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Original Research Article

Effect of Chemotherapy on Cancer Patients Going Through Depression

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Abstract: This study looks at how cancer and mental health are connected. It wants to know how many cancer patients getting chemotherapy are depressed and how it affects them. The researchers looked at patients in three hospitals in Pakistan. They found out that a lot of patients are depressed. Most of them have depression, which is a big problem. The main reasons patients get depressed are because they are in pain all the time they do not have money and they are lonely. Patients usually feel the worst when they are getting chemotherapy. The study shows that depression makes it harder for cancer patients to get better. It makes their life worse they think about hurting themselves. They do not take their medicine like they should. The study says that doctors should always check if cancer patients are depressed and help them with their health. This is important because how patients feel affects how their body recovers from cancer and how well they get better. Cancer patients, like these cancer patients need help with their health so they can get better.

Keywords: Cancer, Chemotherapy, Psychological distress, Moderate Depression, anxiety, and suicidal ideation.

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INTRODUCTION

A cancer diagnosis often arrives like a sudden storm: it upends routines, scrambles plans, and casts long shadows over daily life. For many patients, that first thunderclap is followed by a quieter, persistent companion—psychological distress—that can be as debilitating as the disease itself. Cancer provokes more intense and sustained distress than many non-neoplastic illnesses with poor prognoses, and when that distress becomes prolonged it frequently crystallizes into anxiety, depression, or both. In fact, two-thirds of cancer patients who meet criteria for depression also experience clinically significant anxiety symptoms.

The consequences of this dual burden are far from incidental. Depression erodes quality of life, undermines treatment adherence, complicates symptom management, and has been associated with higher mortality and increased suicide risk among cancer patients. Estimates of depressive symptoms in this population vary widely: studies report prevalence figures from roughly 12–24% up to a broad range between about 16% and nearly 67%, depending on methods, settings, and patient groups. These rates are consistently higher than those seen in other chronic conditions such as stroke, diabetes, or cardiovascular disease.

Depression in the context of cancer is shaped by many factors—age, sex, marital and educational status, occupation, pain severity, the type and stage of cancer, phase of treatment, and the strength of social support networks all play a role. Clinically, depression complicates oncology care: patients may need concurrent treatment for mood disorders and cancer, which can interfere with acceptance of adjuvant therapies, prolong hospitalization, and ultimately affect prognosis. Beyond behavior and adherence, depression may also influence cancer biology through overlapping risk factors and shared disease mechanisms.

Despite growing attention to the interplay between cancer and mood disorders, important gaps remain. Much prior work has centered on whether a history of depression predisposes patients—particularly

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women with breast cancer—to develop malignancy. Fewer studies have taken a broad view across cancer types or examined how depression present at diagnosis affects subsequent oncologic outcomes. Notable exceptions include work that compared depression's impact across various tumor sites and large meta-analyses suggesting a modestly increased cancer incidence among those with depression; however, heterogeneity across studies has limited definitive conclusions.

This study seeks to move beyond association toward clinical consequence: it aims to compare chemotherapeutic response and overall prognosis in cancer patients with and without coexisting depression, while probing the mechanistic pathways that might link mood disturbance to altered cancer outcomes. Specifically, the research asks whether depression at or after diagnosis modifies response to chemotherapy and whether it contributes to differences in survival and disease progression.

Objectives:

1. Examine how psychological factors, particularly depression, influence disease trajectories in cancer.
2. Determine the frequency of depressive symptoms and diagnoses among cancer patients.
3. Identify demographic, clinical, and psychosocial correlates of depression in this population (e.g., age, gender, cancer type, pain, social support).

Aims of the Study

To integrate psychological health with clinical, social, and economic variables in order to better understand—and ultimately improve—treatment outcomes for people living with cancer and depression.

Study Overview

We carried out a comparative cross-sectional study designed to capture a snapshot of how chemotherapy relates to psychological and physical well-being in cancer patients. The aim was to compare groups receiving chemotherapy across several regional cancer centres and to explore links between treatment, symptoms, depressive burden and social support.

METHODOLOGY

Study Design: Comparative cross-sectional study was conducted.

Sample Size and Sampling:

A convenient sampling approach was used. Sample size was calculated in Open Epi using the following parameters: a large population approximation (1,000,000), an anticipated frequency of 50% (used when the true prevalence is unknown), a precision of ±5% and a design effect of 1. With these inputs the required sample for a 95% confidence level was 384 participants.

Inclusion Criteria

- Adults diagnosed with cancer
- Patients currently receiving chemotherapy
- Patients attending the participating cancer hospitals

Exclusion Criteria

- Patients without a cancer diagnosis
- Infants and children

Study Settings and Timeline

Data collection took place at three tertiary centres in Pakistan:

- IRNUM Atomic Energy Cancer Hospital, Peshawar
- Institute of Nuclear Medicine, Oncology and Radiotherapy (INOR), Ayub Teaching Hospital, Abbottabad
- Shaukat Khanum Memorial Cancer Hospital, Peshawar

Study Duration: 6 June 2025 to April 2026.

Variables

- Independent variable: receipt of chemotherapy
- Dependent variables: depression level, physical symptoms, quality of life, and social support
- Confounding variables: age, gender, cancer type, disease stage and socioeconomic status

Measurement Types

- Qualitative variables: gender, marital status, cancer type
- Quantitative variables— Discrete: number of symptoms, number of chemotherapy cycles
- Quantitative

RESULTS

1. Demographic and Socioeconomic Portrait

The survey paints a picture of a population carrying more than illness alone.

Age and Gender:

The largest age cluster sits between 46 and 60 years (23.4%), with a notable number of respondents aged over 75. Gender distribution is roughly even; males were the single largest group at 127 respondents.

Social Isolation:

Social threads are frayed for many: 98 participants are widowed and a sizable portion are divorced, suggesting diminished at-home emotional support. Economic strain is evident too — unemployment is the most frequent work status (123 people) and the commonest education level is primary school (77). Together, these factors point to a landscape

where the cost of care can compound suffering, producing the "financial toxicity" that magnifies psychological burden.

2. Clinical Cancer Profile

Physically, many patients are still in the early stages of disease but are undergoing intense treatment. Lung cancer (19.4%) and hematologic malignancies lead the diagnoses. Although a substantial number are categorized at preliminary stages (Stage I: 83 respondents), most have been living with their diagnosis for 6–12 months and have completed 4–6 cycles of chemotherapy — precisely the window where treatment fatigue often takes hold. Pain is common and consequential: 184 patients report cancer-related pain, most rating it moderate (pain level 4–6), and persistent physical pain is statistically linked with greater depressive symptoms.

3. Psychological Assessment (PHQ-9) and Findings

Using the PHQ-9 screening instrument, the cohort's symptom signal is clear though nuanced. Individual item means for trouble sleeping, low energy, and poor appetite cluster around 1.4–1.5, reflecting symptoms present from "several days" to "more than half the days" for the average respondent. Alarming among these results is item 9 (thoughts of self-harm), which yielded a comparatively high mean score of 1.56 — a red flag underscoring the urgent need for routine mental health screening in oncology settings. The mean total PHQ-9 score sits at 13.27; the modal diagnostic category was Moderate Depression, affecting 174 patients.

4. Depression Management and Outlook:

Depression diagnosis and management were active concerns for many. A total of 185 patients carry a formal depression diagnosis, and of those, 77 were diagnosed during chemotherapy — signifying the treatment period as a critical moment for psychological emergence. The most common therapeutic approach combined pharmacologic and psychotherapeutic strategies (91 respondents reported using both). Despite the prevalence of mood disturbance, 132 patients reported their depression as "well controlled," and 123 explicitly felt that their mood influenced their physical recovery — a strong, patient-reported affirmation of the mind–body connection.

DISCUSSION

This study reveals how financial strain, social isolation, physical pain, and sustained chemotherapy converge to shape a high-risk psychological environment for cancer patients. Moderate depression is common, suicidal ideation is detectable and concerning, and many depressive episodes are identified during active chemotherapy — highlighting a narrow window for intervention. The data argue for several practical priorities: routine, repeated mental-health screening in oncology clinics (including direct inquiry about suicidal thoughts); integrated care pathways that combine pain management, psychosocial support, and financial counselling; and ready access to both psychotherapy and pharmacotherapy during chemotherapy cycles. Addressing depression alongside cancer treatment is not optional — it is central to improving quality of life and potentially influencing treatment tolerance and outcomes.

Depression casts a long shadow over cancer care. Across studies, patients who screen positive for depressive symptoms — often measured with the PHQ-9 — fare worse: they are less likely to stick with prescribed treatments, show weaker responses to therapy, and have poorer overall prognoses than their non-depressed peers. When used as a continuous measure, the PHQ-9 with a cut off around ≥8 has performed well at detecting major depressive disorder in oncology populations and deserves serious consideration as a routine screening tool.

Moderate to severe depressive symptoms are common among people undergoing cancer treatment, and their presence is tightly linked to suboptimal outcomes. Depressed patients more frequently miss or delay chemotherapy doses, struggle with follow-up care, and experience protracted recovery. Meta-analytic evidence from medical populations supports this pattern: depression substantially increases the likelihood of non-adherence, in some analyses by threefold. Conceptually, depression undermines the very ingredients needed for good adherence — clear outcome expectancies, perceived benefit, and the motivation to act — while also sapping energy and self-care capacity.

Sample characteristics point to important nuances. In the present cohort most participants were middle-aged (46–60 years), slightly more often male, and largely married, suggesting family involvement in care. Yet younger patients consistently report higher levels of psychological distress and depression, highlighting the need for age-sensitive psychosocial screening and support.

Beyond behavior, biological and bio behavioral pathways offer plausible mechanisms linking depression to worse cancer outcomes. Depression is associated with immune dysregulation and a pro-inflammatory state — elevated cytokines such as IL-6, TNF-α, and markers like CRP — which can impair immune surveillance and potentially influence tumour biology. Chronic stress and depression also activate the sympathetic nervous system and stress hormone cascades, pathways that have been implicated in facilitating tumor growth and reducing chemotherapy responsiveness.

Taken together, the evidence argues that depression is not an ancillary concern but a clinically important determinant of treatment adherence and cancer prognosis. Routine screening with validated tools like the

PHQ-9, timely psychosocial interventions, and integrated care that addresses both behavioral and biological contributors could improve adherence, treatment response, and ultimately outcomes for patients with cancer.

In many oncology settings, pain and depression arrive as companions—pain amplifies emotional burden and is frequently tied to a diminished quality of life (24). Yet when researchers peel back clinical factors, the relationship between depression and survival becomes less clear: several studies find that depression mainly erodes day-to-day wellbeing rather than acting as an independent predictor of mortality (8). These mixed findings likely reflect a patchwork of study designs, patient groups, cancer types, and measurement approaches, each shading the picture in different ways.

CONCLUSION

Based on the report provided, the conclusion highlights a critical intersection between physical illness and mental health in cancer patients.

The study identifies that psychological distress is primarily driven by three main factors i.e., chronic pain, financial instability, and social isolation.

On the other hand, clinical observations of this study show that depression is prevalent throughout the process but typically peaks during the chemotherapy phase. This study also classifies depression patients with most frequent classification among patients is that of moderate depression, with an average PHQ-9 score of 13.27. This study also suggests that majority of patients (123) explicitly believe their mood directly impacts their physical recovery.

The report concludes that oncology clinics must treat the tumor and the mind simultaneously to improve the overall quality of life and recovery potential for patients.

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