ORIGINAL RESEARCH ARTICLE

Factors Affecting Anxiety Among Patients with Oro-Digestive Cancer: A Cross-Sectional Descriptive Study

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ABSTRACT

Introduction: A cancer diagnosis is perceived as life-altering and carries a deep emotional burden, leading to significant psychological distress. This cross-sectional descriptive study was aimed to assess anxiety and its contributing factors among Oro-digestive cancer patients.

Methods: A study was conducted at a tertiary care hospital, after ethical clearance and participants' consent. Purposive sampling technique was used to enroll 72 adult Oro-digestive cancer patients receiving chemotherapy from August 2024 to January, 2025. Depression anxiety stress scale (DASS-21) was used to assess the anxiety and a validated structured questionnaire was used to elicit data related to socio-demographic & clinical profiles. The scales were pilot tested and administered using face to face interview technique by the principal investigator.

Results: More than 60% of the patients had some degree of anxiety. The mean anxiety score was significantly associated with age group ($F=4.03$, $p=0.023^{*}$), gender ($t=2.09$, $p=0.040^{*}$), marital status ($F=5.74$, $p=0.016^{*}$) and history of substance use ($t=2.48$, $p=0.015^{*}$) Among the clinical variables, type of cancer ($t=2.44$, $p=0.017^{*}$), time since diagnosis ($F=5.39$,$p=0.007^{*}$), performance status ($t=2.29$, $p=0.025^{*}$) and number of side effects faced ($F=26.8$, $p<0.001^{**}$) by the patients had a significant impact on anxiety scores.

Conclusion: Younger, female, and single patients exhibited significantly higher levels of anxiety. In contrast, those experiencing fewer side effects and better performance status reported lower anxiety levels. Additionally, newly diagnosed individuals showed increased anxiety. Identifying these high-risk groups allows for early intervention, ultimately leading to better patient outcomes.

Keywords: Oro-digestive cancer, Chemotherapy, Anxiety Among Cancer Patients, Cancer Patients, Predictors of Anxiety, Factors Affecting Anxiety

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INTRODUCTION

Oro-digestive cancers are the malignancies that affect the oral cavity, pharynx, esophagus, stomach, pancreas, liver, gall bladder, bile duct, colon, rectum, and anus.[1] Typically, cancers of the oral cavity and pharynx are grouped under head and neck cancers[1], while those affecting the remainder of Oro-digestive tract are categorized as gastrointestinal (GI) cancers.[2]

The global impact of cancer is considerable and continues to grow, with rising incidence and mortality rates. It continues to be a significant contributor to global mortality and presents a substantial challenge to the expansion of life expectancy in all nations.[3] Cancer is the primary or secondary cause of mortality before the age of 70 in 112 out of 183 countries, according to 2019 estimates from the World Health Organization (WHO).[4]

Globally, approximately 19.3 million new cancer cases were recorded in 2020, with nearly 10 million fatalities caused by the disease, according to the Global Cancer Observatory (GLOBOCAN).[5] India is third in terms of cancer prevalence, following the United States and China. GLOBOCAN anticipates that the number of cancer cases in India will increase to 2.08 million by 2040, which is a 57.5% increase from 2020.[6]

Cancer affecting the digestive tract represent a significant portion of the global cancer burden, comprising more than a quarter of all cancer cases. Additionally, their incidence is steadily increasing.[7] According to the Global Burden of Cancer Report (2018), stomach cancer was the fourth most prevalent form of cancer among both males and females in India. The incidence of lip and oral cavity cancer was greatest among males. Colorectal cancer, oesophageal cancer, liver cancer, and gallbladder and biliary tract cancers were the other gastrointestinal malignancies with a high incidence in India.[8] GI cancers are responsible for one in four cancer cases and one in three cancer-related fatalities, according to another report. Globally, 4.8 million new cases of gastrointestinal (GI) cancer and 3.4 million related fatalities were documented in 2018.[4]

Chemotherapy is one of the treatment modalities for cancer, however, it is often accompanied with side effects. Chemotherapy is most commonly administered for cancers of the oesophagus, stomach, pancreas, biliary tract, and colorectal.[9] Beyond the physical challenges of cancer and its treatment, a cancer diagnosis is highly stressful and can be life-altering for the patient. This psychological distress may lead to significant health consequences, including the risk of developing psychiatric disorders.[10,11] Anxiety and depression are among the most common yet frequently overlooked complications in cancer patients.

Studies have shown that cancer patients are more prone to developing anxiety and depression compared to the general population.[12] In a meta-analysis of 51 research papers in 2023, it was reported that the overall prevalence of anxiety was 20.4% (95% CI 17% to 23.8%) among patients with digestive tract cancers.[13] Likewise Cheng et al. (2010) reported that cancer patients frequently experience stress associated with their diagnosis and treatment.[14] Studies further reveal that 9 to 60 percent of cancer patients are diagnosed with psychological disorders.[15-19]

The psychological trauma linked to a cancer diagnosis often endures and worsens during chemotherapy, which typically requires repeated hospitalizations. Chemotherapy can lead to both physical and mental health challenges in cancer patients, with anxiety and depression being highly prevalent. Anxiety may worsen physical and psychological side effects, significantly impacting patients' quality of life.[13] Anxiety can also result in behavioural immobility, preventing patients from effectively utilizing coping strategies. As a result, it may impact their adherence to treatment.[20]

Despite its high prevalence, anxiety frequently goes unrecognized and inadequately assessed in clinical settings, leading to suboptimal management. Many patients experience persistent fear, uncertainty, and distress related to their diagnosis, treatment, and prognosis, which can further affect their adherence to medical care and overall health outcomes.[21]

However, limited research exists on the specific predictors of anxiety in hospitalized cancer patients. Factors including various socio-demographic and clinical variables may contribute to varying anxiety levels, yet these remain insufficiently explored. It is essential to identify underlying psychological conditions and the factors contributing to them. This understanding is crucial for effectively addressing the patient's needs, facilitating their adjustment to treatment, and developing an appropriate intervention.

Identifying gaps in knowledge could ultimately impact clinical outcomes and survival among cancer patients. Thus, the primary objective of this descriptive study was to evaluate levels of anxiety and the factors that influence them in patients diagnosed with Oro-digestive cancer and undergoing chemotherapy.

METHODOLOGY

The cross-sectional investigations were reported in accordance with the STROBE guidelines for Strengthening the Reporting of Observational investigations in Epidemiology.[22]

Research design: Using quantitative approach, a cross-sectional descriptive survey was conducted to identify various factors that determine anxiety of the Oro-digestive cancer patients.

Patients and setting: The study involved patients

diagnosed with primary Oro-digestive cancers including cancers originating in the oral cavity, pharynx, oesophagus, stomach, colon, rectum, anus, liver, gallbladder, and pancreas. Eligible participants were aged between 18-60 years, undergoing their second or third cycle of chemotherapy, able to read, write, and understand English or Hindi language. Patients with visual or auditory impairments, diagnosed psychiatric illnesses, unwilling to participate or those receiving combination therapy were excluded.

To ensure that patients had sufficient exposure to the treatment and its related side effects, patients in their second or third chemotherapy cycle were chosen, thereby enabling a more precise assessment of their anxiety levels. The rationale was to exclude patients in the first cycle who may not have yet experienced the complete psychological impact of chemotherapy, as well as to prevent late-cycle patients who may have adapted to the treatment process.

Participants were recruited from the Oncology-day care centre of a selected hospital in New Delhi using a purposive sampling technique. A total of 72 patients were enrolled, and data were collected from study participants, medical records, and the attending physician from August 2024 to January, 2025. The sample size was calculated using the single population proportion formula, based on a previously reported anxiety prevalence of 66.7% among cancer patients receiving chemotherapy.[23]

Variables

Research variable: Anxiety

Socio-Demographic variables: In this study, demographic variables included age, gender, marital status, educational status, occupation, socioeconomic status, type of family, history of substance use.

Clinical variables: In this study, the clinical variables included site of cancer, type of cancer, duration since diagnosis, number of current chemotherapy cycle, duration of chemotherapy cycle in days, time gap between two chemotherapy cycles, chemotherapy received in family member/friend, presence of comorbidity, performance status, number of side effects faced and vital signs (blood pressure, pulse rate, respiratory rate and temperature).

Ethical considerations: Written informed Consent in the preferred language was obtained from each participant before enrolment to the study. The consent form outlined the study's purpose, details, and survey duration. No personal information was collected, and all data was anonymized and securely stored in password-protected files to ensure confidentiality and prevent unauthorized access. The study didn't include any risk or harm to the participants. Ethical approval was obtained from the relevant authorities at the Institute of Liver and Biliary Sciences (EC/NEW/INST/2023/531/188), the designated site for data collection.

Study piloting: The study was pilot-tested on 12 patients diagnosed with Oro-digestive cancer in June 2024. The investigation was determined to be practicable.

Data collection tools and technique: The tools were selected based on a thorough literature review and expert recommendations. These included a structured questionnaire to assess the socio-clinical profile and the Depression Anxiety Stress Scale (DASS)[24] to evaluate anxiety levels. Data collection was conducted through structured, face-to-face individual interviews, with responses recorded using Google Forms.

The structured questionnaire comprised eight items on socio-demographic variables and eleven items on the clinical profile of patients. The anxiety subscale of the DASS included seven items to measure anxiety levels. The final score was obtained by multiplying the scores by two. Anxiety levels were classified into five severity levels: normal (0–7), mild (8–9), moderate (10–14), severe (15–19), and exceedingly severe (20 and above). The utility is available for free in the public domain.

Nine experts in the disciplines of gastroenterology, oncology, and medical surgical nursing evaluated the content validity of the tools. The internal consistency of the tool was assessed on the study sample using Cronbach's alpha, yielding a value of 0.84, which indicates good reliability.

Language validity: Translated versions of the DASS-21 are publicly available in both English and Hindi. The Hindi version was translated by Bhupendra Singh, a Psychiatric Social Worker at PGIMS Rohtak, Haryana. This translation demonstrated a high level of reliability, with a Cronbach's alpha value of 0.990 for the anxiety domain, indicating strong internal consistency and good construct validity.[25] The tools related to socio-demographic and clinical variables were validated by experts in both English and Hindi. The back-translation method was employed in "Language validity," which involved bilingual experts who were proficient in both English and Hindi. In order to ensure conceptual equivalence, consistency, and accuracy, these experts independently translated the instrument back into the original language.

Tool tryout: Tool try-out was done on 10 patients with Oro-digestive cancer. The total time taken for tool administration was 5-7 minutes and tools were found to be unambiguous and comprehensive.

Statistics: Data collected via Google forms was automatically stored. To ensure data completeness and minimize missing responses, the online form required participants to complete each item before proceeding. The extracted excel data was double-checked, duplicates were removed, and the data was then coded for analysis.

Descriptive and inferential statistics were implemented in SPSS version 29.0 for data analysis. The Shapiro-Wilk test was employed to verify the nor-

mality of the data, which was determined to be normally distributed. The conventional value of 0.05 (two-tailed) was established as the statistical significance.

RESULTS

Sample characteristics: The socio-demographic distribution of Oro-digestive cancer patients, as presented in Table 1, showed a mean age of 48.9 ± 8.88 years, with 55.6% being male. Nearly 15% had no formal education, while 51.4% had completed primary or secondary education. Over 40% were employed in government or private sectors, and 40.3% belonged to the lower middle socioeconomic class. Additionally, 58.3% of patients were living in nuclear families. Regarding the current history of substance use, 22.22% of patients reported substance use, with 16.4% consuming alcohol, 9.4% having a history of smoking, and 3.9% using smokeless tobacco.

Nearly half of the Oro-digestive cancer patients in the study were diagnosed with gallbladder and/or biliary tract cancer, while three-fourths had non-metastatic cancer. More than half (55.6%) had been diagnosed within the last six months. At the time of enrolment, 75% were undergoing their second chemotherapy cycle with treatment duration of up to 8 days in nearly 70% of patients. The time gap between two consecutive cycles was 1–2 weeks for almost half of them.

Table 1: Distribution of Oro-digestive cancer patients based on their socio-demographic profile (n=72)

Socio-demographic variables	Patients (%)
Age in years (Mean ± SD)	48.9 ± 8.88
Gender	
Male	40 (55.6)
Female	32 (44.4)
Marital Status	
Single	9 (12.5)
Married	53 (73.6)
Widow/divorce/separated	10 (13.9)
Education	
Graduate and above	24 (33.33)
Primary/secondary	37 (51.4)
No formal education	11 (15.3)
Occupation	
Government/private employee	31 (43.1)
Self employed	24 (33.3)
Home maker	17 (23.6)
Socioeconomic status*	
Upper middle	25 (34.7)
Lower middle	29 (40.3)
Upper lower	18 (25)
Type of Family	
Joint	30 (41.7)
Nuclear	42 (58.3)
Current history of substance use	
Yes	16 (22.22)
No	56 (77.77)

*Kuppuswamy socioeconomic scale

Around 10% had a family or friend history of chemotherapy, while more than 66% had no comorbidities. Additionally, 87.5% of patients were able to carry out their normal activities, as assessed by performance status scores. The mean values of vital parameters are also presented in Table 2.

Levels of anxiety: The mean anxiety score on the DASS scale was 15.4 ± 5.78, ranging from a minimum of 6 to a maximum of 32 among the Oro-digestive cancer patients studied. Among the 72 patients undergoing chemotherapy, 46 (63.88%) exhibited some degree of anxiety.

Table 2. Distribution of Oro-digestive cancer patients based on their clinical profile (n=72)

Clinical variables	Patients (%)
Site of cancer	
Gall Bladder and/or biliary tract	34 (47.2)
Buccal mucosa	4 (5.6)
Pancreas	3 (4.2)
Periampullary carcinoma	13 (18.1)
Stomach	2 (2.8)
Colon/rectum	9 (12.5)
Oesophagus	3 (4.2)
Tongue	2 (2.8)
GE Junction	1 (1.4)
DJ flexure	1 (1.4)
Type of cancer	
Non-metastatic	54 (75)
Metastatic	18 (25)
Duration Since Diagnosis	
less than 6 Months	39 (54.2)
b/w 6 months to 1 year	22 (30.6)
More than 1Year	11 (15.3)
Number of Current chemotherapy cycle	
2	54 (75)
3	18 (25)
Duration of chemotherapy cycle in days	
Up to 8 days	50 (69.4)
Between 9-15 days	17 (23.6)
More than 15 days	5 (6.9)
Time gap between two chemotherapy cycles	
≤1 week	18 (25)
>1-2 weeks	37 (51.4)
>2 weeks	17 (23.6)
Chemotherapy received in Family member/friend	
Yes	8 (11.1)
No	64 (88.9)
Presence of comorbidity	
None	48 (66.7)
Hypertension (HTN)	7 (9.7)
Diabetes Mellitus (DM)	10 (13.9)
DM and HTN	1 (1.4)
Thyroid disorder	2 (2.8)
Any other	4 (5.6)
Performance status	
Able to carry on normal activity	60 (83.3)
Varying amount of assistance needed	12 (16.7)
Systolic BP in mmHg (mean ± SD)	122 ± 12.4
Diastolic BP in mmHg (mean ± SD)	78.0 ± 7.77
Pulse rate per minute (mean ± SD)	80.7 ± 11.4
Respiratory rate per min (mean ± SD)	16.6 ± 12.5
Temperature (⁰F) (mean ± SD)	96.8 ± 9.92

BP – Blood Pressure

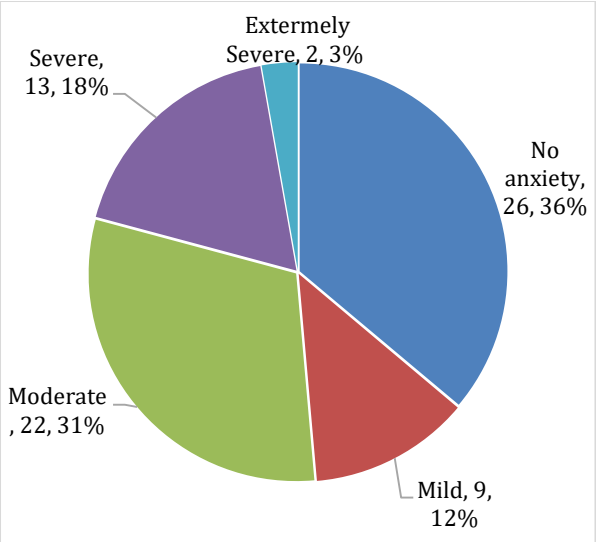

Figure 1: Level of Anxiety among Patients with Oro-digestive cancer

Table 3: Distribution of mean anxiety scores based on the sociodemographic variables among Oro-digestive cancer patients (n=72)

Socio-demographic Variables	n	Anxiety	
		Mean ± SD	Test
Age group			
19-40	20	18.30 ± 5.81	F=4.003†
41-50	15	15.33 ± 6.13	p=0.023*
51-60	37	13.95 ± 5.15	
Gender			
Male	40	14.20 ± 4.64	t=2.09‡
Female	32	17.00 ± 6.70	p=0.040*
Marital status			
Single	9	21.56 ± 6.31	F=7.936†
Married	53	14.15 ± 4.69	p=0.001**
Widow/divorce	10	16.80 ± 7.19	
Education			
No formal education	11	12.73 ± 4.84	F=2.300†
Primary/secondary	37	15.19 ± 5.86	p=0.108
Graduate and above	24	17.08 ± 5.72	
Occupation			
Government/private employee	31	14.76 ± 5.81	F=0.893† p=0.418
Self-employed	24	15.12 ± 5.37	
Home maker	17	17.20 ± 6.25	
Socioeconomic Class			
Upper middle	25	15.12 ± 4.73	F=0.104†
Lower middle	29	15.38 ± 5.88	p=0.902
Upper lower	18	16.00 ± 7.10	
Type of family			
Nuclear	42	14.67 ± 5.13	t=1.36‡
Joint	30	16.53 ± 6.52	p=0.178
Current History of substance use			
Yes	16	17.8 ± 6.99	t=2.48‡
No	56	14.3 ± 4.99	p=0.015*

p≥0.05 non-significant; p≤0.05* significant; p≤0.01** highly significant, †one-way Anova, ‡independent sample t test

Within this group, more than a quarter experienced moderate anxiety, while 12% reported mild anxiety levels. Additionally, 18% had severe anxiety, and 3% were classified as having extremely severe anxiety (Figure 1).

Table 4: Distribution of mean anxiety scores based on the clinical variables among Oro-digestive cancer patients (n=72)

Clinical Variables	n	Anxiety	
		Mean ± SD	Test
Site of cancer			
Gall bladder	34	15.3 ± 6.32	F=0.250†
Colorectal	9	15.1 ± 3.18	p=0.861
Periampullary cancer	13	16.6 ± 5.50	
Others	16	15.0 ± 6.24	
Type of cancer			
Non-metastatic	54	14.5 ± 5.52	t=2.44‡
Metastatic	18	18.2 ± 5.78	p=0.017*
Duration Since Diagnosis			
less than 6Months	39	17.38 ± 6.80	F=5.39†
between 6Months to 1 year	22	13.18 ± 3.12	p=0.007*
more than 1Year	11	13.09 ± 2.87	
Performance status			
Independent	60	14.8 ± 5.43	t=2.29‡
Need varying amount of assistance	12	18.8 ± 6.52	p=0.025*
Presence of comorbidity			
None	48	15.71 ± 6.05	F=0.26†
DM and/or HTN	18	14.56 ± 5.39	p=0.753
Others	6	16.00 ± 5.21	
Number of chemotherapy cycle			
2	54	16.1 ± 6.29	t=1.82‡
3	18	13.3 ± 3.14	p=0.073
Duration of chemotherapy cycle in days			
Up to 8 days	50	15.6 ± 5.98	F=0.075†
Between 9-15 days	17	15.4 ± 5.33	p=0.928
More than 15 days	5	14.4 ± 6.23	
Time gap between two chemotherapy cycles			
<1 week	17	15.8 ± 5.83	F=0.043†
>1 -2 weeks	37	15.4 ± 6.27	p=0.957
>2 weeks	18	15.2 ± 4.91	
Number of side effects			
1	26	11.7 ± 3.13	F=26.8†
2	35	16.1 ± 5.43	P<0.001**
3	11	22.4 ± 4.63	

p≥0.05 non-significant; p≤0.05* significant; p≤0.01** highly significant, †one-way Anova, ‡independent sample t test

Factors influencing the anxiety scores: The mean anxiety score was found to be significantly associated with age group (F=4.003, p=0.023), gender (t=2.09, p=0.040), marital status (F=5.74, p=0.016) and history of substance use (t=2.48, p=0.015) while educational status, occupation, socioeconomic class and type of family had no significant association with the anxiety scores. Anxiety scores were found be significantly higher among females and those with history of substance use (Table 3).

In the post hoc analysis (Table V), Oro-digestive cancer patients aged 19–40 years had significantly higher anxiety scores compared to those in the 51–60 age group. Another notable finding was that single patients experienced higher anxiety levels than their married counterparts (p=0.001).

Among the clinical variables, type of cancer (t=2.44, p=0.017), time since diagnosis (F=5.39, p=0.007*), performance status (t=2.29, p=0.025) and number of side effects faced (F=26.8, p<0.001) by the patients

had a statistically significant impact on anxiety scores. Oro-digestive cancer patients with metastatic cancer and with low performance scores had higher anxiety scores (Table 4).

On post analysis (Table 5), it was found that patients diagnosed within the past six months exhibited greater anxiety than those diagnosed between six months to one year (p=0.015*). Moreover, the study also highlighted a direct relationship between the number of side effects and anxiety levels, indicating that patients experiencing more side effects had higher anxiety scores (p<0.05).

However, there was no significant association found between anxiety and site of cancer, presence of comorbidity, type of chemotherapy, number of chemotherapy cycle, duration of chemotherapy cycle in days, time gap between two chemotherapy cycles.

Table 5: Post hoc analysis to show factors associated with anxiety among Oro-digestive cancer patients (n=72)

Variables†	MD	SE	p	95% CI	
				Lower bound	Upper bound
Age group					
19-40 Vs. 41-50	2.97	1.89	0.336	-1.68	7.62
19-40 Vs. 51-60	4.35	1.54	**0.018***	0.58	8.13
41-50 Vs. 51-60	1.39	1.69	1.00	-2.78	5.55
Marital status					
Married Vs. Single	-7.40	1.90	**0.001****	-12.08	-2.73
Married Vs. Widow/divorce	-2.65	1.82	0.451	-7.12	1.82
Single Vs. Widow/divorce	4.76	2.43	0.163	-1.20	10.71
Duration Since Diagnosis					
<6 Months Vs. between 6Months to 1 year	4.2.	1.45	**0.015***	0.64	7.77
<6Months Vs >1Year	4.29	1.86	0.072	-0.27	8.86
>1Year Vs. between 6Months to 1 year	-0.09	2.01	1.00	-5.03	4.85
Number of side effects					
1Vs. 2	-4.36	1.19	**0.001****	-7.29	-1.44
2 Vs. 3	-10.67	1.66	**<0.0001*****	-14.74	-6.61
1 Vs.3	-6.31	1.59	**0.001****	-10.21	-2.40

p≥0.05 non-significant; p≤0.05* significant; p≤0.01** highly significant; †Post hoc bonferroni

DISCUSSION

Overall anxiety among the participants: This study found that 64% of Oro-digestive cancer patients undergoing chemotherapy felt anxious. A comparable study revealed that 66.7% of chemotherapy participants experienced anxiety.[24] A tertiary care centre in India found that 15.62% of cancer patients had anxiety, rising to 25% in those getting chemotherapy.[26] However, differences in cancer site, stage, and other sample variables affect cancer patients' anxiety levels, which may explain the diversity in anxiety prevalence between studies.[29] Anxiety is recognized as a significant concern among cancer patients[27,28] and the experience of undergoing chemotherapy can further heighten this vulnerability. This study highlights the psychological toll of chemotherapy and the need for regular mental health examinations in this patient population.

Anxiety and sociodemographic variables: Sociodemographic characteristics showed that female patients were more anxious than male patients. This finding is consistent with the study by Bektas et al. (2016)[13], which indicated that societal roles and expectations may play a role in increasing anxiety among women. Many cultures expect women to take on more personal and family obligations, which can increase stress and emotional load, especially while dealing with a serious disease like cancer.[29]

Furthermore, other studies[30-32] have consistently reported similar findings, reinforcing the idea that female cancer patients tend to experience greater anxiety than males. This could be attributed to a combination of psychological, hormonal, and social factors that make women more vulnerable to anxiety. Understanding these gender differences in anxiety can help healthcare professionals develop targeted psychological support strategies to address the specific needs of female patients undergoing cancer treatment.[33]

Anxiety scores were significantly higher among patients who were single. These findings are consistent with a multi-centre study by Goerling et al., which reported the highest prevalence of anxiety among cancer patients who were single (13.2%).[34] Similarly, a study by Lavdaniti et al. found that unmarried and divorced individuals experienced greater psychological distress compared to married cancer patients.[35] One potential explanation for this phenomenon is the absence of social support from family members, which is essential for the alleviation of anxiety or distress in cancer patients. In order to resolve this issue, it is recommended that family counselling be implemented to increase awareness among family members regarding the significance of emotional and psychological support in enhancing patient well-being.[36]

Age is another important factor influencing the prevalence of anxiety, as reported in several studies. In

the present study, younger cancer patients under the age of 40 were found to experience significantly higher psychological distress compared to their older counterparts. Similar findings were reported by Bektas et al., who observed that anxiety levels increased as age decreased.[12]

While all cancer patients face emotional distress, higher anxiety among younger patients can be attributed to the fact that, younger individuals encounter unique challenges related to their future life, career aspirations, and personal relationships, which intensify their anxiety and depression. However, in contrast to our findings, number of studies[36,29] have reported the higher prevalences of anxiety among middle-aged cancer patients. A more detailed and stratified analysis is required to draw definitive conclusions regarding the relationship between age groups and anxiety levels. This would help in identifying specific age-related trends and vulnerabilities more accurately.

An important finding of the study was that Oro-digestive cancer patients with a history of substance use had higher mean anxiety scores. This aligns with a study on lung cancer patients, where current smoking status was linked to increased anxiety in those facing a new or suspected cancer diagnosis.[37] Substance use, including alcohol, tobacco, and drugs, is known to impact brain chemistry, impair stress regulation, and contribute to emotional instability.[38] When combined with a cancer diagnosis and intensive treatment, anxiety levels may further rise due to physical discomfort, uncertainty about prognosis, and fear of disease progression. This finding emphasizes the necessity of providing targeted psychological support and counselling to cancer patients who have a history of substance use. By addressing these underlying issues, it may be possible to alleviate anxiety and enhance overall well-being.

In the current study, no significant association was observed between anxiety and factors such as educational status, occupation, socioeconomic class, or type of family. Similar findings were reported in a study by Chung J et al. (2018), which found no significant association between anxiety scores and factors such as education level, employment status, or monthly income.[28] Likewise, research by Tivoli et al.[39] (2007) reported no significant differences in anxiety levels based on educational background.

Socio-demographic factors can contribute to anxiety in the general population, but their impact lessens when facing a severe stressor like cancer. The disease brings immense psychological distress, affecting people regardless of background. Its life-threatening nature, along with the challenges of treatment and uncertainty, makes cancer the main cause of anxiety, as a result, the impact of pre-existing demographic vulnerabilities becomes less distinct.[40] Additionally, a small number of patients in certain categories within these variables may have limited the ability to detect significant differences. However, unlike the findings of the present study, Radhakrishnan R et al. (2023)[45] found that educational and occupational status were significant factors ($p < 0.05$) contributing to a higher risk of anxiety prevalence in cancer patients.

Anxiety and clinical variables: In the present study, Oro-digestive cancer patients with lower performance status exhibited higher levels of anxiety. These findings align with a study conducted among GI cancer patients in Korea, which reported a significant association between lower performance status and anxiety (odds ratio [OR] 4.19, $p = 0.023$).[28] Similar were the results reported by Oppegaard et al. in 2021 among cancer patients on chemotherapy.[41]

A significantly higher anxiety score was observed in Oro-digestive cancer patients with metastatic disease compared to those with non-metastatic cancer, likely due to the increased disease burden, uncertainty, and more intensive treatment associated with metastasis. These findings are consistent with a study by Bektas et al., which also reported elevated anxiety levels in patients with metastatic cancer.[11]

Present study reported that cancer patients who were recently diagnosed exhibited higher anxiety levels. Consistent with the present study's findings, anxiety levels tend to be higher in the acute phase of the disease, as patients face uncertainty about the challenges ahead.[42,43] However, in contrast to these findings, Radhakrishnan R et al. (2023) reported no significant association between anxiety levels and the duration since diagnosis among patients with gastrointestinal (GI) cancer.[44]

Patients experiencing more chemotherapy-related side effects had higher anxiety scores, likely due to the negative impact of adverse drug reactions on their quality of life (QoL) as documented in previous study.[45] The physical discomfort and unpredictability of side effects may contribute to heightened psychological distress.

In the current study, no significant link was observed between anxiety and the site of cancer, which aligns with the findings of Tivoli et al.[40] However, this is in glaring contrast to numerous other studies that have documented a robust correlation between anxiety levels and tumor location. Specifically, patients with head and neck, ovarian, breast, and gastrointestinal cancers exhibit a higher prevalence of anxiety, while those with lung and skin cancers have comparatively lower rates.[46,47] It is pertinent to note that there is a scarcity of research that compares anxiety levels across various anatomical sites, particularly within Oro-digestive malignancies, as did the current study. The methodological variability is emphasized by these discrepancies across studies, which include the influence of cultural and psychosocial support factors, various anxiety assessment instruments, and cancer staging.

Comorbidities did not significantly affect anxiety. Unlike the present study, anxiety was associated with comorbidities.[44] No correlation was found between

anxiety and chemotherapy cycle factors in this study. In contrast, several research have linked anxiety to chemotherapy regimens and cycle numbers.[48] Comorbidity profiles may differ due to sample characteristics and study settings. In this investigation, the small, single-center sample of 72 patients may have lacked statistical power to identify moderate relationships.

Strength and Limitations

One of the strengths of this study is the use of validated tools to assess anxiety and its associated factors, ensuring reliability and accuracy. Additionally, the findings help identify relationships between anxiety and influencing factors, providing valuable insights that can guide future research.

Present study had methodological limitations. The study's purposive sample and single-center design may have added selection bias, limiting generalizability. A lack of longitudinal follow-up limits the study's cross-sectional methodology, which only captures anxiety levels at one moment without capturing changes over time.

To gain a clearer understanding, future studies focusing on specific types of Oro-digestive cancer with a larger sample size are recommended. Moreover, similar studies enrolling Oro-digestive cancer patients from multiple cancer care centres spread geographically can also be undertaken.

Implementation of Study

Understanding the key factors contributing to anxiety in cancer patients is essential for healthcare providers to develop a comprehensive and patient-centred approach to care. Anxiety in cancer patients can stem from multiple sources including personal or clinical profile of the patients. Identifying these factors allows healthcare professionals to implement early interventions that address both the psychological and physiological aspects of anxiety.

A proactive approach involves routine anxiety screenings as part of standard cancer care. By integrating validated psychological assessment tools into regular patient evaluations, healthcare providers can detect anxiety symptoms early, preventing them from escalating into more severe mental health conditions such as depression or panic disorders. This enables timely referrals to mental health professionals, oncology counsellors, or support groups, ensuring that patients receive appropriate psychological care alongside their medical treatment.

Conclusion

The study revealed a high prevalence of anxiety among patients with Oro-digestive cancer undergoing chemotherapy, influenced by multiple factors including age, gender, substance use history, cancer type, time since diagnosis, number of treatment-related side effects, and the patient's performance status.

These findings highlight cancer patients' psychological burden and the need of early detection and treatment. The determinants of anxiety and other psychological impacts can affect treatment adherence, illness progression, and quality of life; hence they must be studied. Standard cancer care can include DASS-21 psychological screening to detect and treat anxiety. Early identification of high-risk patients allows healthcare practitioners to target interventions, improving patient outcomes.

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