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# Prevalence of depression and anxiety symptoms and their determinant factors among patients with cancer 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 their determinant factors among patients with cancer attending follow-up at Hawassa University Comprehensive Specialized Hospital cancer treatment centre, Ethiopia.

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

**Setting** Patients with cancer at Hawassa University Comprehensive Specialized Hospital cancer treatment centre from October 2019 to December 2019.

**Participants** Randomly selected 415 patients with cancer who had follow-up at cancer treatment centre.

**Main outcome measures** Anxiety and depression symptoms were assessed using Hospital Anxiety and Depression Scale.

**Result** The prevalence rates of depression and anxiety symptoms were found to be 244 (58.8%) and 249 (60.0%), respectively. Older age (>50 years) (AOR (adjusted OR)=2.24, 95% CI=1.14 to 4.40), being unemployed (AOR=1.96, 95% CI=1.08 to 3.56), advanced stage of cancer such as stage III (AOR=5.37, 95% CI=1.34 to 21.45) and stage IV (AOR=4.55, 95% CI=1.12 to 18.44), comorbid psychotic symptoms (AOR=1.67, 95% CI=1.07 to 2.61) and eating problem in the past 2 weeks (AOR=6.16, 95% CI=1.98 to 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 to 14.36) and stage IV (AOR=5.04, 95% CI=1.44 to 17.59) and comorbid psychotic symptoms (AOR=1.73, 95% CI=1.12 to 2.66) were significantly associated with anxiety symptoms.

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

## Strengths and limitations of this study

► We use standardised questionnaires to assess dependent variables and this study also provides 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 minimise the symptoms of depression and anxiety for some reason.

leading cause of death.[1] In 2018, the 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, patients with cancer undergo 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 characterised by a set of physical, emotional and behavioural elements.[7]

Patients with cancer 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

## INTRODUCTION

Nowadays, cancer is one of the world's most serious public health agendas and the second

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 UK, depression and anxiety affect approximately 20% and 10% of patients with cancer, respectively, compared with 5% and 7% of the general population.[12] Furthermore, depression is the most studied psychiatric disorder in patients with cancer, with prevalence ranging from 3% to 58%.[13–16] However, according to a previous study, nearly three-fourths (73%) of these depressed patients with cancer do not receive appropriate psychiatric intervention, and only 5% seek mental health professional help.[17] Early detection and treatment of depression and anxiety in patients with cancer, 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-thirds of patients with cancer have significant levels of anxiety and depression, which impair individuals' quality of life[20] and increase 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 and[10] increased intensity of pain.[23] Depression has been shown to be underdiagnosed and under-recognised in clinical practice,[24] owing to the complex nature and inter-relationship between cancer and depression in patients with cancer.[25 26]

Despite the fact that depression and anxiety are the most common complications in patients with cancer, they are frequently overlooked.[27] Furthermore, the psychosocial requirements of patients with cancer, whether they have a 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 make people live longer with cancer.[28] As far as our knowledge is concerned, 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 patients with cancer, 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 centre. 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 centres.

### Study subjects
Randomly selected patients diagnosed with cancer and who have follow-up at outpatient department of oncology unit.

### Inclusion and exclusion criteria
Those adult (≥18 years) patients diagnosed with any form or type of cancer were 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 a history of mental disorder were excluded from the study.

### Sampling and data collection
The required sample size was determined using single population proportion formula:

$(Z_{\alpha/2})^2 \times p \times (1-p)/d^2$, 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. Patients with cancer 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 were collected by three oncology nurses who had received 2 days of intense training on data collection methodologies and instruments. In 5% of the sample, a pretest 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 of independent variables such as sociodemographic characters, clinical related factors of patients and healthy lifestyle-related factors (nutritional status, body mass index (BMI), substance use, etc), and dependent variables (depression and anxiety). The questionnaire is developed in English and translated 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: 7 items for the anxiety subscale (HADS anxiety) and 7 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, ranging between 0 and 21, and total summed score ranging 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 (ECOG) Scale was used to measure the patient's performance status. This scale captures patient-derived functional status data on a scale of 0–4. An ECOG score of 2–4 indicates a poor performance status, whereas a score of 0–1 indicates a good performance status. Researchers have confirmed the validity of the ECOG Chinese version in assessing the performance status of Chinese patients with cancer.[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 four-item Suicidal Behaviour Questionnaire Revised (SBQ-R) was used. SBQ-R item 1 taps into lifetime suicidal ideation and attempt; item 2 assesses the frequency of suicidal ideation over the past 12 months; item 3 taps into the threat of suicidal behaviour and item 4 evaluates self-reported likelihood of suicidal behaviour. The sensitivity was 80% and specificity 91%, with a score of 3–18 and cut-off point of ≥8 for adult clinical population.[35]

Level of social support among patients with cancer was assessed using the three-item Oslo Social Support Scale and the scores range from 3 to 14. It is categorised 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 on the Numerical Rating Scale. Pain intensity was categorised as 'none' for a score of 0, 'mild' for a score of 1–3, 'moderate' for a score of 4–6 and 'severe' for a score of 7–10 as reported by the patient.[37 38]

Nutritional status was assessed using Mini-Nutritional Assessment Short-Form Scale. It is a screening tool to assess malnutrition or risk of malnutrition and consists of six items related to appetite, loss of weight, mobility, mental distress or acute disease, presence of cognitive impairment and BMI.[39] A score of 12–14 is considered as normal nutritional status and a score of ≤11 indicates malnutrition or risk of malnutrition.[40]

### Data processing and analysis
Data were entered to EpiData V.3.1 and exported to SPSS V.24 for Windows for analysis. Descriptive statistics were used to identify distributions of sociodemographic characteristics of study participants. Prevalence of anxiety and depression symptoms was calculated by summing up the HADS and dichotomising the total score into positive or negative for presence of depression or anxiety. Both bivariate and multivariable logistic regression analyses

with 95% CI were used to see the association between independent and outcome variables. During the bivariate analyses, variables with a p value less than 0.20 were entered into a multivariable logistic regression model using an 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.

### Patient 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
### Sociodemographic characteristics of the patients
A total of 423 patients with cancer 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. A total of 160 (38.6%) participants were unable to read and write, 346 (83.4%) were unemployed and nearly one-third (133, 32.0%) were rural residents (table 1).

### 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%) had stage III cancer, 180 (43.4%) had 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).

### Prevalence of depression and anxiety symptoms
The prevalence rates of depression and anxiety symptoms among patients with cancer were 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 patients with cancer
Among many variables included in the bivariate analysis, those variables (occupation, type of cancer, cancer stage, intensity of pain, type of cancer treatment, taking of corticosteroid medication, comorbid medical illness, anxiety, psychosis, malnutrition, eating problems, age and BMI) with p<0.25 were included in the multivariable logistic regression analysis. Only five variables, that is, age >50 years (adjusted OR (AOR)=2.24, 95% CI=1.14 to 4.40), being unemployed (AOR=1.96, 95% CI=1.08 to 3.56), cancer stage (stage III (AOR=5.37, 95% CI=1.34 to 21.45) and stage IV (AOR=4.55, 95% CI=1.12 to 18.44)), comorbid

**Table 1** Sociodemographic characteristics of patients with cancer 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 |

HUCSH, Hawassa University Comprehensive Specialized Hospital.

psychotic symptoms (AOR=1.67, 95% CI=1.07 to 2.61) and eating problem in the past 2 weeks (AOR=6.16, 95% CI=1.98 to 19.11) were independent factors of depression symptoms among patients with cancer (table 3).

Therefore, older patients (>50 years) were two 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) were more likely to develop depression than those who had stage I cancer. Furthermore, patients with cancer with comorbid psychotic symptoms and eating problems in the past 2 weeks were 1.6 and 6.1 times more likely to be affected by depression than their counterparts.

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

## DISCUSSION

The primary aim of this study was to look into the prevalence of anxiety and depression symptomatology among Ethiopian patients with cancer, as well as the risk factors associated with them. In our study, the prevalence of depression symptoms among patients with cancer was found to be 58.8% (95% CI=54.0% to 63.6%). This finding is similar to the results of a study on patients with cancer 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 than the studies in Bahir Dar and Gondar, Ethiopia (70.8%),[43] Rwanda (67.7%)[27] and China (66.7%).[44] On the other hand, our finding is higher than studies by Naser 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 sociodemographic variations and severity of depression taken into account.

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

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

| Variables | Category | Frequency | Percentage |
|---|---|---|---|
| Type of cancer | Breast | 148 | 35.7 |
| | Cervical | 7 | 1.7 |
| | Genitourinary | 31 | 7.5 |
| | Gastrointestinal | 84 | 20.2 |
| | Lung | 13 | 3.1 |
| | Lymphoma | 51 | 12.3 |
| | Other | 81 | 19.5 |
| WHO cancer 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 | Underweight | 71 | 17.1 |
| | Normal weight | 282 | 68.0 |
| | Overweight | 46 | 11.1 |
| | Obese | 16 | 3.9 |
| Eating problem | Yes | 393 | 94.7 |
| | No | 22 | 5.3 |
| Psychosis | Yes | 236 | 56.9 |
| | No | 179 | 43.1 |
| Suicide behaviour | Yes | 32 | 7.7 |
| | No | 383 | 92.3 |

Continued

| Table 2 | Continued | | |
|---|---|---|---|
| **Variables** | **Category** | **Frequency** | **Percentage** |
| Social support | Poor | 124 | 29.9 |
| | Moderate | 195 | 47.0 |
| | Strong | 96 | 23.1 |

BMI, body mass index; ECOG, Eastern Cooperative Oncology Group; HUCSH, Hawassa University Comprehensive Specialized Hospital.

depression. Older patients experience longer disease duration, a higher risk of cancer metastases and more disabilities, 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 patients with cancer 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.[52] On the other hand, a substantial number of patients with cancer 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 cancer.[50] In line with this, our study also showed that patients with cancer with advanced disease stages are vulnerable to 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 the 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, patients with late-stage cancer are more likely to be subjected to high doses of chemotherapy or any other anti-cancer treatment, resulting in a loss of appetite. Chemotherapy has been reported to cause severe sadness, anger, anorexia and anxiety in patients with cancer, 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 patients with cancer 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 induces 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 in 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. This is 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] Moreover, exposure to high doses of chemotherapeutic and steroid agents induces depressive symptoms such as reduced appetite caused by gastrointestinal 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 also often reported in patients with affective disorders like anxiety disorders.[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 coexisted within the range of subclinical and clinical expression.[59]

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 symptoms list, may have been due to the cancer itself or its treatment rather than due to depression or anxiety. These may have
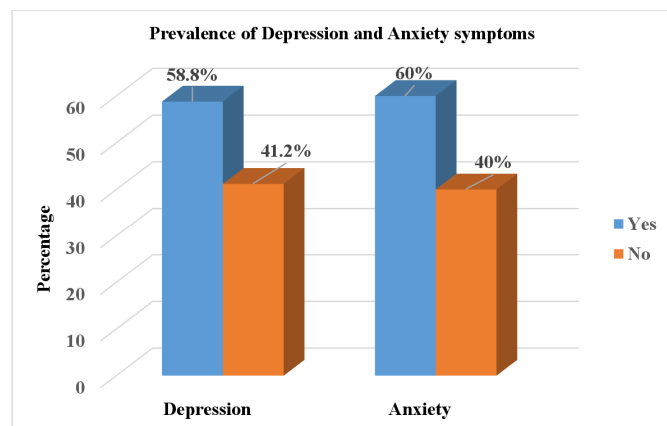


**Figure 1** Prevalence of depression and anxiety symptoms among patients with cancer attending HUCSH, southern Ethiopia, 2019 (n=415). HUCSH, Hawassa University Comprehensive Specialized Hospital.

**Table 3** Bivariate and multivariable regression analyses on depressive symptoms and associated factors among patients with cancer at HUCSH, 2019 (n=415)

| Variables | Category | Depression symptoms | | | | COR (95% CI) | AOR (95% CI) |
| | | Yes | | No | | | |
| | | N | % | N | % | | |
|---|---|---|---|---|---|---|---|
| Age (years) | <30 | 45 | 51.1 | 43 | 48.9 | 1 | 1 |
| | 31–50 | 130 | 56.8 | 99 | 43.2 | 1.19 (0.73 to 1.96) | 1.02 (0.58 to 1.77) |
| | >50 | 69 | 70.4 | 29 | 29.6 | 2.66 (1.46 to 4.84)*** | 2.24 (1.14 to 4.40)* |
| Occupation | Employed | 34 | 49.3 | 35 | 50.7 | 1 | 1 |
| | Unemployed | 210 | 60.7 | 136 | 39.3 | 1.59 (0.95 to 2.67)*** | 1.96 (1.08 to 3.56)* |
| Type of cancer | Breast | 93 | 62.8 | 55 | 37.2 | 1 | 1 |
| | Cervical | 3 | 42.9 | 4 | 57.1 | 0.44 (0.09 to 2.05) | 0.42 (0.08 to 2.21) |
| | Genitourinary | 19 | 61.3 | 12 | 38.7 | 0.93 (0.42 to 2.07) | 0.95 (0.39 to 2.31) |
| | Gastrointestinal | 47 | 56.0 | 37 | 44.0 | 0.75 (0.43 to 1.29) | 0.70 (0.36 to 1.36) |
| | Lung | 12 | 92.3 | 1 | 7.7 | 7.09 (0.89 to 56.07)*** | 7.61 (0.90 to 64.32) |
| | Lymphoma | 29 | 56.9 | 22 | 43.1 | 0.78 (0.40 to 1.48) | 0.74 (0.34 to 1.63) |
| | Others | 41 | 50.6 | 40 | 49.4 | 0.60 (0.35 to 1.04)*** | 0.72 (0.38 to 1.34) |
| WHO stage of cancer | I | 5 | 33.3 | 10 | 66.7 | 1 | 1 |
| | II | 30 | 55.6 | 24 | 44.4 | 2.50 (0.75 to 8.30)*** | 2.87 (0.69 to 11.95) |
| | III | 102 | 62.0 | 71 | 38.0 | 2.87 (0.94 to 8.76)*** | 5.37 (1.34 to 21.45)* |
| | IV | 77 | 60.6 | 52 | 39.4 | 2.96 (0.65 to 9.16)*** | 4.55 (1.12 to 18.44)* |
| | Unknown | 30 | 53.5 | 14 | 46.5 | 4.28 (1.23 to 14.91)*** | 2.11 (0.49 to 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 to 1.82) | 0.76 (0.23 to 2.55) |
| | Moderate | 104 | 57.8 | 76 | 42.2 | 0.68 (0.35 to 1.33) | 0.59 (0.16 to 2.12) |
| | Severe | 72 | 55.8 | 57 | 44.2 | 0.63 (0.31 to 1.26)*** | 0.54 (0.15 to 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 to 6.44)*** | 2.18 (0.0.58 to 8.29) |
| | Combination | 79 | 59.0 | 55 | 41.0 | 1.04 (0.68 to 1.59) | 1.01 (0.59 to 1.71) |
| Take corticosteroid | Yes | 198 | 56.6 | 46 | 43.4 | 0.54 (0.30 to 0.96) | 0.42 (0.14 to 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 to 2.53) | 1.13 (0.59 to 2.16) |
| | No | 201 | 57.4 | 149 | 42.6 | 1 | 1 |
| Anxiety | Yes | 154 | 54.2 | 95 | 45.8 | 1.37 (0.92 to 2.04))*** | 1.29 (0.83 to 2.03) |
| | No | 90 | 61.8 | 76 | 38.2 | 1 | 1 |
| Psychosis | Yes | 149 | 53.1 | 87 | 46.9 | 1.51 (1.02 to 2.24)*** | 1.67 (1.07 to 2.61)* |
| | No | 95 | 63.1 | 84 | 36.9 | 1 | 1 |
| Malnutrition | Yes | 185 | 52.7 | 118 | 47.3 | 0.71 (0.45 to 1.09)*** | 1.42 (0.81 to 2.47) |
| | No | 59 | 61.1 | 53 | 38.9 | 1 | 1 |
| Eating problem | Yes | 236 | 36.4 | 157 | 63.6 | 2.63 (1.07 to 6.41)*** | 6.16 (1.98 to 19.11)** |
| | No | 8 | 60.1 | 14 | 39.9 | 1 | 1 |
| BMI | Underweight | 42 | 59.2 | 29 | 40.8 | 0.48 (0.14 to 1.64)*** | 0.63 (0.15 to 2.62) |
| | Normal weight | 162 | 57.4 | 120 | 42.6 | 0.45 (0.14 to 1.43)*** | 0.47 (0.13 to 1.75) |
| | Overweight | 28 | 60.9 | 18 | 39.1 | 0.51 (0.14 to 1.86) | 0.52 (0.12 to 2.20) |
| | Obese | 12 | 75.0 | 4 | 25.0 | 1 | 1 |

*P<0.05; **p<0.01; ***p<0.25.
AOR, adjusted OR; BMI, body mass index; COR, crude OR; HUCSH, Hawassa University Comprehensive Specialized Hospital.

**Table 4** Bivariate and multivariable regression analyses on anxiety symptoms and associated factors among patients with cancer 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 to 1.99) |
| | Primary | 81 | 64.8 | 44 | 35.2 | 1.63 (0.84 to 3.17)** | 1.31 (0.64 to 2.68) |
| | Secondary | 50 | 63.3 | 29 | 36.7 | 1.53 (0.75 to 3.13)** | 1.60 (0.73 to 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 to 1.06)** | 0.70 (0.43 to 1.12) |
| Type of cancer | Breast | 92 | 62.2 | 56 | 37.8 | 1 | 1 |
| | Cervical | 4 | 57.1 | 3 | 42.9 | 0.81 (0.17 to 3.76) | 0.69 (0.13 to 3.42) |
| | Genitourinary | 21 | 67.7 | 10 | 32.3 | 1.27 (0.56 to 2.91) | 1.16 (0.47 to 2.84) |
| | Gastrointestinal | 42 | 50.0 | 42 | 50.0 | 0.60 (0.35 to 1.04)** | 0.55 (0.30 to 1.02) |
| | Lung | 6 | 46.2 | 7 | 53.8 | 0.52 (0.16 to 1.63) | 0.38 (0.11 to 1.29) |
| | Lymphoma | 36 | 70.6 | 15 | 29.4 | 1.46 (0.73 to 2.90) | 1.37 (0.62 to 2.98) |
| | Others | 48 | 59.3 | 33 | 40.7 | 0.88 (0.50 to 1.54) | 0.84 (0.45 to 1.56) |
| Stage of cancer | I | 5 | 33.3 | 10 | 66.7 | 1 | 1 |
| | II | 33 | 61.1 | 21 | 38.9 | 3.14 (0.94 to 10.48)** | 3.92 (1.07 to 14.36)* |
| | III | 100 | 57.3 | 73 | 42.7 | 2.74 (0.89 to 8.35)** | 3.29 (0.97 to 11.09) |
| | IV | 86 | 67.4 | 43 | 32.6 | 4.00 (1.28 to 12.43)** | 5.04 (1.44 to 17.59)* |
| | Unknown | 25 | 55.8 | 19 | 44.2 | 2.36 (0.77 to 8.98)** | 3.35 (0.89 to 12.63) |
| Take corticosteroid | Yes | 215 | 61.4 | 31 | 38.6 | 1 | 1 |
| | No | 135 | 52.3 | 34 | 47.7 | 0.68 (0.40 to 1.17)** | 0.66 (0.33 to 1.31) |
| Medical illness | Yes | 33 | 50.8 | 32 | 49.2 | 0.64 (0.37 to 1.08)** | 0.61 (0.33 to 1.11) |
| | No | 216 | 61.7 | 134 | 38.3 | 1 | 1 |
| Social support | Poor | 77 | 62.1 | 47 | 37.9 | 1.44 (0.84 to 2.48)** | 1.68 (0.90 to 3.13) |
| | Moderate | 121 | 62.1 | 74 | 37.9 | 1.44 (0.88 to 2.36)** | 1.52 (0.89 to 2.62) |
| | Strong | 51 | 53.1 | 45 | 46.9 | 1 | 1 |
| Depression | Yes | 95 | 55.6 | 76 | 44.4 | 1.36 (0.91 to 2.03)** | 1.34 (0.86 to 2.09) |
| | No | 154 | 63.1 | 90 | 36.9 | 1 | 1 |
| Psychosis | Yes | 152 | 54.2 | 84 | 45.8 | 1.53 (1.02 to 2.27)** | 1.73 (1.12 to 2.66)* |
| | No | 97 | 64.4 | 82 | 35.6 | 1 | 1 |
| Age (years) | <30 | 58 | 65.9 | 30 | 34.1 | 1 | 1 |
| | 31–50 | 132 | 57.6 | 97 | 42.4 | 0.70 (0.42 to 1.17)** | 0.87 (0.49 to 1.54) |
| | >50 | 59 | 60.2 | 39 | 39.8 | 0.78 (0.43 to 1.42) | 1.12 (0.55 to 2.29) |
| Eating problem | Yes | 239 | 45.5 | 154 | 54.5 | 1.86 (0.78 to 4.41)** | 1.92 (0.73 to 5.00) |
| | No | 10 | 60.8 | 12 | 39.2 | 1 | 1 |

*P<0.05; **p<0.25.
AOR, adjusted OR; COR, crude OR; HUCSH, Hawassa University Comprehensive Specialized Hospital.

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 this area.

## CONCLUSIONS

The prevalence of depression and anxiety symptoms among patients with cancer was considerably high. Occupation, cancer stage, comorbid psychotic symptoms, eating problem in the past 2 weeks and patients' age were independent factors of depression symptoms

among patients with cancer. 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 patients with cancer 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 of these patients. Also, special attention should be given for patients with cancer with the mentioned risk factors of depression and anxiety.

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