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Quality of Life and Symptoms of Anxiety and Depression Among Patients With Cancer: Insights From a Tertiary Care Hospital

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Conflict of interest:

None declared

Background:

Cancer is a leading cause of global mortality and morbidity, accounting for millions of deaths each year. This study aimed to assess quality of life (QoL), examine the demographic, clinical, and psychological factors associated with QoL, evaluate the prevalence of anxiety and depressive symptoms, and assess the associations between treatment modalities and QoL domains among patients with cancer receiving anticancer therapy in Lahore, Pakistan.

Material/Methods:

A cross-sectional study included 385 cancer patients using a convenience sampling. Data were collected using the Functional Assessment of Cancer Therapy-General (FACT-G) questionnaire, which assesses 4 QoL domains: physical well-being (PWB), social well-being (SWB), emotional well-being (EWB), and functional well-being (FWB). The Hospital Anxiety and Depression Scale (HADS) was used to measure anxiety and depression levels.

Results:

The median overall FACT-G score was 68 (IQR: 24), with EWB scoring the highest median of 19 (IQR: 7) and PWB the lowest at 14 (IQR: 12). SWB and FWB had median scores of 16 (IQR: 4) and 18 (IQR: 9), respectively. HADS results indicated that 56.1% of participants had normal depression scores, while 23.4% had high depression. For anxiety, 60% were in the regular category, and 15.3% had clinical anxiety. Higher levels of anxiety and depression were associated with poorer QoL across all domains. Educational level and sex were significantly associated with QoL.

Conclusions:

Overall, patients with cancer maintained a moderate QoL, with particularly low PWB scores, highlighting the physical burden of cancer treatment. These findings highlight the importance of routine psychological assessment and supportive care to address the physical, emotional, and social needs of cancer patients during treatment.

Keywords:

Anxiety • Cross-Sectional Studies • Depression • Medical Oncology • Neoplasms • Quality of Life

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Introduction

Globally, cancer is a leading cause of illness and death. Over 70% of cancer-related deaths occur in developing and underdeveloped regions, where access to early detection, treatment, and palliative care is often limited [1]. Annually, the primary contributors are lung cancer (1.69 million deaths), liver cancer (782 000 deaths), colorectal cancer (774 000 deaths), stomach cancer (754 000 deaths), and breast cancer (571 000 deaths). Furthermore, the number of new cancer cases is projected to reach 23.6 million by 2030 [2]. Cancer is on the rise in Pakistan, with approximately 0.18 million new cancer cases reported in 2020. The International Agency for Research on Cancer has documented that Pakistan had 0.18 million newly diagnosed cancer cases, 0.11 million cancer-related deaths, and 0.32 million prevalent cases (5 years) in the same year [3]. Within Asia, Pakistan stands out with the highest breast cancer incidence rate [4]. A closer look at recent tertiary care registry data reveals that the 5 most common cancers overall are head and neck, breast, gynecological tumors, esophageal, and lung cancers. Among men, the prevalent cancers are head and neck, lung, liver, colorectal, and urinary tract cancers; while in women, the predominant cancers are breast, head and neck, gynecological tumors, esophageal, and colorectal cancers [5].

According to the World Health Organization, "Health is not just the absence of disease; it is a state of complete physical, mental, and social well-being." Quality of life (QoL) is defined as an individual's perception of life, encompassing their beliefs, aspirations, expectations, and interests within the framework of their culture [6]. The concept of QoL comprehensively covers how a person assesses the overall well-being of the various facets of their life [7]. These assessments encompass an individual's emotional responses to life events, mental state, sense of fulfillment and contentment, and satisfaction with work and personal relationships [8,9]. Health-related quality of life (HRQoL) has evolved into a comprehensive, multidimensional framework encompassing physical and mental well-being, incorporating significant social influences [10]. Cancer is a severe condition that exerts a lasting impact on physical and mental well-being, especially QoL [11]. The American Psychiatric Association recognizes a cancer diagnosis as a traumatic event that can disrupt many aspects of daily life. This disruption can include difficulties in work and social relationships due to negative thoughts and mood disturbances. Patients frequently react in a variety of ways to the progression and treatment of the disease, and they can experience emotions such as sadness and stress [12]. Different signs and symptoms may be present depending on the type and grade of cancer. Breast, leukemia, and oral cavity cancers are the most frequent cancers in terms of prevalence across all age groups and sexes [13]. In Pakistan, patients with cancer face significant challenges due to insufficient support systems, limited access to psychological

care, and the widespread stigma associated with cancer [14-16]. These factors contribute to heightened levels of anxiety, depression, and emotional distress among patients, further exacerbating the impact of cancer on their daily lives. In Pakistan, cancer care is largely financed through out-of-pocket expenditures, which may intensify financial burden and psychological distress among patients. Structured psycho-oncology services are not routinely integrated into oncology settings, and stigma surrounding mental health may further restrict access to supportive care. Evidence from previous studies indicates that sociodemographic and clinical factors are significantly associated with QoL in patients with cancer. Younger patients often experience greater emotional distress due to disruption in education, employment, and family roles, whereas female patients tend to report higher levels of anxiety and depression. Similarly, low socioeconomic status, unemployment, and limited education are strongly associated with poorer QoL outcomes. Clinical factors such as cancer stage, treatment modality, and chemotherapy-related adverse effects also play a crucial role in determining patient outcomes, with advanced disease and intensive treatment regimens being associated with worse physical, emotional, and social functioning [17]. Psychological distress, particularly anxiety and depression, has been consistently associated with significantly poorer QoL in patients with cancer. Patients with higher levels of anxiety and depressive symptoms report lower global QoL and impaired physical, emotional, and social functioning [18]. Systematic reviews further confirm that psychosocial factors such as social support, coping ability, anxiety, and depression are significantly associated with QoL in cancer patients undergoing treatment, while a lack of social support is associated with poorer outcomes [19]. Moreover, high levels of anxiety and depression are commonly observed among cancer patients receiving chemotherapy, particularly in younger, female, and socially unsupported individuals [20]. Given the sociocultural and healthcare disparities in Pakistan, examining these sociodemographic, clinical, and psychological factors in the local context is essential to inform supportive oncology care. Addressing these psychological challenges is as crucial as providing comprehensive cancer-directed therapies to enhance the QoL of these patients. Given Pakistan's limited healthcare resources, the financial and psychological burden of cancer, and the absence of structured supportive care, understanding the factors affecting QoL is essential. In the present study, we aim to assess QoL, examine the demographic, clinical, and psychological factors associated with QoL, evaluate the prevalence of symptoms of anxiety and depression, and assess the associations between treatment modalities and different QoL domains, including physical, emotional, social, and functional well-being, among adult cancer patients undergoing treatment.

Material and Methods

Study Setting

The present study employed a cross-sectional design and was conducted at Inmol Cancer Hospital, a tertiary care cancer hospital in Lahore, Pakistan, between February 2024 and May 2024.

Inclusion and Exclusion Criteria

The study included patients who were aged 18 years and older, had a confirmed diagnosis of cancer, and were currently receiving anticancer treatment such as chemotherapy or radiotherapy. Participants were required to be able to understand and communicate in Urdu or English sufficiently to complete the interview. This was assessed through a brief verbal interaction prior to enrollment to ensure that patients could comprehend the study questions and provide coherent responses. Patients with evident cognitive impairment, confusion, or communication difficulties that interfered with questionnaire completion were excluded from participation. Assessment was based on medical documentation and the clinical judgment of the treating team and research investigator. Patients who did not provide consent, lacked a confirmed cancer diagnosis, or were unable to attend or complete the interview due to time constraints were excluded. Patients with physical or mental disabilities that prevented participation (eg, extreme fatigue, severe pain, or hospitalization-related limitations) were excluded. Patients were also excluded for mental disabilities as identified based on documented diagnoses in medical records or evident cognitive impairment observed during the initial screening interaction, which indicated an inability to comprehend or respond to the questionnaire. No formal psychiatric screening tool was used; assessment was based on medical documentation and the clinical judgment of the treating team and research investigator. Furthermore, the study did not include those who had just undergone their first chemotherapy or radiotherapy sessions, because their treatment had just started, making it challenging to measure its impact on their QoL. This selection process aimed to include patients with diverse cancer types and treatment modalities to provide a comprehensive assessment of QoL among cancer patients undergoing treatment within this tertiary care setting. However, because convenience sampling was used, the findings may not be fully generalizable to the broader cancer patient population.

Ethical Approval and Consent to Participate

Ethical approval was obtained from the Institutional Research Ethics Committee, Department of Pharmacy Practice, University of Lahore, Pakistan, under reference number IREC/2024/03-H. This study was conducted in accordance with the principles of

the Declaration of Helsinki. All participants provided written informed consent before enrollment.

Patient Permission/Consent Declarations

All participants provided written informed consent for the publication of anonymized data. No identifying personal details or clinical images are included in this manuscript.

Sample Size

The sample size for the study was determined using the Daniel sample size formula. The formula is as follows:

$$n' = \frac{N Z^2 P (1-P)}{d^2 (N-1) + Z^2 P (1-P)}$$

Where,

n' = sample size; N = population number (number of cancer patients registered in Inmol hospital); Z = statistic for the level of confidence; P = anticipated prevalence; and d = margin of error.

The expected proportion (anticipated prevalence) was considered as 50% ($P=0.5$); 5% precision (margin of error) will be regarded as ($d=0.05$); and a 95% confidence level ($Z=1.96$) was used.

$$n = \frac{6000 \times (1.96)^2 \times 0.5 \times (1-0.5)}{(0.05)^2 \times (6000) + (1.96)^2 \times 0.5 \times (1-0.5)}$$

The calculated sample size was 362, and we initially aimed to collect data from 400 patients; however, we collected complete data from 385 due to a 6-month study duration. This adjustment allowed us to maintain a robust dataset while adhering to the research's time constraints.

Study Instrument

To assess the QoL of patients with cancer, the study utilized the Functional Assessment of Cancer Therapy-General (FACT-G) version 4.0. This tool is designed for patients with cancer and is part of the Functional Assessment of Chronic Illness Therapy (FACIT) measurement system. Initially developed in English, a translated version is also available in Urdu to accommodate patients who speak that language. Before using the tool, permission was obtained from the FACIT system administrators. The FACT-G consists of 27 items organized into 4 subscales: physical well-being, emotional well-being, social well-being, and functional well-being, which assess these types of functional well-being [21]. The FACT-G instrument has been widely used internationally for assessing QoL among patients with cancer and has demonstrated strong psychometric properties across

diverse populations. Previous studies conducted in Pakistan have also employed the FACT-G scale to evaluate quality of life among cancer patients, supporting its applicability and cultural suitability in the Pakistani context. These studies reported acceptable reliability and validity of the instrument among Pakistani cancer populations [12,22,23]. Moreover, the Hospital Anxiety and Depression Scale (HADS) questionnaire was used to assess psychological conditions. This validated screening tool was used to detect anxiety and depression among patients with cancer. The scale consists of 14 items, with 7 items each measuring anxiety (HADS-A) and depression (HADS-D). Each subscale score ranges from 0 to 21 and is categorized as normal (0-7), borderline (8-10), and abnormal (≥ 11). The HADS has demonstrated good reliability and validity in multiple clinical settings and has been validated in Pakistani populations, showing satisfactory internal consistency and construct validity for assessing psychological distress [24].

Pilot Study

A pilot study was conducted prior to the main data collection to evaluate the clarity, feasibility, and internal consistency of the questionnaires within the study setting. The pilot testing aimed to ensure that the questions were understandable to participants and could be administered smoothly during the interview process. The internal consistency reliability test revealed a Cronbach's α of 0.795 for the total FACT-G scale, indicating good internal consistency across the entire tool. For the individual subscales, Cronbach's α values were 0.800 for physical well-being, 0.616 for social well-being, 0.752 for emotional well-being, and 0.798 for functional well-being. These values demonstrate that, for the most part, the subscales had good internal consistency. For the HADS scale, Cronbach's α was 0.831, indicating reliability and suitability for the present study. Content validity was assessed through expert review, yielding content validity indices of 0.94 for FACT-G and 0.92 for HADS. The pilot study was conducted to assess the reliability and clarity of the questionnaire within the study setting and was not intended to serve as a formal psychometric validation of the instruments. Interpretation of the findings was therefore based primarily on previously validated versions of the FACT-G and HADS instruments that have demonstrated acceptable psychometric properties in Pakistani and international populations.

Sampling Technique and Data Collection

Patients were selected using convenience sampling [25]. Each patient was approached individually, and the study's purpose was explained before obtaining written consent. Two bilingual experts, fluent in English and Urdu, were present to ensure patients fully understood each question, offering explanations and clarifications as needed. Data were gathered in

a secure, comfortable environment to ensure patient confidentiality and ease of participation, thereby promoting accurate and honest responses. Although convenience sampling can introduce selection bias and limit sample representativeness, efforts were made to minimize this bias by recruiting participants from multiple oncology units and including patients with diverse cancer types, treatment modalities, and demographic backgrounds. This approach enabled a broader representation of patients receiving cancer treatment within the study setting, yielding meaningful insights into their quality of life.

Statistical Analysis

Data analysis was conducted using SPSS version 25. Responses were recorded on a 5-point Likert scale, where 0 indicated "not at all"; 1, "a little bit"; 2, "somewhat"; 3, "quite a bit"; and 4, "very much". Higher scores on the FACT-G reflect better HRQoL. The FACT-G includes an overall score ranging from 0 to 108, with higher scores corresponding to improved quality of life. It also includes 4 subscale scores: physical well-being (0-28), social well-being (0-28), emotional well-being (0-24), and functional well-being (0-28) [26]. To maintain consistency in interpretation, reverse coding was applied to specific items so that higher scores uniformly indicated a better QoL. Clinical and sociodemographic characteristics of the sample were summarized using frequency tables and percentage distributions. The median and interquartile range (IQR) were used to describe the QoL scores. The normality of continuous variables, including QoL scores, was assessed using the Shapiro-Wilk test. The results indicated that the data were not normally distributed ($P < 0.05$), and nonparametric statistical methods were considered appropriate for further analysis. Accordingly, the Mann-Whitney U test was used for comparisons between 2 independent groups, while the Kruskal-Wallis test was applied for comparisons involving more than 2 groups. Descriptive statistics are presented as medians with interquartile ranges (IQR), while group comparisons are reported using mean ranks derived from Mann-Whitney U and Kruskal-Wallis tests. Following this, post hoc pairwise comparisons were conducted using the Bonferroni correction to compare QoL scores across cancer types. The chi-square test (with Fisher exact test where needed) was applied for categorical data to assess the association between anxiety, depression, and various demographic variables. This analysis aimed to determine whether there were statistically significant relationships between demographic factors and levels of anxiety and depression among the study participants. To examine the correlation between depression and QoL, Spearman's correlation was used between FACT-G and HADS, aiming to determine the strength and direction of the relationship between anxiety, depression, and QoL. All statistical tests were performed with a significance level of $P < 0.05$.

Table 1. Demographics characteristics of patients (n = 385).

| Demographic | Grouping | Frequency | % |
|---|---|-----------|------|
| Age | 18-24 years | 26 | 6.8 |
| | 25-34 years | 43 | 11.2 |
| | 35-44 years | 97 | 25.2 |
| | 45-54 years | 104 | 27 |
| | 55 and above | 115 | 29.9 |
| Sex | Male | 117 | 30.4 |
| | Female | 268 | 69.6 |
| Marital status | Single | 38 | 9.9 |
| | Married | 301 | 78.2 |
| | Divorced | 8 | 2.1 |
| | Widowed | 38 | 9.9 |
| Level of education | Primary education | 185 | 48.1 |
| | High school or equivalent | 70 | 18.2 |
| | Secondary | 52 | 13.5 |
| | Bachelor's degree | 43 | 11.2 |
| | Postgraduate degree | 35 | 9.1 |
| Employment status | Employed full-time | 42 | 10.9 |
| | Employed part-time | 16 | 4.2 |
| | Unemployed, not actively seeking employment | 8 | 2.1 |
| | Unemployed, actively seeking employment | 282 | 73.2 |
| | Student | 17 | 4.4 |
| | Retired | 20 | 5.2 |
| Monthly income | Below 50 000 PKR | 305 | 79.2 |
| | 50 000-100 000 PKR | 71 | 18.4 |
| | 200 000-500 000 PKR | 9 | 2.3 |
| Support system during cancer treatment | Yes, a strong support system | 40 | 10.4 |
| | Yes, a moderate support system | 64 | 16.6 |
| | Yes, but limited support | 14 | 3.6 |
| | No, I don't have any support system | 265 | 68.8 |
| | I prefer not to say | 2 | 0.5 |
| Psychological/emotional support during cancer treatment | Yes | 15 | 3.9 |
| | No | 370 | 96.1 |
| How long ago cancer was diagnosed | Less than 1 year ago | 261 | 67.8 |
| | 1-2 years ago | 51 | 13.2 |
| | 2-5 years ago | 44 | 11.4 |
| | Over 5 years ago | 29 | 7.5 |

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Table 1 continued. Demographics characteristics of patients (n = 385).

| Demographic | Grouping | Frequency | % |
|--------------------------|--------------------------------------|-----------|------|
| Type of cancer treatment | Chemotherapy | 273 | 79.9 |
| | Chemotherapy and surgery | 75 | 19.5 |
| | Chemotherapy and radiation | 20 | 5.2 |
| | Radiation, chemotherapy, and surgery | 17 | 4.4 |
| Type of cancer | Breast cancer | 155 | 40.3 |
| | Ovary | 39 | 10.1 |
| | Other | 35 | 9.1 |
| | Uterus cancer | 23 | 6.0 |
| | Leukaemia | 22 | 5.7 |
| | Non-Hodgkin lymphoma | 16 | 4.2 |
| | Hodgkin lymphoma | 14 | 3.6 |
| | Lung cancer | 13 | 3.4 |
| | Diffuse large B-cell lymphoma | 13 | 3.4 |
| | Multiple myeloma | 10 | 2.6 |
| | Bladder cancer | 9 | 2.3 |
| | Testis cancer | 7 | 1.8 |
| | Plasma cell tumour | 7 | 1.8 |
| | Prostate cancer | 6 | 1.6 |
| | Osteosarcoma | 6 | 1.6 |
| | Colon | 5 | 1.3 |
| Brain cancer | 5 | 1.3 | |

Ethics Approval

Ethics approval for the study was obtained from the University of Lahore, Pakistan (reference number IREC/2024/03-H). Written informed consent was obtained from all participants prior to enrollment. The study was conducted in accordance with the principles of the Declaration of Helsinki, ensuring that ethical standards in research involving human participants were upheld throughout.

Results

Demographic Characteristics of Patients

The demographic and clinical characteristics of the patients are summarized in **Table 1**. Among the 385 patients, 69.6% were female, and 30.4% were male. Most patients were married

(78.2%), while 9.9% were single, 9.9% were widowed, and 2.1% were divorced. Regarding monthly income, 79.2% reported earning less than 50 000 Rupees. Most patients (68.8%) reported having no support system during cancer treatment, and 96.1% did not receive psychological or emotional support. In addition, 67.8% had been diagnosed with cancer less than 1 year before the study. The most common tumor type was breast cancer (40.3%), followed by ovarian cancer (10.1%), Hodgkin lymphoma (3.6%), diffuse large B-cell lymphoma (3.4%), lung cancer (3.1%), and other cancer types, as shown in **Table 1**. Most patients received chemotherapy alone (79.9%), whereas the remaining patients received combined treatment modalities, including surgery or radiotherapy.

QoL Assessment Using the FACT-G Scale

The QoL scores and subscale distributions are summarized in **Table 2**. The overall FACT-G QoL score had a median of 68

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Table 2. Assessment of the Functional Assessment Of Cancer Therapy-General (FACT-G).

| Domain | Median (IQR) | Min | Max |
|-------------------------|--------------|-----|-----|
| Physical well-being | 14 (20-18) | 0 | 28 |
| Social well-being | 16 (20-16) | 2 | 24 |
| Emotional well-being | 19 (22-15) | 2 | 24 |
| Functional well-being | 18 (22-13) | 2 | 28 |
| Overall quality of life | 68 (80-56) | 19 | 102 |

(IQR: 56-80), with scores ranging from 19 to 102, indicating substantial variability in patients' reported QoL. While some patients reported lower QoL scores, others demonstrated relatively better overall well-being during treatment. Among the FACT-G domains, emotional well-being had the highest median score (19, IQR: 15-22), suggesting comparatively better emotional adjustment among patients. In contrast, physical well-being was the most affected domain, with lower scores than the other subscales. The median social well-being score was 16 (IQR: 16-20; range: 2-24), reflecting differences in perceived social support among participants. Similarly, functional well-being had a median score of 18 (IQR: 13-22), indicating variation in patients' ability to maintain daily activities and functional independence. Overall, the distribution of subscale scores indicates heterogeneity in the impact of cancer and its treatment on various aspects of patients' quality of life, as shown in **Table 2**.

Factors Associated with QoL in Cancer Patients

A statistically significant difference in overall FACT-G scores was observed across cancer types ($P = 0.029$; **Table 3**). Significant associations between overall QoL and demographic variables were also identified: sex, employment status, education level, and monthly income (all $P < 0.01$). Specifically, men reported higher mean ranks for overall QoL compared with women. Further analysis of FACT-G subscale scores revealed several significant patterns across different demographics. Men consistently had higher mean ranks in physical, social, and emotional well-being (all $P < 0.001$). Education level was significantly associated with physical, social, and functional well-being, whereas monthly income was associated with social well-being. Employment status was significantly associated with physical, emotional, and functional well-being (**Table 3**).

Post Hoc Analysis of the Type of Cancer

Post hoc pairwise comparisons for QoL across cancer diagnoses are presented in **Table 4**. Initial analyses indicated significant differences between several cancer types. In particular, patients with prostate cancer demonstrated different QoL

scores compared with patients diagnosed with Hodgkin lymphoma, leukemia, colon cancer, testis cancer, bladder cancer, and brain cancer. Patients with prostate cancer reported lower overall QoL scores than those with bladder cancer ($P < 0.007$) and brain cancer ($P < 0.006$). However, after applying the Bonferroni correction for multiple comparisons, these differences were no longer statistically significant. Overall, the adjusted analyses indicated no significant differences in QoL across cancer diagnoses in this study. As shown in **Table 4**, some cancer subgroups had relatively small sample sizes, which may have affected the stability of subgroup comparisons and reduced statistical power.

Symptoms of Anxiety and Depression

Symptoms of anxiety and depression were assessed using the HADS and categorized as normal (0-7), borderline (8-10), and abnormal (≥ 11). Overall, 56.1% of participants were classified as normal for depression, and 60.0% for anxiety. Borderline symptoms were observed in 20.5% (depression) and 24.7% (anxiety), while abnormal scores were reported in 23.4% (depression) and 15.3% (anxiety). These results highlight the varying levels of emotional well-being among cancer patients, with a significant proportion potentially at risk for depression and anxiety (**Figure 1**).

Associations Between Demographic Factors and Mental Health Outcomes in Cancer Patients

Significant associations between demographic characteristics and psychological outcomes are presented in **Table 5**. Sex was significantly associated with both anxiety and depression levels among cancer patients. Male patients showed a higher proportion of normal anxiety levels compared with female patients, whereas female patients demonstrated higher proportions of borderline and abnormal anxiety and depression ($P = 0.022$ for anxiety; $P = 0.024$ for depression). Education level was also significantly associated with anxiety ($P = 0.042$) and depression ($P = 0.007$). Patients with higher educational attainment reported greater proportions of normal anxiety and depression levels. Similarly, the presence of a support system

Table 3. Factors affecting the quality of life (QoL) in patients with cancer.

| Descriptive characteristic | Physical well-being | Social well-being | Emotional well-being | Functional well-being | Overall QoL |
|---|---------------------|-------------------|----------------------|-----------------------|-------------|
| | Mean rank | Mean rank | Mean rank | Mean rank | Mean rank |
| Sex | | | | | |
| Male | 234.92 | 222.14 | 239.21 | 193.96 | 230.80 |
| Female | 174.48 | 180.12 | 172.58 | 192.57 | 176.30 |
| P value | < 0.001*** | < 0.001*** | < 0.001*** | 0.910 | < 0.001*** |
| Age (years) | | | | | |
| 18-24 | 253.19 | 222.60 | 197.71 | 196.62 | 231.08 |
| 25-34 | 178.09 | 214.63 | 180.33 | 212.69 | 192.76 |
| 35-44 | 180.88 | 183.45 | 175.80 | 188.15 | 178.76 |
| 45-54 | 184.53 | 165.45 | 195.94 | 185.74 | 181.24 |
| 55 and above | 202.85 | 211.20 | 208.52 | 195.47 | 207.13 |
| P value | 0.260 | 0.007** | 0.261 | 0.724 | 0.105 |
| Education | | | | | |
| Primary education | 174.09 | 175.38 | 179.42 | 179.42 | 166.73 |
| High school graduate | 206.85 | 184.26 | 217.48 | 217.48 | 208.86 |
| Secondary school | 216.46 | 193.49 | 189.72 | 189.72 | 208.11 |
| Bachelor's degree | 205.35 | 235.76 | 219.01 | 219.01 | 221.14 |
| Postgraduate degree | 215.21 | 250.34 | 188.76 | 188.76 | 243.13 |
| P value | 0.030* | < 0.001*** | 0.071* | < 0.001*** | < 0.001*** |
| Marital status | | | | | |
| Single | 225.92 | 207.51 | 206.88 | 199.91 | 218.84 |
| Married | 192.50 | 196.62 | 194.55 | 196.91 | 195.57 |
| Divorced | 155.13 | 109.56 | 167.44 | 155.50 | 127.00 |
| Widowed | 172.03 | 167.36 | 172.45 | 163.00 | 160.72 |
| P value | 0.132 | 0.050* | 0.500 | 0.240 | 0.420 |
| Monthly income | | | | | |
| Below 50 000 PKR | 187.04 | 183.55 | 189.67 | 187.47 | 185.37 |
| 50 000-100 000 PKR | 209.54 | 221.02 | 207.09 | 206.80 | 214.10 |
| 100 000-200 000 PKR | 264.61 | 292.33 | 194.72 | 271.50 | 285.00 |
| P value | 0.045* | < 0.001*** | 0.491 | 0.042* | 0.006** |
| Employment | | | | | |
| Employed full-time | 247.06 | 232.23 | 236.19 | 246.94 | 251.68 |
| Employed part-time | 170.91 | 201.69 | 202.63 | 178.31 | 180.09 |
| Unemployed, actively seeking employment | 124.13 | 202.06 | 192.38 | 198.75 | 163.69 |
| Unemployment, not actively seeking employment | 181.92 | 182.35 | 181.14 | 181.70 | 178.87 |

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Table 3 continued. Factors affecting the quality of life (QoL) in patients with cancer.

| Descriptive characteristic | Physical well-being | Social well-being | Emotional well-being | Functional well-being | Overall QoL |
|---|---------------------|-------------------|----------------------|-----------------------|-------------|
| | Mean rank | Mean rank | Mean rank | Mean rank | Mean rank |
| Student | 229.74 | 217.88 | 189.26 | 184.18 | 212.21 |
| Retired | 249.73 | 229.13 | 265.28 | 256.00 | 274.75 |
| <i>P</i> value | < 0.001*** | < 0.044* | < 0.003** | < 0.001*** | < 0.001*** |
| What type of anticancer treatment have you received? | | | | | |
| Chemotherapy | 195.32 | 201.01 | 200.79 | 192.10 | 197.36 |
| Chemotherapy and radiation | 211.93 | 185.30 | 159.35 | 221.65 | 175.75 |
| Radiation, chemotherapy, and surgery | 193.12 | 151.62 | 191.38 | 212.24 | 203.68 |
| Chemotherapy and surgery | 179.48 | 175.26 | 173.99 | 184.26 | 186.44 |
| <i>P</i> value | 0.613 | 0.110 | 0.145 | 0.508 | 0.482 |
| How long ago cancer was diagnosed | | | | | |
| Less than 1 year ago | 198.01 | 195.36 | 197.20 | 195.91 | 197.36 |
| 1-2 years ago | 175.64 | 177.96 | 183.10 | 173.05 | 175.75 |
| 2-5 years ago | 185.31 | 195.14 | 180.92 | 177.55 | 203.68 |
| Over 5 years ago | 190.09 | 194.98 | 190.95 | 225.34 | 186.44 |
| <i>P</i> value | 0.571 | 0.772 | 0.726 | 0.162 | 0.379 |
| Type of cancer | | | | | |
| Breast cancer | 176.89 | 183.05 | 165.32 | 194.45 | 177.84 |
| Lung cancer | 212.81 | 251.96 | 191.85 | 184.12 | 163.90 |
| Prostate cancer | 105.92 | 184.75 | 161.75 | 95.08 | 214.36 |
| Colon cancer | 216.80 | 265.20 | 259.40 | 213.20 | 171.85 |
| Other | 222.10 | 194.34 | 218.99 | 201.27 | 241.52 |
| Hodgkin lymphoma | 189.79 | 223.86 | 249.46 | 224.86 | 199.31 |
| Bladder cancer | 252.89 | 206.28 | 290.06 | 239.28 | 233.61 |
| Ovarian cancer | 155.09 | 167.85 | 166.00 | 198.09 | 213.31 |
| Multiple myeloma | 217.25 | 219.20 | 194.65 | 206.40 | 191.88 |
| Diffuse large B-cell lymphoma | 186.35 | 235.38 | 194.08 | 170.88 | 216.65 |
| Testis cancer | 226.93 | 230.36 | 278.50 | 212.29 | 265.72 |
| Uterus cancer | 188.63 | 160.70 | 181.61 | 174.35 | 251.71 |
| Plasma cell tumour | 188.29 | 162.93 | 267.07 | 142.29 | 183.71 |
| Non-Hodgkin lymphoma | 224.63 | 208.09 | 202.03 | 166.22 | 107.08 |
| Leukemia | 259.05 | 198.43 | 245.36 | 199.11 | 178.92 |
| Brain cancer | 294.30 | 249.70 | 264.80 | 247.60 | 243.10 |
| Osteosarcoma | 173.50 | 206.58 | 209.50 | 167.92 | 290.90 |
| <i>P</i> value | < 0.001*** | 0.299 | < 0.001*** | 0.642 | 0.29* |

Kruskal-Wallis test, Mann-Whitney test, statistical significance * $P < 0.1$; ** $P < 0.01$; *** $P < 0.001$.

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Table 4. Post hoc analysis of the type of cancer with the Functional Assessment of Cancer Therapy-General (FACT-G).

| Variable | Type of cancer | P value | Adj. Sig. ^a |
|-----------------|------------------|---------|------------------------|
| Prostate cancer | Other | 0.029* | 1.000 |
| Prostate cancer | Hodgkin lymphoma | 0.032* | 1.000 |
| Prostate cancer | Leukemia | 0.009** | 1.000 |
| Prostate cancer | Colon cancer | 0.043* | 1.000 |
| Prostate cancer | Testis cancer | 0.019* | 1.000 |
| Prostate cancer | Bladder cancer | 0.007** | 0.928 |
| Prostate cancer | Brain Cancer | 0.006** | 1.000 |
| Ovarian cancer | Leukaemia | 0.009** | 1.000 |
| Ovarian cancer | Bladder cancer | 0.013* | 1.000 |
| Ovarian cancer | Brain Cancer | 0.016* | 1.000 |
| Uterus cancer | Leukemia | 0.036* | 1.000 |
| Uterus cancer | Bladder cancer | 0.032* | 1.000 |
| Uterus cancer | Brain Cancer | 0.030* | 1.000 |
| Breast cancer | Leukemia | 0.012* | 1.000 |
| Breast cancer | Bladder cancer | 0.021* | 1.000 |
| Breast cancer | Brain Cancer | 0.025* | 1.000 |

Significance level * $P < 0.1$; ** $P < 0.01$; *** $P < 0.001$. ^a Significance values have been adjusted using Bonferroni correction for multiple groups.

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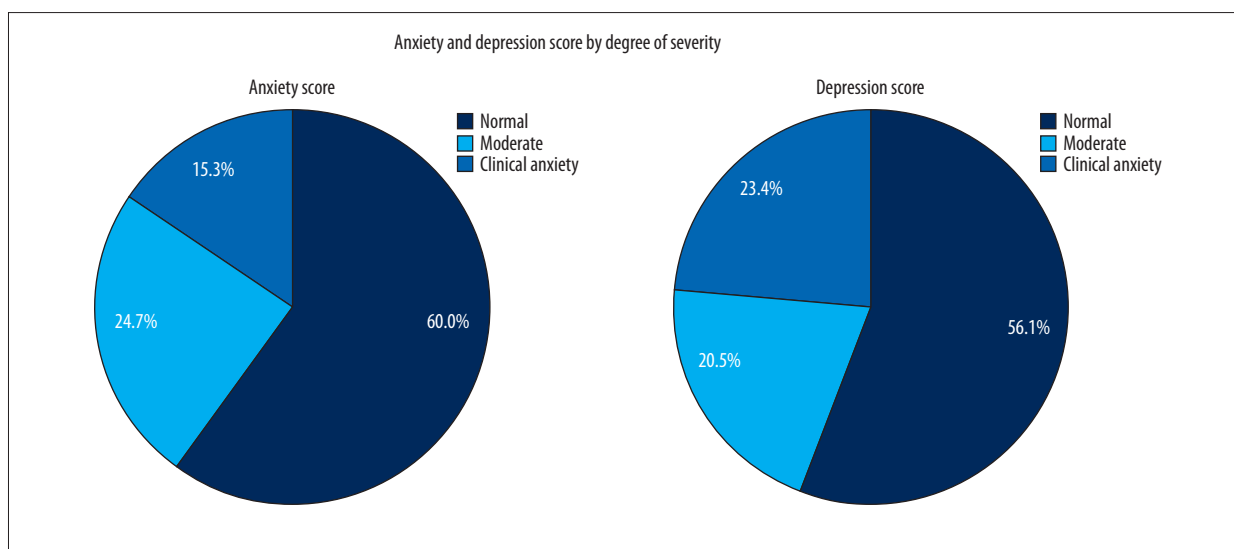


Figure 1. Prevalence of anxiety and depression among participants.

Table 5. Associations between demographic factors and mental health outcomes in cancer patients.

| Descriptive characteristic | Anxiety | | | P value | Depression | | | P value |
|---|--------------|------------------|----------------|--------------------|--------------|------------------|----------------|--------------------|
| | Normal N (%) | Borderline N (%) | Abnormal N (%) | | Normal N (%) | Borderline N (%) | Abnormal N (%) | |
| Sex | | | | | | | | |
| Male | 83 (70.3) | 22 (18.6) | 13 (11.0) | 0.022* | 78 (66.1) | 21 (17.8) | 19 (16.1) | 0.024* |
| Female | 148 (55.4) | 73 (27.3) | 46 (17.2) | | 138 (51.7) | 58 (21.7) | 71 (26.6) | |
| Age (years) | | | | | | | | |
| 18-24 | 17 (65.4) | 7 (26.9) | 2 (7.7) | 0.125 | 16 (61.5) | 5 (19.2) | 5 (19.2) | 0.185 |
| 25-34 | 24 (55.8) | 8 (18.6) | 11 (25.6) | | 22 (51.2) | 10 (23.3) | 11 (25.6) | |
| 35-44 | 58 (59.8) | 19 (19.5) | 20 (20.6) | | 51 (52.6) | 22 (22.7) | 24 (24.7) | |
| 45-54 | 58 (55.8) | 30 (28.8) | 16 (15.4) | | 50 (48.1) | 28 (26.9) | 26 (25.0) | |
| 55 and above | 74 (64.3) | 31 (27.0) | 10 (8.7) | | 77 (67.0) | 14 (12.2) | 24 (20.9) | |
| Education | | | | | | | | |
| Primary education | 100 (54.1) | 48 (25.9) | 37 (20.0) | 0.042* | 87 (47.0) | 44 (23.8) | 54 (29.2) | 0.007** |
| High school graduate | 48 (68.6) | 13 (18.6) | 9 (12.9) | | 39 (55.7) | 17 (24.3) | 14 (20.0) | |
| Secondary school | 29 (55.8) | 16 (30.8) | 7 (13.5) | | 31 (59.6) | 8 (15.4) | 13 (25.0) | |
| Bachelor's degree | 26 (60.5) | 14 (32.6) | 3 (7.0) | | 32 (74.4) | 7 (16.3) | 4 (9.3) | |
| Postgraduate degree | 28 (80.0) | 4 (11.4) | 3 (8.6) | | 27 (77.1) | 3 (3.8) | 5 (14.3) | |
| Monthly income | | | | | | | | |
| Below 50 000 PKR | 178 (58.4) | 76 (24.9) | 51 (16.7) | 0.232 ^a | 164 (53.8) | 64 (21.0) | 77 (85.6) | 0.362 ^a |
| 50 000-100 000 PKR | 45 (63.4) | 18 (25.4) | 8 (11.3) | | 45 (63.49) | 14 (19.7) | 12 (16.9) | |
| 100 000-200 000 PKR | 8 (88.9) | 1 (11.1) | 0 (0.0) | | 7 (77.8) | 1 (11.1) | 1 (11.1) | |
| Employment | | | | | | | | |
| Employed full-time | 28 (66.7) | 10 (23.8) | 4 (9.5) | 0.432 ^a | 30 (71.4) | 5 (6.3) | 7 (16.7) | 0.416 ^a |
| Employed part-time | 6 (37.5) | 7 (43.8) | 3 (18.8) | | 9 (56.2) | 5 (6.3) | 2 (12.5) | |
| Unemployed actively seeking employment | 5 (62.5) | 1 (12.5) | 2 (25.0) | | 5 (62.5) | 3 (37.5) | 0 (0.0) | |
| Unemployment, not actively seeking employment | 162 (57.4) | 71 (25.2) | 49 (17.4) | | 145 (51.4) | 62 (22.0) | 75 (26.6) | |
| Student | 12 (70.6) | 4 (23.5) | 1 (5.9) | | 9 (52.9) | 3 (17.6) | 5 (29.4) | |
| Retired | 18 (90.0) | 2 (10.0) | 0 (0.0) | | 18 (90.0) | 1 (5.0) | 1 (5.0) | |

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Table 5 continued. Associations between demographic factors and mental health outcomes in cancer patients.

| Descriptive characteristic | Anxiety | | | P value | Depression | | | P value |
|--|--------------|------------------|----------------|----------------------|--------------|------------------|----------------|--------------------|
| | Normal N (%) | Borderline N (%) | Abnormal N (%) | | Normal N (%) | Borderline N (%) | Abnormal N (%) | |
| What type of anti-cancer treatment have you received? | | | | | | | | |
| Chemotherapy | 170 (62.3) | 62 (22.7) | 41 (15.0) | 0.076 ^{*,a} | 153 (56.0) | 55 (20.1) | 65 (23.8) | 0.020 [*] |
| Chemotherapy and radiation | 13 (65.0) | 4 (20.0) | 3 (15.0) | | 9 (45.0) | 7 (35.0) | 4 (20.0) | |
| Radiation, chemotherapy, and surgery | 9 (52.9) | 5 (29.4) | 3 (17.6) | | 12 (5.6) | 2 (11.8) | 3 (17.6) | |
| Chemotherapy and surgery | 39 (52.0) | 24 (32.0) | 12 (16.0) | | 42 (19.4) | 15 (20.0) | 18 (24.0) | |
| How long ago cancer was diagnosed | | | | | | | | |
| Less than 1 year ago | 167 (64.0) | 57 (21.8) | 37 (14.2) | 0.674 ^a | 146 (55.9) | 61 (23.4) | 54 (20.7) | 0.721 ^a |
| 1-2 years ago | 29 (56.9) | 13 (25.5) | 9 (17.6) | | 25 (49.0) | 12 (23.5) | 14 (27.5) | |
| 2-5 years ago | 21 (47.7) | 15 (34.1) | 8 (18.2) | | 24 (54.5) | 5 (11.4) | 15 (34.1) | |
| Over 5 years ago | 14 (48.3) | 10 (34.5) | 5 (17.2) | | 21 (72.4) | 1 (3.4) | 7 (24.1) | |
| Type of cancer | | | | | | | | |
| Breast cancer | 84 (54.2) | 44 (28.4) | 27 (17.4) | 0.290 ^a | 79 (51.0) | 35 (44.3) | 41 (45.6) | 0.054 [*] |
| Ovarian cancer | 21 (53.8) | 10 (25.6) | 8 (20.5) | | 22 (56.4) | 10 (25.6) | 7 (17.9) | |
| Other | 22 (62.9) | 9 (25.7) | 4 (11.4) | | 21 (60.0) | 5 (14.3) | 9 (25.7) | |
| Uterus cancer | 11 (47.8) | 9 (39.1) | 3 (5.1) | | 11 (47.8) | 4 (17.4) | 8 (34.8) | |
| Leukemia | 14 (63.6) | 5 (22.7) | 3 (13.6) | | 15 (68.2) | 4 (18.2) | 3 (13.6) | |
| Non-Hodgkin lymphoma | 13 (81.2) | 1 (6.2) | 2 (12.5) | | 10 (62.5) | 3 (18.8) | 3 (18.8) | |
| Hodgkin lymphoma | 11 (78.6) | 2 (2.1) | 1 (1.7) | | 10 (71.4) | 3 (21.4) | 1 (7.1) | |
| Lung cancer | 9 (69.2) | 2 (15.4) | 2 (15.4) | | 8 (61.5) | 3 (23.1) | 2 (15.4) | |
| Diffuse large B-cell lymphoma | 6 (46.2) | 4 (30.8) | 3 (23.10) | | 7 (53.8) | 3 (23.1) | 3 (23.1) | |
| Multiple myeloma | 8 (80.0) | 2 (20.0) | 0 | | 6 (60.0) | 1 (10.0) | 3 (30.0) | |
| Bladder cancer | 8 (88.9) | 0 | 1 (11.1) | | 7 (77.8) | 1 (11.1) | 1 (11.1) | |
| Testis cancer | 5 (71.4) | 1 (14.3) | 1 (14.3) | | 4 (57.1) | 2 (28.6) | 1 (14.3) | |
| Plasma cell tumor | 4 (57.1) | 2 (28.6) | 1 (1.7) | | 4 (57.1) | 1 (14.3) | 2 (28.6) | |
| Prostate cancer | 2 (33.3) | 2 (33.3) | 2 (33.3) | | 2 (33.3) | 1 (16.7) | 3 (50.0) | |
| Osteosarcoma | 4 (66.7) | 1 (16.7) | 1 (16.7) | | 3 (50.0) | 1 (16.7) | 2 (33.3) | |
| Colon | 4 (80.0) | 1 (20.0) | 0 | | 3 (60.0) | 1 (20.0) | 1 (20.0) | |
| Brain cancer | 5 (100) | 0 | 0 | | 4 (80.0) | 1 (20.0) | 0 | |
| Emotional support related to cancer therapy | | | | | | | | |
| Yes | 2 | 8 | 5 | 0.729 | 5 | 3 | 7 | 0.984 ^a |
| No | 229 | 87 | 54 | | 211 | 76 | 83 | |

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Table 5 continued. Associations between demographic factors and mental health outcomes in cancer patients.

| Descriptive characteristic | Anxiety | | | P value | Depression | | | P value |
|---|--------------|------------------|----------------|--------------|--------------|------------------|----------------|----------|
| | Normal N (%) | Borderline N (%) | Abnormal N (%) | | Normal N (%) | Borderline N (%) | Abnormal N (%) | |
| Support system during cancer treatment | | | | | | | | |
| Yes, a strong support system | 30 | 7 | 3 | < 0.001***,a | 29 | 6 | 5 | 0.088*,a |
| Yes, a moderate support system | 38 | 14 | 12 | | 39 | 14 | 11 | |
| Yes, but limited support | 8 | 1 | 5 | | 3 | 2 | 9 | |
| No, I don't have any support system | 153 | 73 | 39 | | 143 | 57 | 65 | |
| Prefer not to say | 2 | 0 | 0 | | 2 | 0 | 0 | |

Chi-square test, significance level * $P < 0.1$; ** $P < 0.01$; *** $P < 0.001$. ^a Fisher exact test was performed for the variables having frequency count < 5.

Table 6. Association of the Functional Assessment of Cancer Therapy-General (FACT-G) questionnaire and the Hospital Anxiety and Depression Scale (HADS).

| Category | | n | PWB | SWB | EWB | FWB | Overall QoL | P value |
|------------|----------|-----------|--------|--------|--------|--------|-------------|------------|
| | | Mean rank | | | | | | |
| Depression | Normal | 216 | 241.83 | 219.75 | 235.93 | 245.91 | 252.96 | < 0.001*** |
| | Moderate | 79 | 160.28 | 193.63 | 173.72 | 173.50 | 163.74 | |
| | Clinical | 90 | 104.53 | 128.24 | 106.86 | 83.13 | 74.79 | |
| Anxiety | Normal | 231 | 232.09 | 211.89 | 247.18 | 231.52 | 244.92 | < 0.001*** |
| | Moderate | 95 | 154.18 | 179.82 | 140.10 | 157.83 | 142.68 | |
| | Clinical | 59 | 102.47 | 140.25 | 66.04 | 98.81 | 70.75 | |

Abbreviations: PWB, physical well-being; SWB, social well-being; EWB, emotional well-being; FWB, functional well-being. Kruskal-Wallis test, significance level * $P < 0.1$; ** $P < 0.01$; *** $P < 0.001$.

showed significant associations with anxiety ($P < 0.001$) and depression ($P = 0.012$), with supported patients demonstrating better psychological status overall. In addition, employment status was significantly associated with depression ($P = 0.020$). Overall, the findings in **Table 5** demonstrate significant relationships between selected demographic factors and symptoms of anxiety and depression among patients with cancer.

Association Between FACT-G and HADS

The Kruskal-Wallis H test was conducted to evaluate differences in QoL domains across 3 anxiety and depression categories (normal, borderline, abnormal) among patients. The results shown in **Table 6** demonstrate significant differences in mean ranks of physical well-being, social well-being, emotional well-being, functional well-being, and overall QoL across the

anxiety and depression categories ($P < 0.001$ for all domains). Participants with normal anxiety and depression levels had the highest mean ranks across all QoL domains, indicating better physical, social, emotional, and functional well-being, as well as better overall QoL. Participants with abnormal anxiety had the lowest mean ranks across all QoL domains, indicating poorer physical, social, emotional, and functional well-being, as well as poorer overall QoL. These findings indicate a significant association between anxiety and depression levels and QoL domains among patients with cancer.

Correlation of FACT-G and HADS

Table 7 presents the results of the Spearman correlation analysis. A statistically significant moderate negative correlation was observed between anxiety scores and overall QoL ($r_s = -0.491$,

Table 7. Correlation of quality of life measured with the Functional Assessment of Cancer Therapy-General questionnaire and depression and anxiety scores from the Hospital Anxiety and Depression Scale (HADS).

| | Correlation coefficient with quality of life | P (2-tailed) |
|------------|--|--------------|
| Depression | -0.450 | < 0.001*** |
| Anxiety | -0.491 | < 0.001*** |

$P < 0.001$), indicating an inverse association between anxiety levels and QoL. Similarly, depression scores demonstrated a significant moderate negative correlation with overall QoL ($P < 0.001$), suggesting that higher depression scores were associated with lower QoL among patients with cancer.

Discussion

Patients with cancer often face a multitude of challenges that are associated with variations in their QoL. These challenges stem from both the progression of the disease and the adverse effects of anticancer therapies. Understanding the factors associated with QoL in cancer patients is essential for informing supportive care strategies. To the best of our knowledge, this is the first study from Lahore, Pakistan, to examine the various dimensions of QoL and the association between demographic and socioeconomic factors and QoL outcomes. Overall QoL scores in our study were comparable to those reported in regional settings, including Pakistan and Jordan [22,27]. This similarity may reflect comparable healthcare infrastructures, sociocultural environments, and family support systems across Middle Eastern and South Asian populations, which can be associated with how patients perceive and report their QoL during cancer treatment. In the present study, significant associations were identified between overall QoL and several factors, including age, marital status, cancer type, and time since diagnosis. Women in the present study reported lower overall QoL, particularly in physical and emotional well-being domains. This finding aligns with regional studies reporting poorer QoL among female patients [28,29]. The observed association between sex and QoL in our study may reflect sociocultural dynamics within the Pakistani context. In many households, women continue to bear primary caregiving and domestic responsibilities even during illness, which may contribute to lower perceived physical and emotional well-being. Additionally, differences in financial dependency, healthcare access, and social autonomy may shape how male and female patients experience and report QoL. However, studies from the United States and Saudi Arabia reported no association between sex and QoL [30,31]. Our findings, consistent with other regional evidence [28] and a lung cancer study [29], indicate lower overall QoL among female patients. These findings underscore the importance of incorporating gender-sensitive supportive care approaches in oncology

settings. The present study found no significant association between marital status and overall QoL, consistent with previous findings [27]. This may reflect the extended family structures common in Pakistan, where social support often extends beyond the marital relationship. Although age was not associated with overall QoL, it was significantly associated with the social well-being domain, corroborating earlier research [12,27]. This suggests that, while age may not be related to overall QoL perception, specific aspects, such as social functioning, may vary across age groups. While some previous studies reported no significant associations between age, educational status, or illness duration and QoL, our findings differed with respect to education, as we observed a significant association between educational status and overall QoL [2]. Similarly, an Indian study found no significant differences in QoL, as measured by the FACT-G, across age, income status, or cancer type. Our study also found no significant differences in overall QoL related to age or cancer type. However, unlike the Indian study, our research revealed that income status was significantly associated with overall QoL, consistent with other studies demonstrating a strong association between lower socioeconomic status and reduced social well-being [32]. In Pakistan's predominantly out-of-pocket healthcare system, socioeconomic status may be associated with differences in access to supportive oncology services, symptom management, and continuity of care. Limited availability of integrated psycho-oncology services in public hospitals may further restrict the timely identification and management of psychological distress among patients with cancer. In addition, cultural reluctance to discuss mental health concerns may contribute to the underutilization of psychological support services despite substantial emotional burden. Patients with higher income or educational attainment may have better access to private healthcare facilities, informational resources, and psychosocial support services, which could contribute to observed differences in QoL domains. Although overall QoL in our study was generally positive, patients reported a lower median physical well-being score than in the Indian study, suggesting a comparatively lower level of perceived physical well-being [1,33]. This pattern aligns with findings from Jordan [34]. While some studies reported functional well-being as the strongest domain [33], others found physical well-being to be the highest [29,35,36] or reported low functional well-being and social well-being in European populations [36,37]. Physical well-being may be associated with treatment-related adverse effects,

fatigue, and pain burden, whereas higher emotional and functional well-being scores may reflect strong familial support systems and adaptive coping mechanisms within the Pakistani sociocultural context. When comparing QoL outcomes between the present study and a similar study in Spain, both reported no significant association between QoL and cancer type [38]. However, the Spanish study demonstrated better outcomes in the physical well-being domain, which may reflect differences in healthcare infrastructure, symptom management practices, and access to rehabilitation services. While prior research has identified treatment type as significantly associated with QoL, we did not observe such an association in our study. This discrepancy may be attributable to variations in healthcare systems, treatment protocols, or patient perceptions of treatment-related burden. A study conducted by Jacob et al (2019) evaluated HRQoL among cancer patients with advanced disease and reported a total FACT-G score of 62.4 ± 10.0 , with the lowest score in the functional well-being domain. In their study, financial difficulty was found to be strongly associated with lower QoL [29]. Similarly, women in our study reported lower physical, social, and emotional well-being than men, consistent with previous findings [39]. However, unlike those findings, which showed no significant association between education level and QoL, the present study identified an important link between education and QoL. A study conducted in Indonesia assessed HRQoL in patients with gynecologic cancer using FACT-G in an observational cross-sectional study [40]. As in the present study, they did not find significant differences in treatment type or duration based on total FACT-G scores. Abu-Helalah et al reported that none of the patients participated in a psychosocial support group, with only 1.7% receiving such support [32]. A related study in Saudi Arabia indicated similarly low participation in psychosocial support, with only 3.7% of patients with colorectal cancer engaged in such systems [32]. In line with these findings, only 3.9% of patients in our study accessed emotional or psychological support during their cancer treatment. We found that 56.1% of patients in the present study had regular depression scores, while 23.4% were diagnosed with clinical depression. Regarding anxiety, 60% of patients were in the normal category, and 15.3% had clinical anxiety. In comparison, a study conducted in Tunisia found that 83.2% of participants were categorized as having normal depression scores, with 15.1% falling into the severe category [41]. Another study conducted in Jordan revealed a different pattern: 77.1% of participants fell into the normal category for depression scores, while 5.4% were in the severe category. For anxiety, 81.7% were within the normal category, and 5.4% were in the severe category [41]. The discrepancies between these studies and the present study may be attributed to several factors, including cultural differences, variations in healthcare access, differences in the psychological support systems available, and differences in the assessment methodologies used. In the Pakistani context, factors such as stigma

surrounding mental health, limited availability of specialized services, and economic constraints may contribute to lower uptake of psychosocial support. Moreover, our study highlights the multifaceted nature of QoL among patients with cancer, which is influenced by factors such as sex, educational status, and socioeconomic status. While some findings align with previous research, others reveal unique associations that underscore the importance of considering sociocultural and healthcare contexts. These findings underscore the importance of considering demographic and socioeconomic factors when designing supportive care strategies for cancer patients. Given the cross-sectional design of this study, the observed relationships should be interpreted as associations rather than causal effects. The findings of this study have important implications for oncology practice in Pakistan. Routine assessment of quality of life, anxiety, and depression in oncology settings may help identify patients requiring additional supportive care. Greater integration of psychosocial support services within cancer treatment centers, particularly for female patients and individuals with limited socioeconomic resources, may improve patient well-being during treatment. Strengthening psycho-oncology services and increasing awareness regarding mental health may also help address unmet supportive care needs among cancer patients in Pakistan.

Limitations

This study has several limitations that should be considered when interpreting the findings. First, it was conducted in a single tertiary care hospital in Lahore, Pakistan, which may limit generalizability to other settings. Second, the analyses were mainly bivariate; multivariable regression could have provided stronger evidence by adjusting for confounders and identifying independent predictors of quality of life. The cross-sectional design also limits causal inference. In addition, cancer stage data were not collected, despite their potential influence on QoL, and only patients currently on treatment were included, excluding survivors and those in remission. Although FACT-G and HADS are validated in Pakistani settings, their cutoff values were developed internationally and may not fully reflect the local sociocultural context. Despite these limitations, the study offers valuable insight into the relationship between psychological distress and QoL in this population. Future multicenter, longitudinal studies incorporating multivariable analyses, cancer staging, and survivorship populations are recommended.

Conclusions

This study indicates that cancer patients in a tertiary care setting in Lahore, Pakistan, generally experienced a moderate QoL, with considerable inter-individual variability. Emotional well-being was the least impaired domain, whereas physical well-being

was the most affected. Key demographic factors, including sex, education, employment status, and monthly income, were significantly associated with QoL scores, with male patients showing higher mean ranks across multiple domains. Although initial bivariate analyses showed differences in quality of life among cancer types, these differences were no longer statistically significant after correction for multiple comparisons. Elevated anxiety and depression scores were consistently associated with lower QoL scores across all domains. Women reported higher depression levels than men, and unemployed or job-seeking individuals exhibited greater depressive symptoms. These findings emphasize the value of embedding structured supportive care within oncology services in Pakistan. Relevant interventions include routine psychological screening with the HADS at key treatment time points, followed by stepped-care support such as brief psychoeducation, individual or group cognitive-behavioral therapy, and referral to psychiatric services for patients with severe distress. To address the marked impairment in physical well-being, multidisciplinary symptom-management clinics focusing on pain control, cancer-related fatigue, and nutritional support could be integrated into oncology care pathways. Gender-sensitive peer-support programs, facilitated by trained survivors or psychosocial providers, may help reduce the higher emotional burden observed among female patients. Socioeconomically disadvantaged patients may benefit from patient navigation services linking them with social workers, financial counseling, and community-based assistance to reduce treatment-related financial strain.

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Data Availability

The data underlying this article will be shared at a reasonable request by the corresponding author.

Conflict of Interest

The authors declare that they have no conflicts of interest.

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Data Availability Statement

The corresponding author will share the data underlying this article upon reasonable request.

Declaration of Figures' Authenticity

All figures submitted have been created by the authors who confirm that the images are original with no duplication and have not been previously published in whole or in part.

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