

Original Article

## Depression and anxiety status among informal caregivers of patients with cancer treated at selected tertiary hospitals in Nepal



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### المخلص

**أهداف البحث:** يعد السرطان سببا رئيسيا للوفاة على مستوى العالم ويضع عبئا ثقيلًا على المرضى ومقدمي الرعاية لهم. غالبا ما يشعر مقدمو الرعاية بالتوتر، مما يؤثر على صحتهم العقلية. تهدف هذه الدراسة إلى تقييم مستويات القلق والاكتئاب بين مقدمي الرعاية غير الرسميين لمرضى السرطان في مستشفيات التعليم العالي المختارة في نيبال. بالإضافة إلى ذلك، سعت الدراسة إلى تحديد العوامل الاجتماعية والديموغرافية المرتبطة بنتائج الصحة العقلية.

**طريقة البحث:** تم إجراء دراسة مقطعية على 383 من مقدمي الرعاية غير الرسميين باستخدام مقياس القلق والاكتئاب في المستشفى. وشملت التحليلات الإحصائية التحليل الوصفي والانحدار اللوجستي الثنائي لاستكشاف الارتباطات مع المتغيرات الاجتماعية والديموغرافية.

**النتائج:** كان متوسط عمر المشاركين  $36.1 \pm 13.1$ ، وتراوح أعمار 56.1% منهم بين 12 و36 عاما. وكان معظمهم متزوجين (81.5%)، وعاطلين عن العمل (66.6%)، وحصلوا على التعليم الابتدائي حتى الثانوي (66.6%). كشفت النتائج عن انتشار ملحوظ للقلق المعتدل إلى الشديد (52%) والاكتئاب (45%) بين مقدمي الرعاية. مقدمو الرعاية للمرضى الذين يتلقون العلاج من مستشفى غير حكومي لديهم أكثر احتمالا ست مرات للإصابة بالقلق وأكثر احتمالا بخمس مرات للإصابة بالاكتئاب.

**الاستنتاجات:** غالبا ما يشعر الأشخاص الذين يعتنون بمرضى السرطان في نيبال بالكثير من التوتر. إن معرفة أسباب هذه المشاعر يمكن أن يساعد في إنشاء برامج لدعم صحتهم العقلية. من المهم حقا الاهتمام بالصحة العقلية لمقدمي الرعاية من أجل رعاية أفضل لمرضى السرطان وحياة أكثر سعادة بشكل عام.

**الكلمات المفتاحية:** السرطان؛ مقدمو الرعاية؛ الاكتئاب؛ القلق؛ نيبال؛ المستشفى الثالثي

### Abstract

**Objective:** Cancer is a major cause of death globally, and places a substantial burden on both patients and their caregivers. Frequent stress among caregivers often affects their mental well-being. This study was aimed at assessing anxiety and depression levels among informal caregivers of patients with cancer treated at selected tertiary hospitals in Nepal. An additional aim was to identify socio-demographic factors associated with these mental health outcomes.

**Methods:** In this cross-sectional study, 383 informal caregivers were surveyed with the Hospital Anxiety and Depression Scale (HADS). Statistical analyses, including descriptive analysis and binary logistic regression, were conducted to explore associations with socio-demographic variables.

**Results:** The mean age of participants was  $36.1 \pm 13.1$  years, and 56.1% were 12–36 years old. Most participants were married (81.5%), were unemployed (66.6%), and had primary to secondary education (66.6%). The

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prevalence of moderate to severe anxiety (52%) and depression (45%) among caregivers was notable. Caregivers of patients treated at non-governmental hospitals were six times more likely (OR 6.3, 95% CI: [3.62–10.95],  $P = 0.001$ ) to have anxiety and five times more likely (OR 5.3, 95% CI: [8.28–19.32],  $P = 0.001$ ) to have depression.

**Conclusion:** People who take care of patients with cancer in Nepal often feel substantial stress. Determining the causes of these feelings can aid in the creation of programs to support caregivers' mental health. Caring for mental well-being among caregivers is critical to achieving better cancer care and quality of life.

**Keywords:** Anxiety; Cancer; Caregivers; Depression; Nepal; Tertiary hospital

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## Introduction

Several lethal diseases, notably cancer, profoundly affect both mental and physical well-being.<sup>1</sup> Cancer describes a group of diseases in which the cells in the body gradually exhibit uncontrolled growth, and form abnormal masses or tumors in one or more organs or tissues. Cancer is a serious medical condition that substantially contributes to global mortality. Globally, cancer is the primary cause of death and was responsible for approximately 10 million fatalities in 2020.<sup>1</sup> The rise in new cancer diagnoses has notably led to an increase in the number of people assuming cancer caregiver roles in recent years.<sup>3</sup> Caregivers for patients with cancer are crucial to decreasing mortality rates by offering efficient palliative care and assisting with clinical treatment.<sup>1</sup> These caregivers play major roles in community-based cancer care approaches, and their involvement can span prolonged periods, sometimes as long as several years. In addition, being a caregiver poses a substantial burden on individuals and affects various aspects of their lives, including their mental and physical well-being, as well as their financial status.<sup>3,4</sup> One study has reported that 13% of caregivers in the United States qualify for a psychiatric disorder diagnosis; moreover, 25% sought treatment for their mental health issues after the cancer diagnosis of a loved one.<sup>5</sup>

In a study in Malaysia,<sup>6</sup> 47.4% of caregivers were affected by caregiver burden, ranging from mild to severe, at 36.1%. The most frequently reported psychological manifestations among informal caregivers were anxiety (29.7%), depression (20.4%), and stress (18.5%). Caregivers of patients with cancer are well known to tolerate remarkable levels of stress within the domestic work environment. Stress arises from their frequent direct interactions with individuals with severe illnesses and their high regard for societal responsibilities, thus distinguishing cancer caregivers from caregivers of patients with non-malignant illnesses.<sup>6</sup>

Cancer, the second-leading cause of death worldwide, was responsible for 18.1 million new cases and 9.6 million deaths

in 2018. In the United States, 1,918,030 new cancer cases and 609,360 cancer deaths were predicted in 2022, among which lung cancer was the primary cause of death, accounting for approximately 350 fatalities daily. Despite a 4%–6% yearly increase in advanced illness since 2011, the incidence of prostate cancer remained steady from 2014 to 2018, whereas female breast cancer incidence continued to slowly increase (by 0.5% annually).<sup>7</sup> In Nepal, 15,543 people died from cancer in 2015, and 19,943 new cases were estimated to have occurred. The incidence has been predicted to increase to 25,834 by 2025, with 20,396 fatalities. If preventive measures are not extensively pursued, cancer rates will continue to grow, reaching a predicted 32,907 new cancer cases and 26,586 fatalities by 2035.<sup>8</sup> Caregiving during cancer treatment can be difficult, and may lead to physical and psychological stress, thus frequently resulting in physical and psychological effects, and/or problems such as financial burden associated with treatment, psychological distress, and restriction of social activities.<sup>9</sup> Additional research has further confirmed that caregivers of patients with cancer experience greater levels of depression, generalized anxiety, and sleep disorders than controls, and frequently work for more than 8 h per day providing care. Over time, self-care activities such as exercise and sleep decrease among caregivers—a pattern associated with worsening mental health.<sup>10</sup> Despite having high rates of psychological distress, family caregivers of patients with cancer seldom seek mental health treatment.<sup>11</sup> The stress of caring for patients with cancer is well known to affect caregivers' quality of life and mental health.<sup>12</sup>

Unfortunately, a dearth of research has been conducted on the anxiety and despair experienced by family caregivers of patients with cancer in Nepal. Such information could be used by authorities to prepare for mental healthcare among caregivers, beyond the care of patients with cancer. To our knowledge, no similar study examining the association between mental health and cancer caregiver status has been undertaken in Nepal, despite the rising burden of mental health, and the increases in patients with cancer and the related psychosocial caregiving burden. Therefore, this study was aimed at investigating the depression and anxiety status among informal caregivers of patients with cancer in selected tertiary hospitals in Nepal.

## Materials and Methods

### *Study design, population, location, period, and selection criteria*

We used a cross-sectional research design to systematically gather quantitative data. We collected quantitative information from a cohort of 383 informal caregivers providing crucial support to patients with cancer. Our study was conducted at three prominent cancer specialist hospitals in Nepal: BP Koirala Memorial Cancer Hospital in Chitwan district, equipped with more than 300 beds; Bhaktapur Cancer Hospital in Bhaktapur district, with a bed capacity exceeding 100; and Nepal Cancer Hospital and Research Center in Lalitpur, with more than 50 beds. The population of our study encompassed male and female family caregivers who actively engaged in caregiving responsibilities for a

minimum duration of 1 month, for patients with cancer undergoing various treatment modalities at these healthcare facilities. Our investigation spanned 6 months, from March to August 2019, which were divided into several phases of research activities, including topic selection (March); protocol development and approval (March to April); data collection (May); and data analysis and reporting (May to August). To ensure the robustness of our data collection instrument, we conducted a pre-test before the actual data collection, to assess and establish the validity and reliability of the semi-structured questionnaire.

#### Sample size

The sample size for this study was calculated with the standard formula  $\frac{z^2 * p * q}{d^2}$ , where  $n$  = sample size,  $z$  = value of standard normal distribution ( $z$ -distribution) at a 5% level of significance or 95% confidence limit ( $z$  value = 1.96),  $p$  = 38.1%<sup>13</sup> = 0.381,  $q$  = 1 -  $p$ , and  $d$  = precision level (5%). Therefore,  $n = \frac{(1.96)^2 * 0.381 * 0.619}{(0.05)^2} = 362$ . With a non-response rate of approximately 5%, a sample size of 383 was calculated to be required. Samples were collected after a sampling framework was developed through a multistage systemic sampling technique collecting every other sample.

#### Sampling technique

The initial selection of three well-known hospitals, BP Koirala Memorial Cancer Hospital, Bhaktapur Cancer Hospital, and Nepal Cancer Hospital and Research Center, followed a purposive sampling design (Figure 1). We chose specific hospitals known for treating large numbers of patients with cancer, ensuring that the sample represented the population of interest.

A second phase involved using a systematic sampling technique to select the samples within each hospital. Specifically, every other bed in various wards was selected. This approach was systematic because it followed a pre-determined pattern (every other bed) for selecting the samples. To account for differences in bed capacity, a larger sample was drawn from hospitals with greater bed capacity. After the beds were identified through systematic sampling, the primary caregivers of patients in the respective beds were chosen as the study cohort.

#### Ethical issues

Ethical approval for this study was granted by the Research Ethics Committee of the Department of Public Health, Faculty of Allied Health Sciences, Daffodil International University (ethical clearance No: FAHS-REC/DIU/2018/1002). We obtained written informed consent from all participants, ensuring their understanding of the study's purpose and their right to withdraw at any time. Strict measures were taken to maintain privacy and confidentiality, and no personal identification information was collected. Additionally, permission was secured from the administrations of the involved study hospitals, to ensure that the research aligned with both ethical and institutional guidelines.

#### Data collection tool

##### HADS interpretation

We used the Hospital Anxiety and Depression Scale (HADS) to evaluate anxiety and depression levels among study participants. The HADS provides separate scores for anxiety (HADS-A) and depression (HADS-D) on a scale of 0–21.

- **Anxiety (HADS-A):**
  - 0–7: Normal (minimal to no anxiety)
  - 8–10: Borderline (mild anxiety)
  - 11–14: Moderate (moderate anxiety)
  - 15–21: Severe (severe anxiety)
- **Depression (HADS-D):**
  - 0–7: Normal (minimal to no depression)
  - 8–10: Borderline (mild depression)
  - 11–14: Moderate (moderate depression)
  - 15–21: Severe (severe depression)

These categories helped us assess participants' emotional well-being. Higher scores indicated more pronounced anxiety or depression symptoms. This analysis aided in understanding of the psychological effects of caregiving for patients with cancer.

#### Validity

- **Convergent validity:** The HADS has been shown to correlate strongly with other well-established measures of anxiety and depression, such as the Beck Anxiety Inventory and Beck Depression Inventory. For example, a study of 400 patients with psychiatric disorders has found that the HADS anxiety and depression subscales showed correlations of 0.82 and 0.84 with the Beck Anxiety Inventory and Beck Depression Inventory, respectively.<sup>14</sup>
- **Discriminant validity:** The HADS has been shown to have good discriminant validity, with low correlations with measures of other psychiatric disorders, such as psychosis and substance use disorders. For example, a study of 200 patients with psychosis has reported that the HADS anxiety and depression subscales showed correlations of 0.36 and 0.42 with the Positive and Negative Symptom Scales, respectively.<sup>15</sup>

#### Reliability

- **Internal consistency:** The HADS has good internal consistency, with Cronbach's alpha coefficients typically ranging from 0.70 to 0.90 for both the anxiety and depression subscales. For example, a study of 95 patients in an emergency department in KSA has found Cronbach's alpha coefficients for the anxiety and depression subscales of 0.73 and 0.77, respectively.<sup>16</sup>
- **Test–retest reliability:** The HADS has good test–retest reliability, with Pearson correlation coefficients typically ranging from 0.70 to 0.90 for both the anxiety and depression subscales. For example, a study of 100 patients with chronic pain has found Pearson correlation coefficients for the anxiety and depression subscales of 0.80 and 0.85, respectively, at 2 weeks.<sup>17</sup>

### Data collection procedure

Data collection for this study was conducted through a structured interview process facilitated by an interviewer-administered semi-structured questionnaire. The questionnaire was initially developed in English and was subsequently translated into Hindi for use during the data collection phase. Before the interviews, a comprehensive explanation of the study's purpose was provided to the informal caregivers. Informed consent from both the participants and the relevant authorities was obtained.

After the interviews, each questionnaire underwent a thorough review to ensure completeness. The entire dataset was then subjected to cross-checking to ascertain data consistency and accuracy. To facilitate data entry into statistical software, a systematic coding system was applied to the questionnaires.

### Quality control

Quality control measures were implemented at multiple stages of the data collection process. Rigorous oversight ensured that data were collected accurately, and the integrity of the information was maintained. This process included a thorough review of each questionnaire for completeness, adherence to the study's objectives, and accuracy of the responses.

### Data management

All collected data were entered, coded, and cleaned to ensure data accuracy and reliability. Statistical Package for Social Sciences (SPSS), version 22 was used for data analysis. The key variables of interest were the anxiety and depression levels of the patient caregivers. To explore relationships with other variables, we conducted various statistical analyses, including descriptive analysis and binary logistic regression. These analyses formed the core of our investigation, thus facilitating the exploration of critical associations and patterns within the dataset.

### Results

As shown in [Table 1](#), the participants ( $n = 383$ ) were  $36.1 \pm 13.1$  years old (mean  $\pm$  SD), and most participants (56.1%) were in the 12–36 year age group. Approximately 81.5% were married, and many participants (66.6%) were unemployed. A total of 66.6% of participants had primary to secondary education, and approximately 52.5% belonged to a nuclear family. Most (61.6%) participants had an annual income  $<200,000$  Nepalese rupees. Approximately 63.2% of participants cared for patients receiving treatment from governmental hospitals, and 47.3% of participants were the children or parents of the patients.

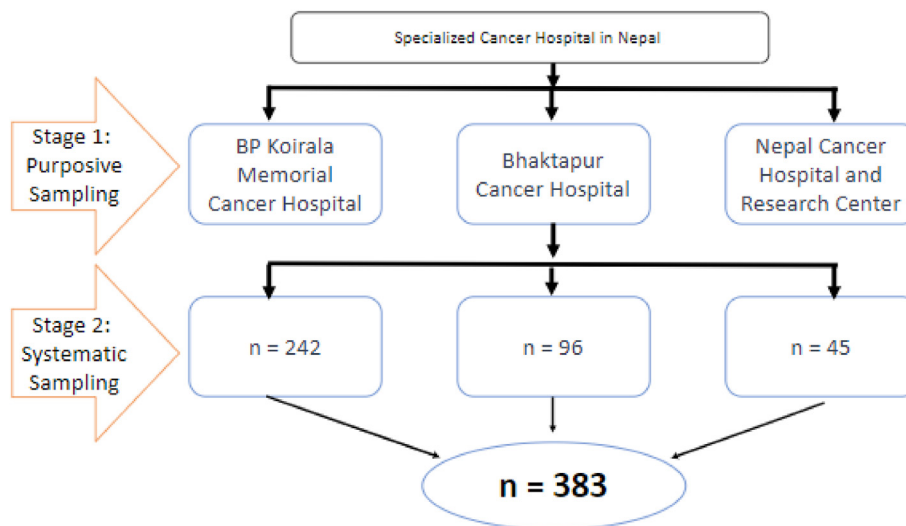


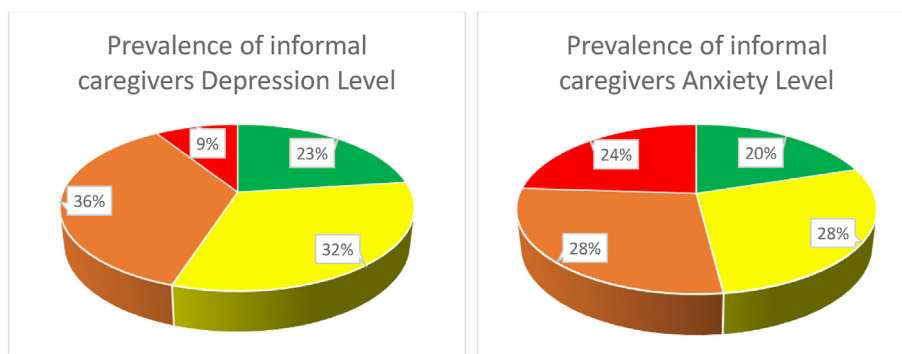
Figure 1: Sampling technique.

**Table 1: Sociodemographic characteristics and mental health status.**

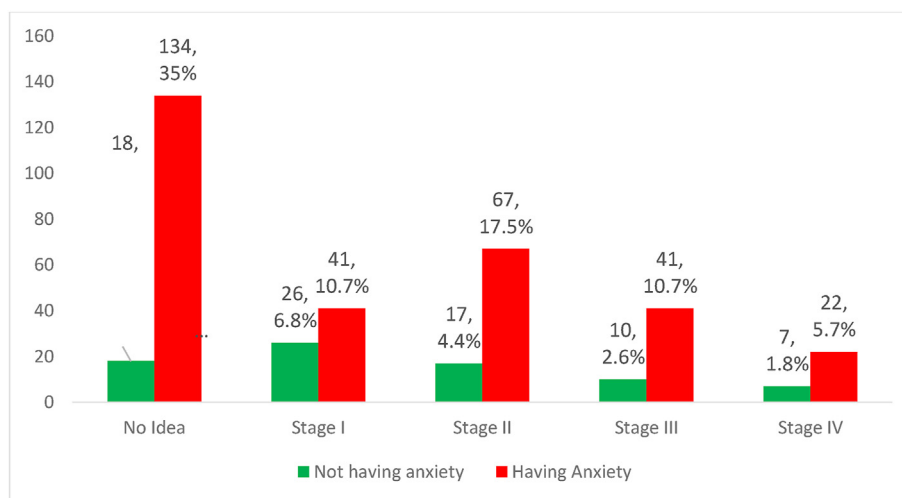
Variable	Depression		Total	Anxiety		Total
	No (%)	Yes (%)		No (%)	Yes (%)	
<b>Age</b>						
12–36	30 (7.8)	185 (48.3)	215 (56.1)	39 (10.2)	176 (46.0)	215 (56.1)
37–80	48 (12.5)	120 (31.3)	168 (43.9)	51 (13.3)	117 (30.5)	168 (43.9)
<b>Mean ± SD</b>	36.1 ± 13.1					
<b>Sex</b>						
Female	40 (10.4)	135 (35.2)	175 (45.6)	34 (8.9)	141 (36.8)	175 (45.6)
Male	50 (13.1)	158 (41.3)	208 (54.4)	44 (11.5)	164 (42.8)	208 (54.4)
<b>Marital status</b>						
Unmarried	18 (4.7)	53 (13.8)	71 (18.5)	11 (2.9)	60 (15.7)	71 (18.5)
Married	72 (18.8)	240 (62.7)	312 (81.5)	67 (17.5)	245 (64.0)	312 (81.5)
<b>Occupation</b>						
Unemployed	59 (15.4)	196 (51.2)	255 (66.6)	53 (13.8)	202 (52.7)	255 (66.6)
Employed	31 (8.1)	97 (25.3)	128 (33.4)	25 (6.5)	103 (26.9)	128 (33.4)
<b>Education level</b>						
Primary–secondary	52 (13.6)	203 (53.0)	255 (66.6)	43 (11.2)	212 (55.4)	255 (66.6)
Higher secondary and above	38 (9.9)	90 (23.5)	128 (33.4)	35 (9.1)	93 (24.3)	128 (33.4)
<b>Family type</b>						
Nuclear family	44 (11.5)	157 (41.0)	201 (52.5)	39 (10.2)	162 (42.3)	201 (52.5)
Joint family	46 (12.0)	136 (35.5)	182 (47.5)	39 (10.2)	143 (37.3)	182 (47.5)
<b>Annual income (Nepalese rupees)</b>						
<200,000	54 (14.1)	182 (47.5)	236 (61.6)	44 (11.5)	192 (50.1)	236 (61.6)
>200,000	36 (9.4)	111 (29.0)	147 (38.4)	34 (8.9)	113 (29.5)	147 (38.4)
<b>Relation to patient</b>						
Child or parent	37 (9.7)	144 (37.6)	181 (47.3)	30 (7.8)	151 (39.4)	181 (47.3)
Spouse	28 (7.3)	77 (20.1)	105 (27.4)	23 (6.0)	82 (21.4)	105 (27.4)
Other	25 (6.5)	72 (18.8)	97 (25.3)	25 (6.5)	72 (18.8)	97 (25.3)
<b>Hospital type</b>						
Governmental	30 (7.8)	212 (55.4)	242 (63.2)	23 (6.0)	219 (57.2)	242 (63.2)
Non-governmental	60 (15.7)	81 (21.1)	141 (36.8)	55 (14.4)	86 (22.5)	141 (36.8)

As shown in Figure 2 (left), 23% of participants (informal caregivers) were rated as normal on the HADS-D scale for depression, 32% had mild depression, 36% had moderate depression, and 9% had severe depression. Moreover, as

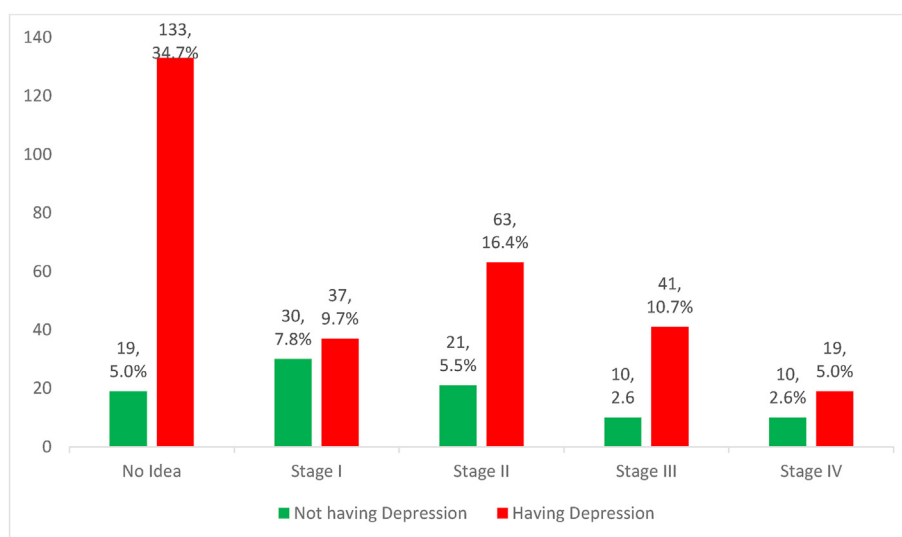
shown in Figure 1 (right), 20% of participants were rated as normal on the HADS-A scale for anxiety, 28% had mild anxiety, 28% had moderate anxiety, and 24% had severe anxiety.



**Figure 2:** Prevalence of depression (left) and anxiety (right) among informal caregivers. Green, normal; yellow, mild; orange, moderate; red, severe.



**Figure 3:** Prevalence of anxiety among informal caregivers according to cancer stage of the patient.



**Figure 4:** Prevalence of depression among informal caregivers according to cancer stage of the patient.

A total of 134 (35%) participants (informal caregivers) did not know the patient's cancer stage but had anxiety (Figure 3). Moreover, 41 (10.7%) participants caring for stage I patients, 67 (17.5%) participants caring for stage II patients, 41 (10.7%) participants caring for stage III patients, and 22 (5.7%) participants caring for stage IV patients had anxiety.

A total of 133 (34.7%) participants did not know the patient's cancer stage but had depression (Figure 4). A total of 37 (9.7%) participants caring for stage I patients, 63 (16.4%) participants caring for stage II patients, 41 (10.7%) participants caring for stage III patients, and 19 (5.0%) participants caring for stage IV patients had depression.

Caregivers of patients treated at a non-governmental hospital had a six-times greater chance (OR 6.3, 95% CI: [3.62–10.95],  $P = 0.001$ ) of having anxiety and a five times greater chance (OR 5.3, 95% CI: [8.28–19.32],  $P = 0.001$ ) of having depression (Table 2). Caregivers >36 years of age were two times more likely to have anxiety (OR 2.74, 95% CI: [1.5–4.9],  $P = 0.001$ ) and two times more likely to have depression (OR 2.62, 95% CI: [1.5–4.6],  $P = 0.001$ ). Participants who knew their patient's cancer stage were three times more likely to have depression (OR 3.07, 95% CI: [1.7–5.3],  $P = 0.001$ ) and two times more likely to have anxiety (OR 2.55, 95% CI: [1.4–4.5],  $P = 0.002$ ). Married participants had twice the odds of having depression (OR 2.04, 95% CI: [0.98–4.2],  $P = 0.04$ ).

**Table 2: Adjusted socio-demographic factors associated with anxiety and depression levels.**

Characteristics/risk factors		Anxiety level				Depression level			
		Bivariate analysis OR (95% CI)	<i>P</i> -value	Multivariate analysis OR (95% CI)	<i>P</i> -value	Bivariate analysis OR (95% CI)	<i>P</i> -value	Multivariate analysis OR (95% CI)	<i>P</i> -value
Age (years)	≤36	1	0.001	<b>1</b>	<b>0.001</b>	1	0.006	<b>1</b>	<b>0.001</b>
	>36	2.46 (1.4–4.1)		<b>2.74 (1.5–4.9)</b>		1.96 (1.2–3.1)		<b>2.62 (1.4–4.6)</b>	
Marital status	Unmarried	1	0.26	1	0.59	1	0.68	<b>1</b>	<b>0.04</b>
	Married	1.5 (0.74–2.9)		1.2 (0.54–2.8)		.88 (0.48–1.6)		<b>2.04 (0.98–4.2)</b>	
Education	Higher secondary and above	1	0.017	1	0.016	1	0.044	1	0.03
	Primary to secondary	1.85 (1.1–3.0)		0.53 (0.31–0.89)		1.64 (1.0–2.6)		0.59 (0.36–0.96)	
Family type	Nuclear family	1	0.62	1	0.81	1	0.43	1	0.45
	Joint family	1.13 (0.68–1.8)		0.94 (0.56–1.6)		1.2 (0.75–1.9)		0.83 (0.51–1.3)	
Occupation	Unemployed	1	0.77	1	0.92	1	0.81	1	0.68
	Employed	0.92 (0.54–1.5)		0.96 (0.52–1.7)		1.06 (0.64–1.7)		0.88 (0.50–1.5)	
Annual Income (Nepalese rupees)	>200,000	1	0.29	1	0.67	1	0.71	1	0.86
	≤200,000	1.31 (0.79–2.1)		0.88 (0.51–1.5)		1.09 (0.67–1.1)		0.95 (0.54–1.6)	
Hospital type	Governmental	1	0.00	<b>1</b>	<b>0.001</b>	1	0.00	<b>1</b>	<b>0.001</b>
	Non-governmental	6.08 (3.5–10.5)		<b>6.3 (3.62–10.95)</b>		5.23 (3.15–8.69)		<b>5.31 (3.15–8.87)</b>	
Cancer stage	No idea	1	0.001	<b>1</b>	<b>0.002</b>	1	<b>0.00</b>	<b>1</b>	<b>0.001</b>
	Stage I–IV	2.61 (1.4–4.6)		<b>2.55 (1.4–4.5)</b>		3.10 (1.7–5.4)		<b>3.07 (1.7–5.3)</b>	

## Discussion

A systematic review and meta-analysis has indicated that the global pooled prevalence of depression is 42.08% (95% CI: 34.71–49.45) among caregivers of patients with cancer, and female caregivers are affected more than male caregivers.<sup>18</sup> In comparison, this study found that, among caregivers of patients with cancer, married participants had twice the odds of having depression (OR 2.04, 95% CI: [0.98–4.2],  $P = 0.05$ ) than unmarried participants. A nationwide cross-sectional study has indicated that the location of death for patients with cancer influences not only their quality of dying and death, but also the mental health of their family caregivers. In that study, depressive symptoms were significantly greater among caregivers of patients who died in acute hospitals (5.7; 95% confidence interval [CI]: 5.3–6.2) than caregivers of patients who died in hospice or at home (4.8; 95% CI: 4.4–5.1).<sup>19</sup> In another study, significantly lower mental component summary scores have been found for caregivers of patients with cancer than non-caregivers (40.18 vs. 46.70), thus indicating a clinically meaningful decrease in health-associated quality of life.<sup>20</sup> The researchers of this study, in harmony with our research, observed 79.6% poor level anxiety and 76.5% poor level depression, respectively, among the informal caregivers of patients with different stages of cancer, either known or unknown.

According to another systematic review, the prevalence of depression and anxiety among a population of cancer caregivers has been found to be 42.30% and 46.56%, respectively; almost half the caregivers showed severe anxiety (53%) and depression (46.3%).<sup>21</sup> In Nepal, we found that the prevalence of severe depression was 9%, and that of severe anxiety was 24%, among the informal caregivers of patients with cancer. Severe depression and/or anxiety can lead to deterioration of mental health and the quality of every area of life. The Global Burden of Disease Study 2019 has reported 301.39 million (95% UI: 252.63, 356.00) prevalent cases of anxiety disorders, representing a 50% increase since 1990.<sup>22</sup> Anxiety disorders are associated with a significant increase in mortality risk.<sup>23</sup> Indeed, informal caregivers of patients with cancer face risks of morbidity and premature mortality.

According to the World Health Organization Report 2023, approximately 280 million people worldwide have depression, and suicide is the fourth leading cause of death among 15–29-year-olds; moreover, more than 700,000 people die from suicide every year (WHO, 2023). The findings of this study established the vulnerable age group in the population as a whole was 12–36 years (mean  $\pm$  SD 36.1  $\pm$  13.1 years). Caregivers >36 years old from <36 years participants had more than twice the odds of having anxiety (OR 2.74, 95% CI: [1.5–4.9],  $P = 0.001$ ) and depression (OR 2.62, 95% CI: [1.5–4.6],  $P = 0.001$ ). These observations indicated that the people of an age group are proceeding towards the inevitable threats gradually beyond their will. In this context, screening of mental health status and providing psychosocial support are crucial for informal caregivers of patients with advanced cancer. Similar suggestions have been provided in

a previous report indicating that social support—including promotion of healthy behaviors throughout the oncology pathway, from diagnosis to treatment to survival—can improve the health of patients and family members in supportive roles.<sup>24</sup>

In the current study, most of the informal carers (81.5%) were married, and many (66.6%) were unemployed. Study findings from Iran have demonstrated that family caregivers of patients with thoracic cancer occasionally experience more physical and psychological distress than the patients.<sup>25</sup> Family caregivers may face challenges including insufficient support, fear of losing loved ones, feelings of loneliness, heavy workloads, inadequate rest, and poor self-care. However, family type and occupation were not significantly associated with the mental health status of informal caregivers of patients with cancer in this study.

This study revealed that family caregivers who did not know the patient's cancer stage experienced anxiety (35%) and depression (34.7%), whereas participants who knew the patient's cancer stage had a three times greater depression risk (OR 3.07, 95% CI: [1.7–5.3],  $P = 0.001$ ) and a two times greater anxiety risk (OR 2.55, 95% CI: [1.4–4.5],  $P = 0.002$ ). Similarly, a qualitative study from Kenya has indicated that the practical challenges associated with role overload and competing tasks, continuous unmet needs, financial stress, and a lack of preparedness in handling end-of-life care for patients in advanced stages of cancer are the main psychosocial stress concerns.<sup>26</sup> The investigators noted significant risks of anxiety and depression due to knowledge deficits among caregivers with primary to secondary education.

Treatment costs of various cancers are very high in the long term, thus posing financial burdens on family members. The services provided by non-governmental hospitals or health centers are always more expensive than those provided by governmental hospitals or medical centers. A quantitative study from Pakistan has highlighted that informal caregivers perceive financial burden during caregiving.<sup>27</sup> In contrast, our study established that financial burden was not significantly associated with anxiety and depression levels; most (61.6%) participants' annual income was <200,000 Nepalese rupees. The European Union National Health and Wellness Survey 2010 and 2011 have indicated that informal caregivers of patients with cancer experience significant impairments and stress-associated comorbidities (depression, anxiety, insomnia, headache, migraine, and gastrointestinal problems) resulting from healthcare resource use (emergency department visits, hospitalization, and traditional provider visits), among other aspects.<sup>28</sup> Similarly, approximately 63.2% of participants in this study cared for patients who received treatment from governmental hospitals; the caregivers of patients treated at non-governmental hospitals showed highly significant associations with anxiety (OR 6.3, 95% CI: [3.62–10.95],  $P = 0.001$ ) and depression (OR 5.3, 95% CI: [8.28–19.32],  $P = 0.001$ ). A growing body of evidence indicates that supportive interventions, including psychoeducation, skills training, and therapeutic counselling, can help alleviate



caregivers' burdens, and support their information needs, coping strategies, physical functioning, psychological well-being, and quality of life.<sup>18</sup>

#### Limitations and strengths

This study focused on various risk factors rather than solutions. The study was limited to selected tertiary hospitals: well-known hospitals treating many patients with cancer were selected through a systemic sampling technique involving collection of every other sample to generalize the findings. Because of its cross-sectional design, this study identified frequencies and adjusted associations rather than causality. However, this is the first study investigating the perceived mental health status of informal caregivers of patients with cancer in Nepal, to our knowledge. Samples were selected through a multistage sampling technique to prevent selection bias. The findings of this research may help policymakers develop appropriate policies and laws to control risks and ensure better lives among vulnerable populations.

#### Conclusion

This research sheds light on the mental health status of informal caregivers of patients with cancer in selected tertiary hospitals in Nepal. The prevalence of poor level anxiety (79.6%) and poor level depression (76.5%) among the informal caregivers of patients with cancer in various stages was alarmingly high. Moreover, the prevalence of severe depression was 9%, and that of severe anxiety was 24%. Caregivers older than 36 years were relatively more vulnerable to mental deterioration; therefore, our findings emphasize the urgent need for routine screening for early detection of mental health status (normal or disordered) among informal caregivers of patients with cancer. In addition, significant risks of anxiety and depression due to knowledge deficits were found in caregivers with primary to secondary education levels; nonetheless, family type, occupation, and income were not significantly associated with mental health status among the informal caregivers of patients with cancer. Furthermore, the caregivers of patients treated at non-governmental hospitals showed significant associations with anxiety and depression. Therefore, psychosocial support is crucial for the stability of both patients with cancer and their caregivers. Finally, we recommend the development of appropriate policies to achieve sufficient interventions, such as psychosocial support, easily accessible healthcare facilities, routine screening, and knowledge and awareness building programs using different levels of communication, to protect affected people.

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#### Conflict of interest

No conflicts of interest are reported.

#### Ethical approval

Approval from the Research Ethics Committee of Department of Public Health, Faculty of Allied Health Sciences, and Daffodil International University was provided before the study.

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Written approval from the study hospitals' administration was provided before the study.

#### Authors' contributions

Bed Prakash Sharma (First Author): Overall Concept, Data collection.

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#### Further reading

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