADS symptom list, may have been due to the cancer itself or its treatment rather than due to depression or anxiety. These may have an impact on the magnitude of depression or anxiety in this study. This is the first study of its kind in Ethiopia and one of the very few in Africa. Therefore, the study is an important contribution to our knowledge regarding the potential role of depression and anxiety in the treatment of cancer in these area.

CONCLUSIONS

The prevalence of depression and anxiety amongst cancer patients was considerably high. Occupation, stage of cancer, comorbid psychotic symptoms, problem of eating in the past two weeks and age of the patients were independent factors of depression among cancer patients. In addition, cancer stage and comorbid psychosis were associated with anxiety. Perhaps more attention is needed to detect changes in the psychological status of cancer patients in an effort to reduce the occurrence of depression and anxiety. Continuous screening for anxiety and depression is recommended as a necessary approach for good cancer care; on the other hand, after the diagnosis of clinically important psychological disorders, proper treatment interventions must be performed to improve the quality of life in these patients. Also, special attendtion should be given for cancer patients with the mentioned risk factors of depression and anxiety.

Abbreviations

- AOR – Adjusted Odd Ratio
- APA - American Psychiatry Association
- CI – Confidence Interval
- COR – Crude Odd Ratio
- ECOG - Eastern Cooperative Oncology Group Scale
- IRB - Institutional Review Board
- HADS - Hospital Anxiety And Depression Scale
- HUCSH - Hawassa University Comprehensive Specialized Hospital
- OR- Odd Ratio
- OSSS- Oslo Social Support Scale

PSQ-5 - Psychosis Screening Questionnaire

SBQ-R - Suicidal Behavior Questioner Revised

SPSS- Statistical Package for Social Science

WHO-World Health Organization

Declarations

Consent for publication

Not applicable

Availability of data and material

All the datasets used and analyzed during the current study are available on this manuscript.

Competing interests

The authors declare no competing interests.

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Authors Contribution

MA, BD, BDu, DG, NB, LG, AG and AB were involved in the design and data collection of the study. MA and BD performed the analysis and write up of the study. MA prepare the manuscript for publication and all authors critically reviewed the manuscript. All authors read and approved the final manuscript.

Ethics Statement

This study was approved by the Institutional Review Board at the College of Medicine and Health Sciences of Hawassa University (No. IRB/047/11, on date 26/02/2019). Permission was also obtained from administrative bodies HUCSH. Patients were enrolled into the study on a voluntary basis after a thorough explanation about the study. They were informed and obtained verbal consent and interviewed during their visits to the cancer treatment center. Any information obtained from the patients was kept confidential.

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Figure Legend

Figure 1: Prevalence of depression and anxiety symptoms among cancer patients attending Oncology unit at Hawassa University Comprehensive Specialized Hospital, Southern Ethiopia, 2019 (N=415)

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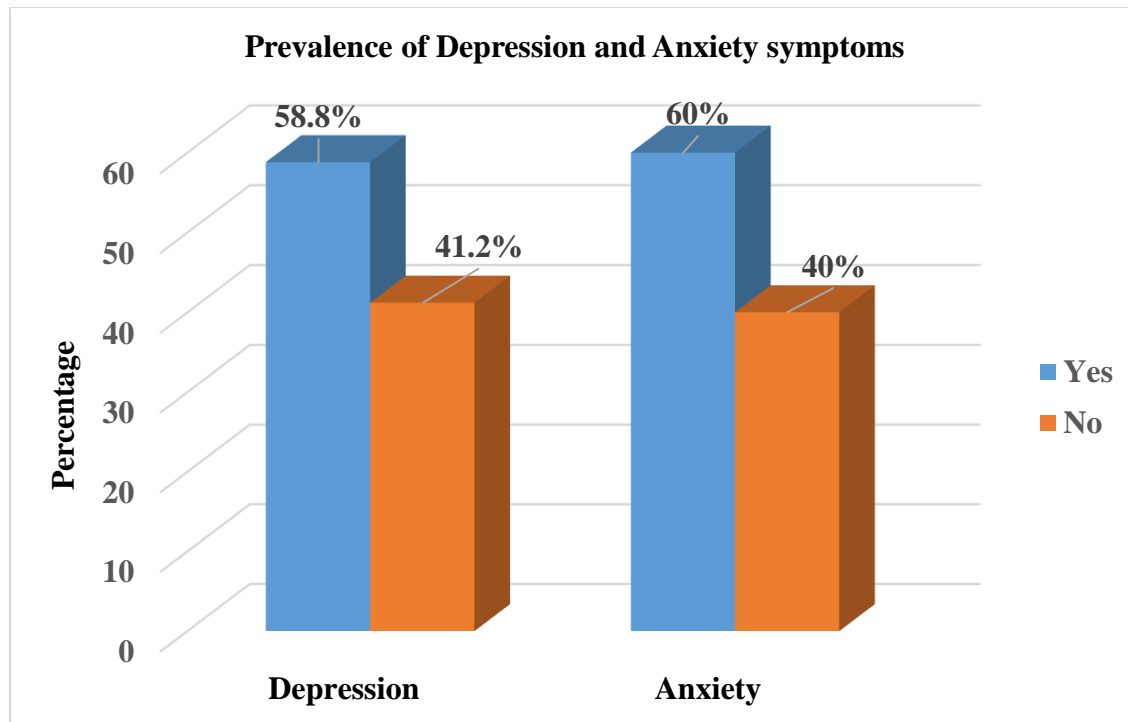


Figure 1: Prevalence of depression and anxiety symptoms among cancer patients attending Oncology unit at Hawassa University Comprehensive Specialized Hospital, Southern Ethiopia, 2019 (N=415)

Prevalence of depression and anxiety symptoms and its determinant factors among cancer patients in southern Ethiopia: a cross-sectional study

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Prevalence of depression and anxiety symptoms and its determinant factors among cancer patients in southern Ethiopia: a cross-sectional study

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Abstract

Objective: The study was aimed to assess the prevalence of depression and anxiety symptoms and its determinant factors among cancer patients attending follow-up at Hawassa University Comprehensive Specialized Hospital cancer treatment center, Ethiopia.

Design: Institution based cross-sectional study design was implemented.

Setting: Cancer patients at Hawassa University Comprehensive Specialized Hospital cancer treatment center from October 2019 to December 2019.

Participants: Randomly selected 415 cancer patients who had follow up at cancer treatment center.

Main outcome measures: Anxiety and depression symptoms were assessed using Hospital Anxiety and Depression Scale (HADS).

Result: The prevalence of depression and anxiety symptoms were found to be 244(58.8%) and 249(60.0%), respectively. Older age (>50 years) (AOR (adjusted odds ratio) = 2.24, 95% CI (confidence interval) = 1.14, 4.40), being unemployed (AOR=1.96, 95% CI= 1.08, 3.56), advanced stage of cancer such as stage-III (AOR= 5.37, 95% CI= 1.34, 21.45) and stage-IV (AOR=4.55, 95% CI=1.12, 18.44), comorbid psychotic symptoms (AOR= 1.67, 95% CI= 1.07, 2.61) and problem of eating in the past two weeks (AOR=6.16, 95% CI=1.98, 19.11) were independent factors significantly associated with depressive symptoms. In addition, cancer stage such as stage-II (AOR=3.92, 95% CI=1.07, 14.36) and stage-IV (AOR=5.04, 95% CI=1.44, 17.59) and comorbid psychotic symptoms (AOR= 1.73, 95% CI= 1.12, 2.66) were significantly associated with anxiety symptoms.

Conclusion: Depression and anxiety symptoms amongst cancer patients were considerably high. Age, occupation, stage of cancer, comorbid psychotic symptoms, and problem of eating were determinant factors of depressive symptoms among cancer patients. Besides, stage of cancer and comorbid psychosis were determinants of anxiety symptoms. Health care professionals working in the oncology unity need to conduct routine screening and treatment of depression and anxiety symptoms for cancer patients.

Keywords: Prevalence, Anxiety, Depression, Cancer, HADS, Hawassa, Ethiopia

Strengths and limitations of the study

- We use standardized questionnaires to assess dependent variables and this study also provide valuable baseline data in the area.
- The study is cross-sectional and direction of association between depression and anxiety and related factors could not be established.
- Some of the physical symptoms due to the cancer itself or its treatment may have an impact on the magnitude of depression or anxiety.
- Risk of biased responses such as social desirability bias by which patients either exaggerate or minimize the symptoms of depression and anxiety for some reason.

Introduction

Now a days, cancer is one of the world's most serious public health agenda and it is second leading cause of death (1). In 2018, the World Health Organization (WHO) estimated that cancer caused approximately 18 million new cases and 9.6 million deaths worldwide (2). Breast, lung, colorectal, prostate, and skin cancer are the most common causes of cancer death. According to their diagnosis, cancer patients undergo a unique treatment modalities, such as surgery, radiation, and chemotherapy (3).

When a person is diagnosed with cancer, they are more likely to experience adverse mental health outcomes such as depression and anxiety (4,5). Depression and anxiety are the two most prevalent and debilitating neuropsychiatric disorders caused by physical illnesses like cancer (6). Depression and anxiety are both psychological and physiological disturbances characterized by a set of physical, emotional, and behavioral elements (7).

Cancer patients initially experience shock or denial, followed by emotional chaos, nervousness, lack of concentration, difficulty falling asleep, loss of appetite, irritability, and intrusive thoughts about the future (8). Anxiety and depression are frequent emotional reactions to a cancer diagnosis and are deemed normal. Some patients, however, have an overpowering reaction that interferes with their everyday activities, (9) and high levels of signs and symptoms can last for weeks, months, or even years (10). These are due to perceived threats such as loss of body functions, changes in appearance, disruption of family and life plans, death, diminished quality of life, recurrence or progression of the disease, and the occurrence of unpleasant symptoms such as pain, nausea, and fatigue (8,11).

According to a recent study conducted in the United Kingdom, depression and anxiety affect approximately 20% and 10% of cancer patients, respectively, compared to 5% and 7% of the general population (12). Furthermore, depression is the most studied psychiatric disorder in cancer patients, with prevalence ranging from 3% to 58% (13–16). However, according to a previous studies, nearly three-fourths (73%) of these depressed cancer patients do not receive appropriate psychiatric intervention, and only 5% seek mental health professional help (17). Early detection and treatment of depression and anxiety in cancer patients, on the other hand, results in a reduction in disease progression, increased survival rates, lower medical costs, and improved quality of life (18,19).

Almost two-third of patients with cancer have significant levels of anxiety and depression, which impairs individuals quality of life (QOL) (20), and increases their risk of suicide (21). Furthermore, untreated depression and anxiety have significant negative consequences,

including altered treatment decision-making (22), non-compliance with treatment, extended recovery times (10), increases the intensity of pain (23). Depression has been shown to be under-diagnosed and under-recognized in clinical practice (24), owing to the complex nature and inter-relationship between cancer and depression in cancer patients (25,26).

Despite the fact that depression and anxiety are the most common complications in cancer patients, they are frequently overlooked (27). Furthermore, the psychosocial requirements of cancer patients, whether they have a prior mental illness history or not, are frequently overlooked during cancer therapy, which is primarily focused on addressing somatic symptoms and side effects. Earlier detection and improved treatment of cancer makes people to live longer with cancer, given away a major global challenge (28). As far as our knowledge, there is a scarcity of explicit data showing evidence in the Ethiopian context in general, and in the study area in particular, regarding the mental health problems of people living with cancer. Therefore, the objective of this study was to assess the prevalence of depression and anxiety symptoms in Ethiopian cancer patients, as well as to identify various influencing factors for depression and anxiety symptoms.

Methods and Materials

Study design and setting

From October to December 2019, an institution-based cross-sectional study design was used at Hawassa University Comprehensive Specialized Hospital (HUCSH) cancer treatment center. The hospital is the only one in the region that provides cancer care, and it is now constructing one of Ethiopia's largest cancer treatment centers.

Study subjects

Randomly selected patients diagnosed with cancer and who have follow up at out patient department of oncology unit.

Inclusion and exclusion criteria

Those adult (≥ 18 years) patients diagnosed with any form or type of cancer included in the study. However, patients who are unable to give proper information or critically ill patients at the time of interview and those with prior history of mental disorder were excluded from the study.

Sampling and data collection

The required sample size was determined using single population proportion formula $(Z_{\alpha/2})^2 * p * (1-p) / d^2$, where n is the sample size, z is the standard normal score set at 1.96, d is the desired degree of accuracy and p is the estimated proportion of the target population. By taking $P=50\%$, $Z_{\alpha/2}= 1.96$ and $w=5\%$, the computed sample size was 384 and by taking 10%

non response rate, the total sample size computed was 422. Systematic random sampling technique was used for this study. Cancer patients who were visiting HUCSH cancer clinic during the study period; and who fulfilled the inclusion criteria were included in the study until the final study sample size was reached.

Data was collected by three oncology nurses who had received two days of intense training on data collection methodologies and instruments. In 5% of the sample, a pre-test was conducted to identify potential problems with the data collecting tools, as well as to assess the consistency of the questionnaires and the performance of the data collectors. During data collection, supervision was maintained, and each questionnaire was checked for completeness on a daily basis by the supervisor.

Variables and measurements

Data were collected by using interviewer administered structured questionnaire. It consists independent variables such as sociodemographic characters, clinical related factors of patients, and healthy life style related related factors (nutritional status, BMI, substance use, etc.) and dependent variables (depression and anxiety). The questionnaire is developed in English and transated to local language (Amharic) and the Amharic version was used to collect the data.

The Hospital Anxiety and Depression Scale (HADS) was used to assess the dependent variables anxiety and depression. It consists of two subscales, anxiety and depression (29). The HADS consists of 14 items, seven items for the anxiety subscale (HADS anxiety) and seven for the depression subscale (HADS depression). Each item is scored on a response-scale with four alternatives ranging between 0 and 3 (30). Item scores were summed to provide subscaled scores of anxiety and depression, ranged between 0 and 21, and total summed score ranged from 0 to 42. A higher score represents higher symptoms of anxiety or depression (31). Recommended cut-off scores are 8–10 for doubtful cases and ≥ 11 for definite cases (29).

The Eastern Cooperative Oncology Group Scale (ECOG) was used to measure the patient's performance status. This scale captures patient-derived functional status data on a scale of 0 to 4. An ECOG score of 2 to 4 indicates a poor performance status, whereas a score of 0 to 1 indicates a good performance status. Researchers have confirmed the validity of the ECOG Chinese version in assessing the performance status of Chinese cancer patients (32).

The five item Psychosis Screening Questionnaire (PSQ-5) was used to assess the presence of psychotic symptoms in the past year (33). The PSQ has five probe questions enquiring about mania, thought insertion, paranoia, strange experiences and hallucinations. Individuals with psychosis were those who answered yes to one or more psychotic symptoms on the PSQ (34).

To assess suicide behaviour a 4 items suicidal behaviour questionnaire revised (SBQ-R) was used. SBQ-R item 1 taps in to life time suicidal ideation and attempt; item 2 assesses the frequency of suicidal ideation over the past twelve months; item 3 taps into the threat of suicide behaviour; and item 4 evaluates self-reported likelihood of suicidal behaviour. The sensitivity 80%, specificity 91% with a score of 3-18 and cut-off point ≥ 8 for adult clinical population (35).

Level of social support among cancer patients was assessed using the 3 item Oslo social support scale (OSSS) and the scores range from 3-14. It is categorized as poor (3-8), moderate (9-11) and strong (12-14) social support (36).

Intensity of cancer pain was assessed using universal pain screening with a 0-10 pain intensity numeric rating scale (NRS). Pain intensity categorized as “none” for a score of 0, “mild” for a score of 1 to 3, “moderate” for a score of 4 to 6, and “severe” for a score of 7 to 10) as reported by the patient (37,38).

Nutritional status was assessed using Mini-nutritional Assessment Short-Form (MNA®-SF) scale. It is a screening tool to assess malnutrition or risk of malnutrition and consists of 6 items related to appetite, loss of weight, mobility, mental distress or acute disease, presence of cognitive impairment, and body mass index (BMI) (39). A score of 12-14 are considered normal nutritional status and a score of ≤ 11 indicates malnutrition or risk of malnutrition (40).

Data processing and analysis

Data were entered to Epi-data version 3.1 and exported to SPSS version 24 for windows for analysis. Descriptive statistics were used to identify distributions of socio-demographic characteristics of study participants. Prevalence of anxiety and depression symptoms were calculated by summing up the HADS and dichotomizing the total score in to positive or negative for presence of depression or anxiety. Both bivariate multivariable logistic regression analyses with 95% CI was used to see the association between each independent and outcome variables. During the bivariate analyses variables with p-value less than 0.20 entered into a multivariable logistic regression model using a enter method. Finally those variables which showed statistical significance at $P < 0.05$ and 95% CI in the final model were reported as independently associated with anxiety and depression. The model fitness test was conducted using the Hosmer and Lemeshow goodness of fit test.

Patients and public involvement

Patients and the public were not involved in this study, including the recruitment, data collection, analysis, interpretation and dissemination of the results.

RESULT

Socio-demographic characteristics of the patients

A total of 423 cancer patients were targeted for the study, with 415 participating at a response rate of 98.3%. The mean age of patients is 42.51 (SD±14.24) years. The study participants were dominantly Protestant 146(35.2%) by religion followed by Orthodox Christianity 136(32.8%). The majority of study subjects 339(81.7%) were married. From a total participants 160(38.6%) were unable to read and write, 346(83.4%) were unemployed and nearly one-third 133(32.0%) were rural residents (Table 1).

Table 1: Socio-demographic characteristics of cancer patients at HUCSH, 2019 (n=415)

Variables	Category	Frequency	Percentage
Mean (±SD) Age in Years		42.51 (±14.24)	
Gender	Male	144	34.7
	Female	271	65.3
Religion	Protestant	146	35.2
	Orthodox	136	32.8
	Muslim	125	30.1
	Other	8	1.9
Educational status	Unable to read and write	160	38.6
	Primary education	125	30.1
	Secondary education	79	19.0
	College and above	51	12.3
Marital Status	Married	339	81.7
	Single	44	10.6
	Widowed	28	6.7
	Divorced	4	1
Occupation	Employed	69	16.6
	Unemployed	346	83.4
Residence	Urban	282	68.0
	Rural	133	32.0

Clinical characteristics of the patients

The median time since cancer diagnosis and time to begin treatment are 5 and 3 months, respectively. More than one-third 148(35.7%) have breast cancer followed by gastrointestinal related cancer 84(20.2%), 173(41.7%) were stage-III, 180(43.4%) have moderate level of pain, 66(64.1%) of the patients were on chemotherapy and nearly half 195(47.0%) had moderate social support (table 2).

Table 2: Clinical characteristics of cancer patients at HUCSH, 2019 (n=415)

Variables	Category	Frequency	Percentage
Type of Ca	Breast Cancer	148	35.7
	Cervical Cancer	7	1.7
	Genitourinary Cancer	31	7.5
	Gastrointestinal Cancer	84	20.2
	Lung Cancer	13	3.1
	Lymphoma	51	12.3
	Other	81	19.5
WHO Ca Staging (I-IV)	I	15	3.6
	II	54	13.0
	III	173	41.7
	IV	129	31.1
	Unknown	44	10.6
Intensity of Pain	None	48	16.6
	Mild	58	14.0
	Moderate	180	43.4
	Severe	129	31.0
Type of Treatment	Chemotherapy only	266	64.1
	Surgery only	15	3.6
	Combination therapy	134	32.3
Take corticosteroid medication	Yes	350	84.3
	No	65	15.7
Comorbid Chronic medical illness	Yes	65	15.7
	No	350	84.3
Use of substance over the last 3 months	Yes	17	4.1
	No	398	95.9
Performance status (ECOG scale)	Good	364	87.7
	Poor	51	12.3
Duration of illness	<12 months	355	85.5
	13-36 months	48	11.6
	>37 months	12	2.9
Duration of treatment	<12 months	375	90.4
	13-36 months	31	7.5
	>37 months	9	2.2
Malnutrition	Yes	303	27.0
	No	112	73.0
BMI	Under weight	71	17.1
	Normal weight	282	68.0
	Over weight	46	11.1
	Obese	16	3.9
Problem of eating	Yes	393	94.7
	No	22	5.3
Psychosis	Yes	236	56.9
	No	179	43.1
Suicide behavior	Yes	32	7.7
	No	383	92.3
Social support	Poor	124	29.9
	Moderate	195	47.0
	Strong	96	23.1

Prevalence of depression and anxiety symptoms

The prevalence of depression and anxiety symptoms among cancer patients was found to be 58.8% (n=244) and 60% (n=249), respectively, in our study as indicated in figure 1.

Independent predictors of depression and anxiety among cancer patients

Among many variables included in the bivariate analysis, those variables (occupation, type of Ca, stage of Ca, intensity of pain, type of Ca treatment, taking of corticosteroid medication, comorbid medical illness, anxiety, psychosis, malnutrition, problems of eating, age and BMI) with p-value <0.25 was included in multivariate logistic regression analysis. Only five variables i.e. age >50 years (AOR= 2.24, 95% CI= 1.14, 4.40), being unemployed (AOR=1.96, 95% CI= 1.08, 3.56), stage of cancer (stage-III (AOR= 5.37, 95% CI= 1.34, 21.45) and stage-IV (AOR=4.55, 95% CI=1.12, 18.44)), comorbid psychotic symptoms (AOR= 1.67, 95% CI= 1.07, 2.61) and problem of eating in the past two weeks (AOR=6.16, 95% CI=1.98, 19.11) were independent factors of depression symptoms among cancer patients (table 3).

Table 3: Bivariable and multi-variable regression on depressive symptoms and associated factors among cancer patients at HUCSH, 2019 (n=415)

Variables	Category	Depression symptoms				COR (95% CI)	AOR (95% CI)
		Yes		No			
		N	%	N	%		
Age	<30 Years	45	51.1	43	48.9	1	1
	31-50 years	130	56.8	99	43.2	1.19(0.73, 1.96)	1.02(0.58, 1.77)
	>50 years	69	70.4	29	29.6	2.66(1.46, 4.84)***	2.24(1.14, 4.40)*
Occupation	Employed	34	49.3	35	50.7	1	1
	Unemployed	210	60.7	136	39.3	1.59(0.95, 2.67)***	1.96(1.08, 3.56)*
Type of cancer	Breast cancer	93	62.8	55	37.2	1	1
	Cervical cancer	3	42.9	4	57.1	0.44(0.09, 2.05)	0.42(0.08, 2.21)
	Genitourinary Ca	19	61.3	12	38.7	0.93(0.42, 2.07)	0.95(0.39, 2.31)
	Gastrointestinal Ca	47	56.0	37	44.0	0.75(0.43, 1.29)	0.70(0.36, 1.36)
	Lung Ca	12	92.3	1	7.7	7.09(0.89, 56.07)***	7.61(0.90, 64.32)
	Lymphoma	29	56.9	22	43.1	0.78(0.40, 1.48)	0.74(0.34, 1.63)
	Others	41	50.6	40	49.4	0.60(0.35, 1.04)***	0.72(0.38, 1.34)
WHO Stage of Ca	Stage-I	5	33.3	10	66.7	1	1
	Stage-II	30	55.6	24	44.4	2.50(0.75, 8.30)***	2.87(0.69, 11.95)
	Stage-III	102	62.0	71	38.0	2.87(0.94, 8.76)***	5.37(1.34, 21.45)*
	Stage-IV	77	60.6	52	39.4	2.96(0.65, 9.16)***	4.55(1.12, 18.44)*
	Unknown	30	53.5	14	46.5	4.28(1.23, 14.91)***	2.11(0.49, 8.95)
Intensity of pain	None	32	66.7	16	33.3	1	1
	Mild	36	62.1	22	37.9	0.81(0.36, 1.82)	0.76(0.23, 2.55)
	Moderate	104	57.8	76	42.2	0.68(0.35, 1.33)	0.59(0.16, 2.12)
	Severe	72	55.8	57	44.2	0.63(0.31, 1.26)***	0.54(0.15, 1.98)
Type of treatment	Chemotherapy	154	57.9	112	42.1	1	1
	Surgery	11	73.3	4	26.7	2.00(0.62, 6.44)***	2.18(0.058, 8.29)
	Combination	79	59.0	55	41.0	1.04(0.68, 1.59)	1.01(0.59, 1.71)
Take corticosteroid	Yes	198	56.6	46	43.4	0.54(0.30, 0.96)	0.42(0.14, 1.21)
	No	152	70.8	19	29.2	1	1
Comorbid medical illness	Yes	43	66.2	22	33.8	1.45(0.83, 2.53)	1.13(0.59, 2.16)
	No	201	57.4	149	42.6	1	1
Anxiety	Yes	154	54.2	95	45.8	1.37(0.92, 2.04)***	1.29(0.83, 2.03)
	No	90	61.8	76	38.2	1	1
Psychosis	Yes	149	53.1	87	46.9	1.51(1.02, 2.24)***	1.67(1.07, 2.61)*
	No	95	63.1	84	36.9	1	1
Malnutrition	Yes	185	52.7	118	47.3	0.71(0.45, 1.09)***	1.42(0.81, 2.47)
	No	59	61.1	53	38.9	1	1
Problem of eating	Yes	236	36.4	157	63.6	2.63(1.07, 6.41)***	6.16(1.98, 19.11)**
	No	8	60.1	14	39.9	1	1
BMI	Under weight	42	59.2	29	40.8	0.48(0.14, 1.64)***	0.63(0.15, 2.62)
	Normal weight	162	57.4	120	42.6	0.45(0.14, 1.43)***	0.47(0.13, 1.75)
	Over weight	28	60.9	18	39.1	0.51(0.14, 1.86)	0.52(0.12, 2.20)
	Obese	12	75.0	4	25.0	1	1

Ca- cancer; BMI- Body mass index; *p-value <0.05; **p-value <0.01; *** p-value <0.001;
COR- Crude odds ratio; AOR- Adjusted odds ratio

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Therefore, older patients (>50 years) were 2 times more likely to be affected by depression than younger age groups (<30 years) and unemployed patients were nearly two times more likely to be affected by depression than those who were employed. Those patients with advanced stage of cancer (stage-III were 5.3 times and stage-IV were 4.5 times) more likely to develop depression than those who were Stage-I. Furthermore, cancer patients with comorbid psychotic symptoms and eating problems in the past two weeks were 1.6 and 6.1 times more likely to be affected by depression than their counter parts.

In addition, patients with cancer stage of II (AOR= 3.92, 95% CI= 1.07, 14.36) and IV (AOR= 5.04, 95% CI= 1.44, 17.59) are 4 and 5 times more likely to be affected by anxiety, respectively, than those patients with cancer Stage-I. Cancer patients with comorbid psychosis (AOR= 1.73, 95% CI= 1.12, 2.66) were 1.7 times to be affected by anxiety as shown in table 4.

Table 4: Bivariate and multi-variable regression on anxiety symptoms and associated factors among cancer patients at HUCSH, 2019 (n=415)

Variables	Category	Anxiety symptoms		COR (95% CI)		AOR (95% CI)	
		Yes		No			
		N	%	N	%		
Educational status	Not able to read and write	91	56.9	69	43.1	1.17(0.62, 2.20)	0.98(0.48, 1.99)
	Primary	81	64.8	44	35.2	1.63(0.84, 3.17)**	1.31(0.64, 2.68)
	Secondary	50	63.3	29	36.7	1.53(0.75, 3.13)**	1.60(0.73, 3.46)
	College or above	27	52.9	24	47.1	1	1
Residence	Urban	177	62.8	105	37.2	1	1
	Rural	72	54.1	61	45.9	0.70(0.46, 1.06)**	0.70(0.43, 1.12)
Type of cancer	Breast cancer	92	62.2	56	37.8	1	1
	Cervical cancer	4	57.1	3	42.9	0.81(0.17, 3.76)	0.69(0.13, 3.42)
	Genitourinary Ca	21	67.7	10	32.3	1.27(0.56, 2.91)	1.16(0.47, 2.84)
	Gastrointestinal Ca	42	50.0	42	50.0	0.60(0.35, 1.04)**	0.55(0.30, 1.02)
	Lung Ca	6	46.2	7	53.8	0.52(0.16, 1.63)	0.38(0.11, 1.29)
	Lymphoma	36	70.6	15	29.4	1.46(0.73, 2.90)	1.37(0.62, 2.98)
	Others	48	59.3	33	40.7	0.88(0.50, 1.54)	0.84(0.45, 1.56)
Stage of Ca	Stage-I	5	33.3	10	66.7	1	1
	Stage-II	33	61.1	21	38.9	3.14(0.94, 10.48)**	3.92(1.07, 14.36)*
	Stage-III	100	57.3	73	42.7	2.74(0.89, 8.35)**	3.29(0.97, 11.09)
	Stage-IV	86	67.4	43	32.6	4.00(1.28, 12.43)**	5.04(1.44, 17.59)*
	Unknown	25	55.8	19	44.2	2.36(0.77, 8.98)**	3.35(0.89, 12.63)
Take corticosteroid	Yes	215	61.4	31	38.6	1	1
	No	135	52.3	34	47.7	0.68(0.40, 1.17)**	0.66(0.33, 1.31)
Medical illness	Yes	33	50.8	32	49.2	0.64(0.37, 1.08)**	0.61(0.33, 1.11)
	No	216	61.7	134	38.3	1	1
Social support	Poor	77	62.1	47	37.9	1.44(0.84, 2.48)**	1.68(0.90, 3.13)
	Moderate	121	62.1	74	37.9	1.44(0.88, 2.36)**	1.52(0.89, 2.62)
	Strong	51	53.1	45	46.9	1	1
Depression	Yes	95	55.6	76	44.4	1.36(0.91, 2.03)**	1.34(0.86, 2.09)
	No	154	63.1	90	36.9	1	1
Psychosis	Yes	152	54.2	84	45.8	1.53(1.02, 2.27)**	1.73(1.12, 2.66)*
	No	97	64.4	82	35.6	1	1
Age	<30 Years	58	65.9	30	34.1	1	1
	31-50 years	132	57.6	97	42.4	0.70(0.42, 1.17)**	0.87(0.49, 1.54)
	>50 years	59	60.2	39	39.8	0.78(0.43, 1.42)	1.12(0.55, 2.29)
Problem of eating	Yes	239	45.5	154	54.5	1.86(0.78, 4.41)**	1.92(0.73, 5.00)
	No	10	60.8	12	39.2	1	1

*p-value <0.05, **p-value <0.25; Ca- cancer, COR- crude odds ratio, AOR- adjusted odds ratio

DISCUSSION

The primary aim of this study was to look into the prevalence of anxiety and depression symptomatology among Ethiopian cancer patients, as well as the risk factors associated with them. In our study, the prevalence of depression symptoms among cancer patients was found to be 58.8% (95% CI: 54.0, 63.6). This finding is similar to the results of a study on cancer patients conducted in Gondar (58.4%) (41), Pakistan (61.6%) (42) and the pooled prevalence (54.9%) in China (10). However, compared with some previous literature, the reported rates of depression in our study were slightly lower from a study in Bahir Dar and Gonder, Ethiopia (70.8%) (43), Rwandan study (67.7%) (27), and another Chinese study (66.7%) (44). On the other hand, our finding is higher than studies by Naser A. et al., in Jordan (23.4%) (45). This disparity might be attributed to differences in the study populations in terms of cancer types, screening tools used, or other socio-demographic variations and severity of depression taken into account.

Regarding the prevalence of anxiety symptoms in Ethiopian cancer patients, our finding 60% (95% CI: 55.4, 64.6) is higher with studies in Gondar (51%) (41), China (43.5%) (46), Iran (43.2%) (47), Jordan (19.9%) (44), Rwanda (52.1%) (27), and Sudanese (26.7%) (48) studies. However, the results presented in this study confirm that cancer patients suffer from psychological or psychiatric complications. This variation could be due to differences in participants' place of residence, demographic characteristics of participants, methodological differences of the studies, and sample size.

Similar to previous studies (49) the finding of this study showed that, older age groups were more prone to depression. Older patients experience longer disease duration, a higher risk of cancer metastases, and more disability, all of which contribute to depression. (50). Another reason could be that older patients have difficulty asking for assistance and communicating with others. Furthermore, worrying about excessive treatment costs and family financial difficulties may be causes of psychological distress.

Findings from previous studies indicated that depressive symptoms are more common in unemployed individuals (51). Similarly, our result underlined that unemployed cancer patients are more likely to be affected by depression than their counter parts. Hence, unemployment in combination with cancer exerts overwhelming physical and psychological strain such as depression in an individual (52). On the other hand, substantial number of cancer patients suffer from psychosomatic and social problems such as tiredness, pain, cognitive deficits, anxiety, and depression (53). These enduring physical and psychological effects of cancer or

its treatment may be a reason for social and occupational dysfunction including the withholding of employment (54).

High magnitude of anxiety and depression can be related to end-stage of cancer (50). In line with this, our study also showed that cancer patients with advanced disease stages are vulnerable for anxiety. This might be related to the higher levels of physical debilitation and advanced illnesses (55). Prevalence of psychiatric disorders mostly varies at different stages of cancer. Despite the fact that adjustment disorders with depressed or anxious moods are more frequent at early stage of the disease; severe psychiatric complications such as very severe anxiety and major depression are more common in late stages of cancer (56). As a result, late-stage cancer patients are more likely to be subjected to high doses of chemotherapy or any other anticancer treatment, resulting in a loss of appetite. Chemotherapy has been reported to cause severe sadness, anger, anorexia, and anxiety in cancer patients, despite the fact that it frequently enhances survival rates (55).

Even though, depression and psychosis are considered as a separate concept, this study showed that cancer patients with comorbid psychotic symptoms are more prone to depression. Clinically, this suggests diagnoses such as schizoaffective or mood disorders with psychotic features, in which depressive and psychotic symptoms co-occur. The comorbidity between depression and psychotic disorders is very high, too (57). Experiencing psychotic symptoms such as hallucination and delusion induce feelings of fear, hopelessness and helplessness which ends up with depression (58). Conversely, depression could have an impact on psychotic symptoms by provoking negative appraisal of external stimuli, consequently increasing psychotic symptoms (59). Also, psychosis and depression may result from shared liability that leads both to exist on the same continuum (60). However, further research is needed to clarify this complex relationship.

We also found out that depression is more experienced by patients with eating problems such as nausea and vomiting. Because patients may feel nauseous or vomit the week or day before treatment, as they approach the clinic, or even just thinking about chemotherapy (8). Besides, exposure to high doses of chemotherapeutic and steroid agents induce depressive symptoms such as reduced appetite caused by gastro-intestinal side effects like nausea and vomiting (61,62).

Symptoms and syndromes of anxiety are present in the majority of patients with psychotic illness (63) and psychotic symptoms are often reported in patients with affective disorders like anxiety disorders, too (64). Similar to these findings in our study patients with comorbid

psychotic symptoms are more likely to develop anxiety than their counterparts. As a result, affective dysregulation (anxiety) and reality distortion are coexisted within the range of subclinical and clinical expression (65).

Despite providing valuable baseline data, this study has also some limitations encountered. The study is cross-sectional and direction of association between depression and anxiety and related factors could not be established. Some of the physical symptoms, which are part of the HADS symptom list, may have been due to the cancer itself or its treatment rather than due to depression or anxiety. These may have an impact on the magnitude of depression or anxiety in this study. This is the first study of its kind in Ethiopia and one of the very few in Africa. Therefore, the study is an important contribution to our knowledge regarding the potential role of depression and anxiety in the treatment of cancer in these area.

CONCLUSIONS

The prevalence of depression and anxiety symptoms amongst cancer patients was considerably high. Occupation, stage of cancer, comorbid psychotic symptoms, problem of eating in the past two weeks and age of the patients were independent factors of depression symptoms among cancer patients. In addition, cancer stage and comorbid psychosis were associated with anxiety symptoms. Perhaps more attention is needed to detect changes in the psychological status of cancer patients in an effort to reduce the occurrence of depression and anxiety. Continuous screening for symptoms of anxiety and depression is recommended as a necessary approach for good cancer care; on the other hand, after the diagnosis of clinically important psychological disorders, proper treatment interventions must be performed to improve the quality of life in these patients. Also, special attention should be given for cancer patients with the mentioned risk factors of depression and anxiety.

Abbreviations

- AOR – Adjusted Odd Ratio
- APA - American Psychiatry Association
- CI – Confidence Interval
- COR – Crude Odd Ratio
- ECOG - Eastern Cooperative Oncology Group Scale
- HADS - Hospital Anxiety And Depression Scale
- HUCSH - Hawassa University Comprehensive Specialized Hospital
- IRB - Institutional Review Board
- OR- Odd Ratio
- OSSS- Oslo Social Support Scale

PSQ-5 - Psychosis Screening Questionnaire

SBQ-R - Suicidal Behavior Questioner Revised

SPSS- Statistical Package for Social Science

WHO-World Health Organization

Declarations

Consent for publication

Not applicable

Availability of data and material

All the datasets used and analyzed during the current study are available on this manuscript.

Competing interests

The authors declare no competing interests.

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Authors Contribution

MA, BD, BDu, DG, NB, LG, AG and AB were involved in the design and data collection of the study. MA and BD performed the analysis and write up of the study. MA prepare the manuscript for publication and all authors critically reviewed the manuscript. All authors read and approved the final manuscript.

Ethics Statement

This study was approved by the Institutional Review Board at the College of Medicine and Health Sciences of Hawassa University (No. IRB/047/11, on date 26/02/2019). Permission was also obtained from administrative bodies HUCSH. Patients were enrolled into the study on a voluntary basis after a thorough explanation about the study. They were informed and obtained verbal consent and interviewed during their visits to the cancer treatment center. Any information obtained from the patients was kept confidential.

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Figure Legend

Figure 1: Prevalence of depression and anxiety symptoms among cancer patients attending HUCSH, southern Ethiopia, 2019 (n=415)

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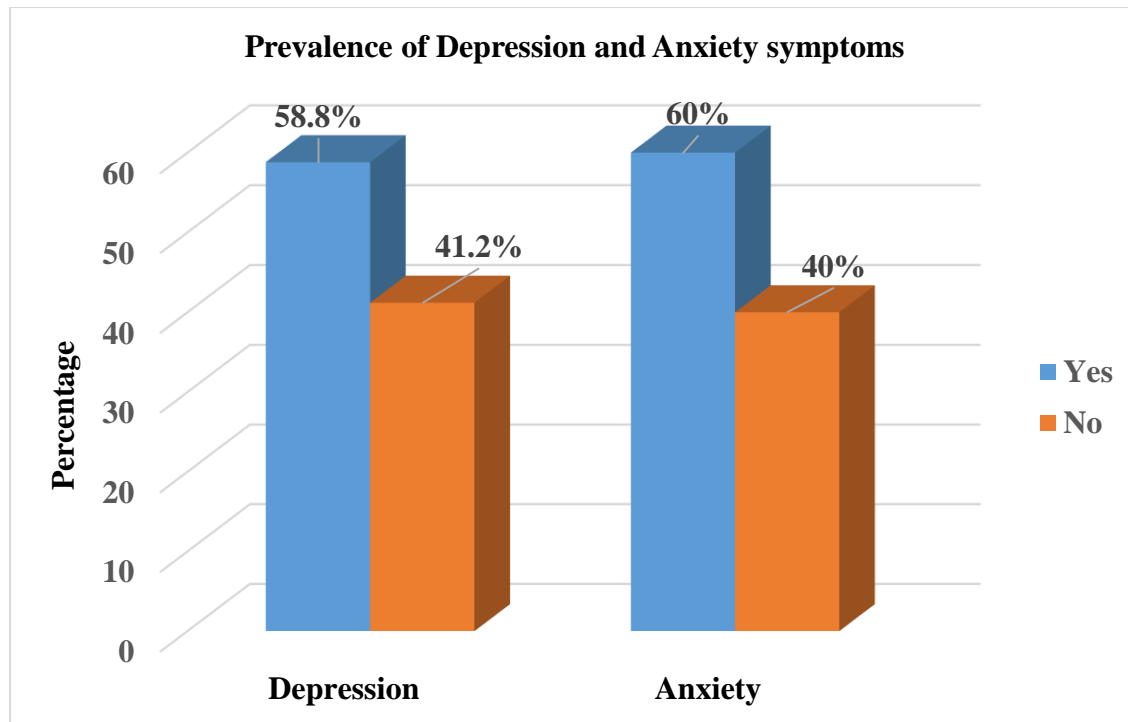


Figure 1: Prevalence of depression and anxiety symptoms among cancer patients attending at HUCSH, Southern Ethiopia, 2019 (n=415)

STROBE Statement

Checklist of items that should be included in reports of observational studies

Section/Topic	Item No	Recommendation	Reported on Page No
Title and abstract	1	(a) Indicate the study’s design with a commonly used term in the title or the abstract	1
		(b) Provide in the abstract an informative and balanced summary of what was done and what was found	2
Introduction			
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported	4-5
Objectives	3	State specific objectives, including any prespecified hypotheses	5
Methods			
Study design	4	Present key elements of study design early in the paper	5
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	5
Participants	6	(a) <i>Cross-sectional study</i> —Give the eligibility criteria, and the sources and methods of selection of participants	5
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable	6-7
Data sources/measurement	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group	6-7
Bias	9	Describe any efforts to address potential sources of bias	N/A
Study size	10	Explain how the study size was arrived at	5-6
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	7
Statistical methods	12	(a) Describe all statistical methods, including those used to control for confounding	7
		(b) Describe any methods used to examine subgroups and interactions	N/A
		(c) Explain how missing data were addressed	N/A
		(d) <i>Cross-sectional study</i> —If applicable, describe analytical methods taking account of sampling strategy	7
		(e) Describe any sensitivity analyses	7

Section/Topic	Item No	Recommendation	Reported on Page No
Results			
Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed	8
		(b) Give reasons for non-participation at each stage	N/A
		(c) Consider use of a flow diagram	N/A
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders	8
		(b) Indicate number of participants with missing data for each variable of interest	N/A
		(c) <i>Cohort study</i> —Summarise follow-up time (eg, average and total amount)	N/A
Outcome data	15*	<i>Cohort study</i> —Report numbers of outcome events or summary measures over time	N/A
		<i>Case-control study</i> —Report numbers in each exposure category, or summary measures of exposure	N/A
		<i>Cross-sectional study</i> —Report numbers of outcome events or summary measures	10
Main results	16	(a) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included	10-13
		(b) Report category boundaries when continuous variables were categorized	N/A
		(c) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	N/A
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses	10-13
Discussion			
Key results	18	Summarise key results with reference to study objectives	14-16
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias	16
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence	14-16
Generalisability	21	Discuss the generalisability (external validity) of the study results	16
Other Information			

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Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based	17
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**Give information separately for cases and controls in case-control studies and, if applicable, for exposed and unexposed groups in cohort and cross-sectional studies.*

Note: An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLoS Medicine at <http://www.plosmedicine.org/>, Annals of Internal Medicine at <http://www.annals.org/>, and Epidemiology at <http://www.epidem.com/>). Information on the STROBE Initiative is available at www.strobe-statement.org.

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