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Depression, anxiety and their associated factors among patients with cancer receiving treatment at oncology units in Amhara Region, Ethiopia: a cross-sectional study

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ABSTRACT

Objective To assess the prevalence of anxiety and depression symptoms, and their associated factors among patients with cancer receiving cancer treatment in Amhara region oncology centres in Northwest, Ethiopia.

Design Institution-based cross-sectional study was conducted.

Setting Three oncology units at comprehensive hospitals in the Amhara region, Ethiopia.

Participants Adult patients who had a pathologically confirmed cancer diagnosis and received cancer therapy were our study participants.

Main outcome measures The Hospital Anxiety and Depression Scale was used to assess anxiety and depression symptoms.

Result A total of 392 patients with cancer participated in this study, of which 57.1% (95% CI 52.1% to 62.1%) and 60.2% (95% CI 55.2% to 65.1%) had anxiety and depression, respectively.

Poor social support (adjusted OR, AOR=4.43, 95% CI (1.70 to 11.50)), poor performance status (AOR=1.97, 95% CI (1.02 to 3.79)) and increased pain severity (AOR=1.30, 95% CI (1.14 to 1.48)) were factors associated with anxiety. Furthermore, poor performance status (AOR=2.77, 95% CI: (1.42, 5.39)) and pain severity (AOR=1.25, 95% CI: (1.11 to 1.42)) were significantly associated with depression.

Conclusion and recommendation Anxiety and depression were common among patients with cancer. Social support, performance status and pain were determinant factors of anxiety in patients with cancer. Moreover, performance status and pain were associated with depressive symptoms. Therefore, patients with low social support, poor performance status and severe pain should get special emphasis.

STRENGTHS AND LIMITATIONS OF THIS STUDY

⇒ As a strength, this study used a locally validated tool.
⇒ A temporal relationship between the outcome variable and independent variables could not be established because of the cross-sectional nature of the study design.
⇒ The findings of this study are only applicable to the Amhara region of Ethiopia, not the rest of the country.
⇒ To identify and assess the effects of a set of variables acting on a specified outcome via multiple causal pathways, path analysis was a more methodologically sound method than doing multiple logistic regression.
⇒ Some important independent variables like fear of recurrence/progression/of disease, insurance ownership, distance to a cancer treatment centre, and side effects of cancer chemotherapy were not assessed.

INTRODUCTION

Cancer is a major public health problem, killing 8.8 million people worldwide each year and the second leading cause of morbidity and mortality, with nearly 70% of cancer-related fatalities occurring in low-income and middle-income countries.[1] Cancer accounts for about 5.8% of total national mortality in Ethiopia, and the incidence of cancer is estimated to be at least 60 960 cases, and the death rate of more than 44 000 each year.[2]

The cancer diagnosis causes many complex feelings and lifestyle changes in people who are diagnosed with it, and a lot of people feel to blame for getting cancer and suffer from psychological disorders like major depression and anxiety.[3] Approximately half of all patients with cancer have psychological disorders such as anxiety and depression.[4]

The prevalence of anxiety and depression ranges from 6.49% to 95% globally.[5–20] In Ethiopia, depression prevalence rates ranged from 25% to 70.86%.[8 9 17 18 20 21] On the other hand, the prevalence of anxiety ranges from 51% to 64.9%.[17 18 20]

Anxiety and depression were linked to a variety of conditions in patients with cancer. Sociodemographic factors such as age,[5 10 18 19]

sex,[5 19 20] residence,[16 20] religion,[16] educational status,[18 20] monthly income,[7 10 20] occupation[12 13] and clinical factors such as performance status,[19] type of cancer,[13] weight loss,[13] cancer stage,[5 13 17] treatment type[5 13] and comorbidity[11 17] have been shown to have a significant impact on anxiety. Similarly, depression was also associated with age,[5–8 17 19] sex,[7 20] residence,[20] educational status,[7 9 20] occupation,[8 9 17] religion,[7] monthly income,[7 10 20] cancer stage,[6] pain,[6 8 19] comorbidity,[11 17] duration of chemotherapy,[9] body mass index (BMI),[6 9] type of cancer,[18] cancer stage,[5 17] cancer treatment type[5 6 8 18] and performance status.[19 22–24]

Managing depression and anxiety along with cancer is challenging. Chemotherapeutics may interact with antidepressants and cause nervous system toxicity, by reducing the metabolism of the antidepressants or by additive effects of the cancer drugs themselves.[25] Other cancer treatment-related factors, including the steadily rising cost of chemotherapy, the unavailability and high cost of treatment modalities, and the complexity and high cost of radiotherapy equipment and facilities, also affect the patient's mental health.[26]

Depression and anxiety can impair patients' quality of life, and treatment compliance, and ultimately impact their survival negatively.[27] As the evidence showed psychological disorders make patients less likely to survive cancer in the long term by 10%–20%. They also decrease patient coping abilities and treatment outcomes.[4] Depression makes patients' entire experience with cancer more difficult, weakens their resilience, and hampers their ability to deal with life after cancer. It erodes their courage as well as their will to live.[15] As evidence shows the incidence of suicide among patients with cancer is high.[28] The burden escalates when cancer is comorbid with depression and anxiety.[29] In addition, because of the costs associated with diagnosis, treatment and lost productivity, these comorbid disorders have a detrimental economic impact on the patient, family and the community at large.[30 31]

Despite the high burden of anxiety and depression among patients with cancer, research on psychological disorders and their associated factors in those populations is limited in the Amhara region, Ethiopia. Furthermore, the available evidence revealed that there was variation among countries and sociocultural factors. Therefore, this study aimed to assess the prevalence of anxiety and depression symptoms, and the factors contributing to them among patients with cancer receiving cancer treatment in Amhara region oncology centres in Northwest, Ethiopia.

METHODS AND MATERIALS

Study design, period and setting

The methodology has been described in detail previously.[32] An institution-based cross-sectional study design was employed from 15 February 2020 to 15 March 2022 at hospitals that have oncology units in the Amhara region. Only three hospitals in the region have oncology units; the Felege Hiwot Comprehensive Specialised Hospital, Dessie Comprehensive Specialised Hospital, and the University of Gondar Comprehensive Specialised Hospital. These hospitals are located in Bahir Dar, Dessie, and Gondar cities respectively.

Inclusion and exclusion criteria

This study included patients over the age of 18 years who had a pathologically confirmed cancer diagnosis and were receiving cancer therapy; however, those with a critical medical condition who were unable to comprehend and respond to questions throughout the data collection period were excluded.

Sample size determination and sampling technique

The sample size was calculated using the single population proportion formula by taking the following assumptions: the prevalence of anxiety as 51% from a previous study,[20] 95% level of confidence and 5% margin of error. After adding a 10% non-response rate the final sample size was calculated to be 423. A systematic random sampling technique was used to approach study participants from each hospital. The sampling interval was determined by dividing the total study population who had follow-up and were under treatment during one typical month (1020) by the total sample size (423). Based on this, the sampling interval (K) was calculated to be $1020/423 \approx 2$. The first participant was selected randomly by a lottery method from one or 2, and the next respondent was chosen at regular intervals (every 2).

Study variables

The dependent variables were depression and anxiety and the independent variables were socio-demographic variables (age, sex, marital status, occupation, religion, residence, level of education, monthly income and social support), behavioural variables (coffee drinking, smoking status, alcohol use and khat use), clinical factors (type of cancer, stage of cancer, duration of chemotherapy, treatment type, performance status, comorbid disease, BMI and pain intensity).

Operational definition

Anxiety and depression: For this particular study, anxiety and depression were operationalised as a score greater than or equal to eight on each subscale.

Smoking status: Never smoker was an individual who had never tried a cigarette in his/her lifetime. A former smoker was an individual who had smoked in the past but stopped smoking 30 days before the data collection period. A current smoker was an individual who smoked a cigarette one or more in the past 30 days before the survey.[33]

Khat chewing: Former khat chewer was an individual who had ever used khat at least once in his/her lifetime but never used it in the last 30 days. The current khat chewer was an individual who had used khat at least once in the last month before the study. Never khat chewer was

an individual who never tried khat chewing in his/her lifetime at all.[34]

Alcohol drinking status: Former alcohol user was an individual who admitted to having ever used alcohol but stopped in the last 30 days. The current alcohol user was an individual who took alcoholic drinks within 30 days preceding the study. Never user was an individual who never used alcohol in his/her lifetime.[34 35]

Performance status: by using the Eastern Cooperative Oncology Group (ECOG) performance status scale, a grade of 0–1 indicates good performance status and a grade of 2–4 indicates poor performance status.[36]

Social support: by using the three-item Oslo social support scale (OSSS-3), a score of 3–8 represents 'poor support', 9–11 'moderate support', and 12–14 'strong support'.[37]

BMI: BMI was classified as underweight (BMI <18.5), normal (BMI 18.5–24.99), overweight (BMI 25.0–29.99) and obese (BMI≥30.0).[38]

Pain intensity: From 0 to 10 Numeric Pain Scale, mild (1–3), moderate (4–6) and severe (7-10).[39]

Measurements and data collection technique

Data collection tool

Pretested, structured, interviewer-administered questionnaires and a data extraction checklist were used to collect the data. The tool has the following subsections.

Sociodemographic, behavioural and clinical factors: The questions for these variables were adapted from the review of different pieces of literature.[40–44]

Anxiety and depression: The Hospital Anxiety and Depression Scale (HADS) was used to assess these variables. The 14-item measure examines depression and anxiety symptoms and is divided into two subscales, each having seven items that are assessed on a four-point scale (0–3). Each subscale's total score runs from 0 to 21. Based on their results, the respondents can be classified as normal (0–7), borderline (8–10) or abnormal cases (11-21).[45] This scale was also validated in Ethiopian patients with cancer.[46] For this study, the internal consistency measurement of the HADS found to be a Cronbach's alpha coefficient of 0.92 and 0.89 for anxiety and depression subscales which was acceptable for this study.

Performance status: The patients' performance status (the patient's level of functioning seen from their daily activity, physical ability and self-care) was measured using the one-item ECOG score, which ranges from 0 (fully active) to 4 (completely disabled).[47]

Social support: It was measured using the OSSS3, which includes questions about the primary support group, others' interests and concerns, and the ease of obtaining practical help. The first item was rated on a four-point scale, while the other two were graded on a five-point scale, resulting in a total score of 14 when the three items were added together.[48] Cronbach's alpha was 0.71 in this study.

Data collection procedure

Five trained nurses who had a bachelor's science degree collected the data and three trained nurses who had a Master's degree closely followed the data collection process. Participants were approached after they finished their examination at the oncology outpatient department. The interview took place in a private room after the eligible study participant was selected. After each interview, the data collectors took measurements of the participant's weight and height. Weight was measured with a light cloth while standing, and height was measured with a straight upright body posture. The client's chart was also reviewed to retrieve some medical information that could not be captured by the interview.

Data quality was assured by providing training for both interviewers and supervisors about techniques of interview, the concept of the questionnaire, the secrecy of information, and the rights of the participants before data collection for 1 day. There was also regular supervision, spot-checking and reviewing of the completed questionnaire daily to maintain data quality.

Data management and analysis

Data were coded, and entered into Epi-data V. 4.6 and then exported to SPSS V.23.0 for analysis. Data were cleaned and descriptive statistics like median, frequencies and proportions were computed for continuous as well as categorical variables accordingly and presented by using tables and texts. Model fitness was checked by the Hosmer-Lemeshow goodness of fit test. The p value for the test were 0.891 and 0.622 for anxiety and depression, respectively, which were greater than 0.05 indicating that the model fitted the data. Binary logistic regression analysis was computed to examine the association between the dependent and independent variables. Bivariable logistic regression analysis was performed to select candidate variables for multivariable logistic regression analysis and variables with p values of less than 0.25 were entered into the multivariable logistic regression analysis model. After running multiple logistic regression analyses with the enter method, those with p<0.05 were considered statistically significant.

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

From the total sample size, 392 (92.7%) respondents responded to the questionnaire. Of the total respondents, nearly two-thirds (64.0%) were female. The median age of the participants was 43 (IQR 34–52) years. In terms of residency, slightly more than half of the participants (52.0%) were from rural areas (table 1).

Behavioural characteristics

Of 392 study participants, more than half (53.6%) and almost one-third (23.5%) of them drink coffee daily and

Table 1 Sociodemographic characteristics of study participants attending oncology units in Amhara region hospitals, 2022 (n=392)

Variables		Frequency	%
Sex	Male	141	36.0
	Female	251	64.0
Age (year)	20–34	110	28.1
	35–50	177	45.2
	51–64	68	17.3
	≥65	37	9.4
Residence	Rural	204	52.0
	Urban	188	48.0
Marital status	Married	257	65.6
	Single	49	12.5
	Divorced	48	12.2
	Widowed/widower	38	9.7
Occupation	Unemployed	29	7.4
	Student	19	4.8
	Employed	52	13.3
	Farmer	93	23.7
	Merchant	80	20.4
	Housewife	119	30.4
Religion	Orthodox	311	79.3
	Muslim	69	17.6
	Protestant	12	3.1
Educational status	Uneducated	198	50.5
	Completed elementary school	96	24.5
	Completed high school	60	15.3
	Completed higher education and above	38	9.7
Monthly income	<Br2715	263	67.1
	≥Br2715	129	32.9
Social support	Poor support	211	53.8
	Moderate support	148	37.8
	Strong support	33	8.4

occasionally, respectively. Half (50.5%) of study participants were former alcohol users and around 12.2% of them were current users of alcohol. Regarding khat chewing and cigarette smoking, a few of them (3.6%) and (2.8%) were current khat chewers and current cigarette smokers, respectively (table 2).

Clinical characteristics

Of the study participants, more than half have cancers of the gastrointestinal tract (31.1%) and breast cancer (25.0%). Two hundred seven(52.8%) participants were treated with chemotherapy alone, while 34.9% were treated with a combination of surgery and chemotherapy.

Table 2 Behavioral characteristics of study participants attending oncology units in Amhara region hospitals, 2022 (n=392)

Variables		Frequency	%
Coffee drinking	Never	90	23.0
	Daily	210	53.6
	Occasionally	92	23.5
Alcohol drinking	Never drinker	146	37.2
	Former drinker	198	50.5
	Current drinker	48	12.2
Khat chewing	Never chewer	344	87.8
	Former chewer	34	8.7
	Current chewer	14	3.6
Cigarette smoking	Never smoker	369	94.1
	Former smoker	12	3.1
	Current smoker	11	2.8

Around 29.1% of participants had metastasised cancer (stage IV) and 12% of them had comorbid diseases other than cancer (table 3).

Prevalence of anxiety and depression

Of the study participants, 57.1% (95% CI 52.1% to 62.1%) and 60.2% (95% CI 55.2% to 65.1%) of them had anxiety and depression, respectively.

Factors associated with anxiety

In bivariable logistic regression analysis, 15 independent variables (age, sex, marital status, occupation, monthly income, coffee drinking, alcohol use, duration of chemotherapy, cancer type, stage of cancer, treatment type, comorbid disease, performance status, pain and social support) were found to have p<0.25. Subsequently, these variables were entered into the multivariable analysis.

In multivariable analysis social support, performance status and pain showed a statistically significant association with anxiety among patients with cancers. The odds of having anxiety were 4.43 times among patients with cancer who had poor social support as compared with those who had good social support (adjusted OR, AOR=4.43, 95% CI (1.7 to 11.5). The odds of having Anxiety was 1.97 times among patients who had poor performance status as compared with those patients who had good performance status (AOR=1.97, 95% CI (1.02 to 3.79)). On the other hand, when the severity of pain increased by one point on a 0–10 scale, the odds of having anxiety increased by a factor of 1.30 (AOR=1.30, 95% CI (1.14 to 1.48)) (table 4).

Factors associated with depression

In bivariable logistic regression analysis, 16 independent variables (age, sex, marital status, occupation, monthly income, coffee drinking, alcohol use, duration of chemotherapy, cancer type, stage of cancer, treatment type, comorbid disease, performance status, pain, social

Table 3 Clinical characteristics of study participants attending oncology units in Amhara region hospitals, 2022 (n=392)

Variables		Frequency	%
Type of cancer	Breast cancer	98	25
	Cancer of the gastrointestinal tract	122	31.1
	Gynaecological cancer	62	15.8
	Lymphomas	23	5.9
	Cancer of skin, bone, and soft tissues	44	11.2
	Others*	43	11
Treatment type	Chemotherapy	207	52.8
	Surgery+chemotherapy	137	34.9
	Others†	48	12.2
Stage of cancer	Stage I	2	0.5
	Stage II	161	41.1
	Stage III	115	29.3
	Stage IV	114	29.1
Comorbid disease	Absent	345	88
	Present	47	12
Body mass index	Underweight	117	29.8
	Normal weight	248	63.3
	Overweight and obese	27	6.9
Performance status	Good	247	63
	Poor	145	37
Duration of chemotherapy	≤6 months	342	87.2
	>6 months	50	12.8
Pain intensity	No pain	98	25
	Mild	163	41.6
	Moderate	74	18.9
	Sever	57	14.5

*Others include (lung cancer, bladder cancer, prostatic cancer, sinonasal cancer, hepatocellular cancer, pharyngeal cancer, testicular cancer, nasopharyngeal cancer, thyroid cancer, laryngeal cancer, pancreatic cancer and cancer of unknown).
†Others include (surgery+hormonal therapy, surgery+chemotherapy+hormonal therapy, chemotherapy+radiotherapy, chemotherapy+hormonal therapy).

support and BMI) were found to have p<0.25. Subsequently, these variables were entered into the multivariable analysis.

In multivariable analysis, performance status and pain showed a statistically significant association with depression among patients with cancer. Accordingly, the odds of having depression was 2.77 times among patients who had poor performance status as compared with those patients who had good performance status (AOR=2.77, 95% CI (1.42 to 5.39)). When the severity of pain increased by one point on a 0–10 scale, the odds of having depression increased by a factor of 1.25 (AOR=1.25, 95% CI (1.11 to 1.42)) (table 5).

DISCUSSION

This study aimed to assess the prevalence and associated factors of anxiety and depression among patients with cancer at oncology units in Amhara region hospitals by using a cross-sectional study. Based on this objective, the prevalence of anxiety in this study was 57.1% (95% CI 52.1% to 62.1%), which is consistent with other studies conducted in Rwanda,[6] India[7] and Southern Ethiopia[17] where 52.1%, 55.7% and 60.0% of their study participants had anxiety respectively. On the other hand, the present finding is higher than the studies conducted in Iran[13] and Beijing, China.[5] The discrepancy might arise from different study participants' clinical characteristics. In our study, patients were recruited regardless of their performance status but in the Chinese study listed above, they included only patients who had Karnofsky Performance Status score ≥60. This might increase the prevalence of anxiety in our study because poor performance status is linked with higher anxiety occurrence as revealed in our study. In the Iranian study, their study participants did not start cancer treatment, which is believed to increase the risk of anxiety.[5 13] The prevalence of anxiety in the current study is also higher than in the studies conducted in Greek[16] and Shanghai, China.[11] This might be due to the difference in the utilised tool. Generalised Anxiety Disorder-2 and Zung Self-rating Anxiety Scale were used in the Greek and China studies, respectively.

By contrast, the prevalence of anxiety in our study is lower than the study finding in Liaoning China,[14] Ghana,[10] Addis Ababa Ethiopia[18] and Egypt.[12] This inconsistency might be due to differences in characteristics of study participants in terms of types of cancer or other sociodemographic variations. Only patients with breast cancer were included in the studies conducted in Ghana and Egypt which might increase the prevalence of anxiety in their study.[10 12] This is supported by a study that revealed patients who had breast cancer had an increased risk to develop anxiety.[13] In the Ethiopian study mentioned above, the participants were patients who had advanced cancer and receiving palliative care. This is often associated with an increased level of pain and a higher level of existential concerns that ultimately increase the level of psychological distress in that study.

The prevalence of depression in this study was 60.2% (95% CI 55.2% to 65.1%), which is consistent with the studies done in China,[5] southern Ethiopia[17] and Gondar Ethiopia[20] where 57.1%, 58.8% and 58.4% of depression prevalence was reported. On the other hand, it is lower

Table 4 Factors associated with anxiety among study participants at oncology units in Amhara region hospitals, 2022 (n=392)

Variables		Anxiety		Crude OR (95% CI)	P value	Adjusted OR (95% CI)	P value
		Yes	No				
Sex	Male	64	77	1		1	
	Female	160	91	2.12 (1.39 to 3.22)	<0.001	0.74 (0.41 to 1.33)	0.497
Marital status	Married	147	110	1		1	
	Single	18	31	0.43 (0.23 to 0.82)	0.010	0.58 (0.22 to 1.53)	0.271
	Divorced	32	16	1.5 (0.78 to 2.86)	0.223	1.50 (0.64 to 3.54)	0.352
	Widowed	27	11	1.84 (0.87 to 3.86)	0.109	1.30 (0.44 to 3.80)	0.638
Occupation	Government employed	29	23	1		1	
	Unemployed	16	13	0.97 (0.39 to 2.43)	0.959	1.03 (0.31 to 3.52)	0.959
	Student	7	12	0.47 (0.16 to 1.36)	0.162	0.59 (0.12 to 3.08)	0.539
	Farmer	46	47	0.78 (0.39 to 1.54)	0.466	0.70 (0.26 to 1.90)	0.487
	Merchant	48	32	1.20 (0.59 to 2.41)	0.630	1.21 (0.48 to 3.09)	0.689
	Housewife	78	41	1.51 (0.78 to 2.93)	0.225	1.31 (0.49 to 3.46)	0.588
Monthly income	Below 2715	156	107	1.31 (0.86 to 1.99	0.215	1.37 (0.76 to 2.48)	0.296
	≥2715	68	61	1		1	
Social support	Poor	168	43	10.42 (4.52 to 24.04)	<0.001	4.43 (1.7 to 11.5)	**0.002**
	Moderate	47	101	1.24 (0.54 to 2.88)	0.615	0.82 (0.32 to 2.14)	0.691
	Strong	9	24	1		1	
Coffee drinking	Never	59	31	1		1	
	Daily	105	105	0.53 (0.32 to 0.88)	0.014	0.78 (0.38 to 1.63)	0.520
	Occasionally	60	32	0.99 (0.54 to 1.82)	0.962	0.96 (0.42 to 2.23)	0.939
Alcohol drinking status	Never drinker	87	59	1		1	
	Former drinker	98	100	0.67 (0.43 to 1.02)	0.064	0.77 (0.43 to 1.37)	0.368
	Current drinker	39	9	2.94 (1.33 to 6.52)	0.008	2.05 (0.78 to 5.42)	0.147
Performance status	Good	109	138	1		1	
	Poor	115	30	4.85 (3.02 to 7.79)	<0.001	1.97 (1.02 to 3.79)	**0.044**
Treatment type	Chemotherapy	135	72	1		1	
	Surgery+chemotherapy	56	81	0.37 (0.24 to 0.58)	<0.001	0.66 (0.34 to 1.29)	0.226
	Others*	33	15	1.17 (0.59 to 2.30)	0.642	0.92 (0.33 to 2.57)	0.873
Comorbid disease	No	190	155	1		1	
	Yes	34	13	2.13 (1.09 to 4.18)	0.027	0.94 (0.37 to 2.37)	0.888
Cancer stage	Localised cancer	84	87	1		1	
	Advanced cancer	140	81	1.79 (1.19 to 2.69)	0.005	1.18 (0.66 to 2.11)	0.580
Cancer type	Gynaecological cancer	41	21	1		1	
	Breast cancer	60	38	0.81 (0.42 to 1.57)	0.531	1.32 (0.52 to 3.35)	0.560
	Cancer of gastrointestinal tract	64	58	0.57 (0.30 to 1.07)	0.078	1.06 (0.41 to 2.75)	0.901
	Lymphomas	11	12	0.47 (0.18 to 1.24)	0.128	0.67 (0.17 to 2.63)	0.570
	Cancer of skin, bone and soft tissues	20	24	0.43 (0.19 to 0.94)	0.035	0.57 (0.18 to 1.80)	0.336
	Others†	28	15	0.96 (0.42 to 2.17)	0.914	1.57 (0.47 to 5.19)	0.462
Age	Continuous			1.021 (1.01 to 1.04)	0.012	0.98 (0.96 to 1.01)	0.218
Pain severity	Continuous			1.53 (1.39 to 1.69)	<0.001	1.30 (1.14 to 1.48)	**<0.001**

Continued

Table 4 Continued

Variables		Anxiety Yes	Anxiety No	Crude OR (95% CI)	P value	Adjusted OR (95% CI)	P value
Duration of chemotherapy (months)	Continuous			1.07 (1.03 to 1.12)	0.001	1.03 (0.99 to 1.08)	0.187

Bold indicates statistically significant variables.
*Others include (surgery+hormonal therapy, surgery+chemotherapy+hormonal therapy, chemotherapy+radiotherapy, chemotherapy+hormonal therapy).
†Others include (lung cancer, bladder cancer, prostatic cancer, sinonasal cancer, hepatocellular cancer, pharyngeal cancer, testicular cancer, nasopharyngeal cancer, thyroid cancer, laryngeal cancer, pancreatic cancer and cancer of unknown).

than studies conducted in Ghana,[10] Egypt[12] and Gondar Ethiopia.[9] The discrepancy might arise from the tool difference.

In contrast, the prevalence of depression in the current study is higher than the study results found in Shanghai China,[11] Liaoning China,[14] Iran,[13] Rwanda[6] and Greek.[16] The inconsistency might be due to differences in characteristics of study participants in terms of clinical parameters (such as cancer type and stage) and the used tools. Another possible reason might be due to better health service interventions and psychological counselling delivered to patients with cancer in the aforementioned high-income countries. Our finding is also higher than a study finding from Addis Ababa Ethiopia where the Patient Health Questionnaire-9 tool was used to assess depression which might be the source of the discrepancy.[8 21]

In this study, patients with cancer who received poor social support had a higher risk of anxiety than those who received strong social support This is supported by the fact that social support provides physical and psychological benefits to patients who are faced with stressful physical and psychosocial events, and is thought to be a factor in lowering psychological distress in stressful situations.[49] This implies that increasing the level of social support provided to patients with cancer by their families and significant others is crucial in reducing their anxiety and depression symptoms.

As our research demonstrated, poor performance status affects anxiety. Our result is consistent with that of a previous Chinese study.[19] The possible explanation for this association is that patients with poor performance status are more likely to be bedridden and have restricted self-care abilities, intensifying their dependency. This, in turn, worsens their level of anxiety.

Increased pain intensity, as measured by a 0–10 Numeric Pain Scale, was also linked with anxiety and depression in the current study. This finding is consistent with the findings of other studies.[6 8 19] Impaired functioning induced by pain can lead to stress, low self-esteem and social isolation, all of which can have a severe impact on psychological health.[50] Furthermore, they are linked by their shared anatomy. To generate the mental and physical experience of pain, the part of the brain that interprets sensations (somatosensory cortex) interacts with the parts of the brain that regulate emotions and the stress response (amygdala, hypothalamus and anterior cingulate gyrus). These same regions also contribute to anxiety and depression.[51] Physiologically serotonin and norepinephrine play a role in pain signalling in the brain and have been linked to the development of anxiety and depression.[52 53] This indicates the necessity of proper pain management in patients with cancer, which eventually decreases the risk of developing these psychiatric problems.

In this study, the odds of having depression were considerably higher among patients with low-performance status as compared with those with good performance status, as supported by other studies.[19 22–24] The association could be due to inflammatory cytokines including interleukin-6 and tumour necrosis factor-α, which harm patients with cancer performance. These cytokines not only impair the performance status, but they can also make patients with cancer depressed.[54] This implies that performance status assessment and specialised care tailored to each patient's level are essential.

There were methodological limitations with this study. To begin with, a temporal relationship between the outcome variable and independent variables could not be established because of the cross-sectional nature of the study design. On the other hand, the findings of this study are only applicable to the Amhara region of Ethiopia, not the rest of the country. To identify and assess the effects of a set of variables acting on a specified outcome via multiple causal pathways, path analysis was a more methodologically sound method than doing multiple logistic regression. In addition, some important independent variables like fear of recurrence/progression/ of disease, insurance ownership, distance to a cancer treatment centre and side effects of cancer chemotherapy were not assessed.

CONCLUSION AND RECOMMENDATION

The prevalence of anxiety and depression is high among patients with cancer. Poor social support, poor performance status and increased severity of pain were factors that significantly affect anxiety among patients with cancer. Similarly poor performance status and increased

Table 5 Factors associated with depression among study participants at oncology units in Amhara region hospitals, 2022 (n=392)

Characteristics		Depression		Crude OR (95% CI)	P value	Adjusted OR (95% CI)	P value
		Yes	No				
Sex	Male	69	72	1		1	
	Female	167	84	2.08 (1.36 to 3.16)	0.001	1.71 (0.75 to 3.93)	0.203
Marital status	Married	153	104	1		1	
	Single	21	28	0.51 (0.28 to 0.95)	0.033	0.43 (0.17 to 1.14)	0.090
	Divorced	33	15	1.50 (0.77 to 2.89)	0.232	1.01 (0.43 to 2.40)	0.978
	Widowed	29	9	2.19 (0.98 to 4.82)	0.051	1.26 (0.42 to 3.76)	0.682
Occupation	Government employed	28	24	1		1	
	Unemployed	20	9	1.91 (0.73 to 4.96)	0.187	2.38 (0.68 to 8.33)	0.176
	Student	9	10	0.77 (0.27 to 2.21)	0.629	1.44 (0.30 to 6.87)	0.650
	Farmer	51	42	1.04 (0.53 to 2.06)	0.908	1.02 (0.39 to 2.72)	0.963
	Merchant	50	30	1.43 (0.70 to 2.90)	0.324	1.45 (0.58 to 3.60)	0.429
	Housewife	78	41	1.63 (0.84 to 3.16)	0.149	1.05 (0.41 to 2.73)	0.915
Monthly income	Below 2715	167	96	1		1	
	>=2715	69	60	0.66 (0.43 to 1.01)	0.058	0.96 (0.54 to 1.71)	0.896
Social support	Poor	166	45	4.44 (2.07 to 9.47)	<0.001	1.46 (0.59 to 3.65)	0.413
	Moderate	55	93	0.71 (0.33 to 1.52)	0.378	0.45 (0.18 to 1.09)	0.077
	Strong	15	18	1		1	
Coffee drinking	Never	64	26	1		1	
	Daily	111	99	0.46 (0.26 to 0.77)	0.004	0.65 (0.32 to 1.34)	0.243
	Occasionally	61	31	0.79 (0.43 to 1.49)	0.485	0.68 (0.30 to 1.57)	0.375
Alcohol drinking status	Never drinker	94	52	1			
	Former drinker	106	92	0.64 (0.41 to 0.98)	0.044	0.71 (0.40 to 1.25)	0.237
	Current drinker	36	12	1.66 (0.79 to 3.46)	0.177	1.13 (0.46 to 2.77)	0.783
Performance status	Good	116	131	1		1	
	Poor	120	25	5.42 (3.29 to 8.92)	<0.001	2.77 (1.42 to 5.39)	**0.003**
Cancer type	Gynaecological cancer	45	17	1		1	
	Breast cancer	55	43	0.48 (0.24 to 0.96)	0.038	0.49 (0.19 to 1.23)	0.129
	Cancer of GIT	68	54	0.48 (0.25 to 0.92)	0.028	0.82 (0.31 to 2.18)	0.696
	Lymphomas	14	9	0.58 (0.22 to 1.61)	0.300	1.32 (0.35 to 4.92)	0.682
	Cancer of skin, bone, and soft tissues	22	22	0.38 (0.17 to 0.85)	0.010	0.52 (0.16 to 1.64)	0.262
	Others*	32	11	1.09 (0.45 to 2.66)	0.834	2.18 (0.64 to 7.39)	0.212
BMI	Underweight	74	43	1.31 (0.83 to 2.05)	0.247	0.66 (0.36 to 1.22)	0.183
	Normal weight	141	107	1		1	
	Overweight	21	6	2.66 (1.04 to 6.81)	0.042	1.53 (0.46 to 5.07)	0.491
Treatment type	Chemotherapy	143	64	1		1	
	Surgery+chemotherapy	61	76	0.36 (0.23 to 0.56)	<0.001	1.01 (0.52 to 1.95)	0.986
	Others†	32	16	0.89 (0.46 to 1.75)	0.745	1.64 (0.59 to 4.56)	0.347
Comorbid disease	No	201	144	1		1	
	Yes	35	12	2.09 (1.05 to 4.17)	0.036	0.76 (0.30 to 1.90)	0.556
Cancer stage	Localised cancer	85	86	1		1	
	Advanced cancer	151	70	2.18 (1.45 to 3.29)	<0.001	1.61 (0.91 to 2.87)	0.105
Age	Continuous			0.02 (1.01 to 1.04)	0.006	0.99 (0.97 to 1.02)	0.693

Continued

Table 5 Continued

Characteristics		Depression Yes	Depression No	Crude OR (95% CI)	P value	Adjusted OR (95% CI)	P value
Pain	Continuous			1.49 (1.35 to 1.64)	<0.001	1.25 (1.11 to 1.42)	**<0.001**
Duration of chemotherapy (months)	Continuous			1.04 (1.01 to 1.08)	0.023	1.01 (0.97 to 1.05)	0.592

Bold indicates statistically significant variables.
*Others include (lung cancer, bladder cancer, prostatic cancer, sinonasal cancer, hepatocellular cancer, pharyngeal cancer, testicular cancer, nasopharyngeal cancer, thyroid cancer, laryngeal cancer, pancreatic cancer and cancer of unknown).
†Others include (surgery+hormonal therapy, surgery+chemotherapy+hormonal therapy, chemotherapy+radiotherapy, chemotherapy+hormonal therapy).
BMI, body mass index; GIT, gastrointestinal tract.

severity of pain were determinant factors for depressive symptoms in patients with cancer.

Health professionals need to provide special consideration for patients with poor performance status, severe pain intensity and poor social support. Future researchers better evaluate the effects of certain variables like fear of recurrence/progression/of disease, insurance ownership, distance to a cancer treatment centre, and side effects of cancer chemotherapy on anxiety/depression using an advanced model.

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Ethics approval Ethical clearance was obtained from the University of Gondar College of Medicine and Health Sciences School of Nursing Ethical Committee (Ref No. C/H/N/U:03/206/14). A formal letter was written to all three hospitals and written informed consent was obtained from each participant. Confidentiality was maintained by omitting the participant's name and personal identification, and the collected information was not revealed to anyone except the principal investigators and kept locked with a key. Privacy was maintained by arranging a quiet place during the interview.

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