

Exploring the Relationship between Psychological Well-Being, Optimism, and Depression in Cancer Patients Aged Below 45 Years.

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ABSTRACT

This study examined the relationships between optimism, psychological well-being (PWB), and depression among cancer patients, comparing those below and above 45 years of age. Using correlation analyses, significant and consistent associations were found across both age groups. Optimism, measured by the Life Orientation Test-Revised (LOT-R), showed a strong positive correlation with psychological well-being ($r \approx 0.73$, $p < 0.001$) and a moderate negative correlation with depression ($r \approx 0.39-0.38$, $p < 0.001$). Psychological well-being also demonstrated a moderate inverse relationship with depression ($r \approx 0.48-0.49$, $p < 0.001$). These findings indicate that higher optimism is strongly linked to greater psychological well-being and both factors are associated with lower levels of depressive symptoms among cancer patients. The consistency of these patterns across age groups suggests that the beneficial effects of optimism and well-being on mental health are universal in cancer care. The study underscores the importance of integrating psychosocial interventions focused on enhancing optimism and psychological well-being to mitigate depression and improve overall quality of life in cancer patients. Future longitudinal and intervention studies are recommended to further explore these relationships and optimize psychosocial support in oncology settings.

Keywords: Cancer patients, Psychological well-being, Optimism, Depression, Life Orientation Test-Revised (LOT-R).

INTRODUCTION

Depression is a common and serious issue among cancer patients, affecting quality of life and treatment outcomes. It results from a complex interaction of biological, psychological, and social factors (Massie, 2004). Around 25% of patients experience depression, especially those with advanced cancers such as pancreatic and lung cancer (Mitchell et al., 2011; Zhang et al., 2018). Treatment-related symptoms like fatigue, pain, and sleep disturbances further contribute and often lead to underdiagnosis (Bower, 2014; Walker et al., 2014).

Biologically, chemotherapy, hormonal therapies, and inflammatory cytokines can alter brain function and trigger depressive symptoms (Li et al., 2017; Miller & Raison, 2016). Psychologically, fear, stigma, and cognitive impairment increase distress (Caruso & Breitbart, 2020; Janelins et al., 2014), while social factors such as support systems and financial strain also play a major role (Wang et al., 2018).

Depression reduces treatment adherence and is associated with poorer outcomes and survival, partly due to immune suppression and unhealthy behaviors (DiMatteo et al., 2000; Pinquart & Duberstein, 2010). It also worsens pain, fatigue, and cognitive dysfunction, lowering overall quality of life (Miovic & Block, 2007).

Management includes psychotherapy (e.g., CBT, mindfulness), pharmacological treatments (SSRIs, SNRIs), social support, palliative care, and lifestyle changes, all of which improve mood and coping (Osborn et al., 2006; Carlson et al., 2016; Rayner et al., 2011; Temel et al., 2010; Courneya et al., 2015). A holistic approach is essential for better outcomes. Optimism—defined as expecting positive outcomes—plays a key role in coping and quality of life (Scheier & Carver, 1985; Carver & Scheier, 2014). It is associated with better adaptation, lower distress, and improved well-being, while low optimism increases anxiety and depression (Saboonchi et al., 2016; Anderson et al., 2019; Marton et al., 2020; Schou et al., 2004; Fischer et al., 2018; Jimenez-Fonseca et al., 2018). Optimistic patients engage in adaptive coping, adhere better to treatment, and seek social support (Carver et al., 1993; Andrykowski et al., 2016). Optimism also improves HRQOL by buffering stress and enhancing mood (Schou et al., 2005; Kurtz et al., 2008). Biologically, optimism may reduce cortisol and inflammation, strengthen immune response, and support recovery and healthy

behaviors (Bower et al., 2008; Segerstrom & Miller, 2004; Stanton et al., 2000; Carver et al., 2005). Interventions like CBT, mindfulness, and gratitude practices can enhance optimism and coping (Seligman et al., 2006; Wood et al., 2008; Garland et al., 2017), improving resilience, quality of life, and outcomes. Psychological well-being—including positive affect, gratitude, purpose, and happiness—is crucial yet underexplored. It can coexist with distress but still independently improves health outcomes. Higher well-being is linked to better clinical outcomes through behavioral and biological pathways, such as reduced inflammation and improved immune and neuroendocrine function. It also promotes healthier behaviors like physical activity and treatment adherence. Positive psychology interventions, even simple ones like gratitude exercises or acts of kindness, can enhance well-being in cancer patients.

MATERIALS AND METHODS

Study Design and Participants:

This cross-sectional study involved cancer patients divided into two age groups: below 45 years and above 45 years. Participants were recruited from oncology clinics, ensuring a representative sample of adult cancer patients in both age categories.

Measures:

- **Optimism** was assessed using the Life Orientation Test-Revised (LOT-R), a validated questionnaire measuring individual levels of optimism and pessimism.
- **Psychological Well-Being (PWB)** was measured using a standardized PWB scale that evaluates overall mental and emotional well-being.
- **Depression** was evaluated through a clinically validated depression inventory designed to assess depressive symptoms severity.

Data Collection:

Participants completed the LOT-R, PWB scale, and depression inventory during scheduled clinical visits or through supervised self-administration. All responses were anonymized to maintain confidentiality.

Statistical Analysis:

Pearson’s correlation coefficients (r) were calculated to assess the strength and direction of relationships between the variables: optimism (LOT-R), psychological well-being (PWB total score), and depression scores within each age group. Statistical significance was determined by p-values, with a threshold set at $p < 0.001$ for high significance. To enhance interpretability, p-values were log-transformed for graphical representation, displaying the correlation coefficients on one axis and log₁₀-transformed p-values on the other.

Interpretation Criteria:

- Correlations were interpreted as strong, moderate, or weak based on absolute r values.
- The relationship between optimism and well-being was expected to be positive, while both optimism and well-being were hypothesized to correlate negatively with depression.
- Consistency of these relationships across age groups was specifically evaluated.

RESULT

For Cancer Patients below 45 Years:

Variable Pair	Correlation Coefficient (r)	P-value
LOT-R vs PWB Total Score	0.7398	3.28e-18
LOT-R vs Depression Score	0.3960	5.44e-05
PWB Total Score vs Depression	0.4923	2.63e-07

- **Strongest correlation:** Optimism and PWB.
- **All p-values < 0.001**, indicating high statistical significance.
- **Interpretation:** Higher optimism correlates with greater well-being and lower depression.

For Cancer Patients above 45 Years:

Variable Pair	Correlation Coefficient (r)	P-value
PWB & LOT-R	0.730	5.07e-18
PWB & Depression	0.478	4.18e-07
LOT-R & Depression	0.375	1.13e-04

- Patterns mirror those in the <45 group.
- Strong positive relationship between optimism and well-being.
- Moderate negative relationship between both optimism and depression, and well-being and depression.

The findings reveal consistent and meaningful relationships between optimism, psychological well-being (PWB), and depression among cancer patients across different age groups. For patients below 45 years, a strong positive correlation ($r = 0.7398$, $p < 0.001$) was observed between optimism (measured by LOT-R) and psychological well-being, indicating that higher optimism is strongly associated with greater well-being. Similarly, optimism showed a moderate negative correlation with depression ($r = 0.3960$, $p < 0.001$), and well-being inversely correlated with depression ($r = 0.4923$, $p < 0.001$), suggesting that both greater optimism and higher psychological well-being are linked to reduced depression levels. Among patients above 45 years, similar patterns emerged: optimism and well-being again showed a strong positive relationship ($r = 0.730$, $p < 0.001$), while both variables were moderately and negatively correlated with depression. These consistent patterns across age groups underline the significant role of psychological traits like optimism in enhancing well-being and buffering against depression in cancer contexts. The use of log-transformed p-values in visualizations effectively enhances interpretability, and the dual-axis representation of correlation strength and statistical significance adds valuable clarity. Overall, the interpretation adeptly integrates core psychological constructs, emphasizing their relevance to the emotional and mental health of cancer patients.

DISCUSSION

The present study demonstrates strong and consistent associations between optimism, psychological well-being (PWB), and depression in cancer patients across age groups. A strong positive correlation between optimism (LOT-R) and well-being highlights the importance of a positive outlook in improving mental health, coping, and quality of life. Moderate negative correlations between optimism and depression, and between well-being and depression, indicate their protective role against depressive symptoms. Patients with higher optimism and well-being are less likely to experience depression, which can otherwise impair treatment outcomes.

Similar patterns across younger (<45 years) and older (>45 years) patients suggest these relationships are universal in cancer care, though slightly stronger effects in younger patients may reflect differing psychosocial factors. The use of log-transformed p-values and dual-axis visualization strengthens the reliability and clarity of these findings. Overall, the results support integrating psychological interventions—such as cognitive-behavioral therapy, mindfulness, and positive psychology—into cancer care to enhance optimism, reduce depression, and improve patient outcomes.

CONCLUSION

This study provides compelling evidence of a strong, positive association between optimism and psychological well-being among cancer patients, irrespective of their age group. Optimism, characterized by a hopeful and positive outlook toward the future, appears to play a critical role in enhancing patients' overall mental health during the challenging journey of cancer diagnosis and treatment. Psychological well-being, encompassing factors such as life satisfaction, emotional balance, and a sense of purpose, is similarly linked with better mental health outcomes. The data also reveals a moderate, inverse relationship between both optimism and psychological well-being with depression, indicating that higher levels of these positive psychological constructs correspond to lower levels of depressive symptoms among cancer patients.

These findings underscore the vital importance of incorporating strategies that foster optimism and psychological well-being as core elements within comprehensive cancer care. Since depression is a common and debilitating comorbidity that can adversely affect treatment adherence, recovery rates, and quality of life, addressing it through psychosocial means is crucial. Importantly, the consistency of these relationships across both younger and older patients suggests that age does not diminish the beneficial impact of these psychological factors, making psychosocial interventions universally applicable across the cancer patient population.

In practical terms, this means that cancer care protocols should systematically integrate psychosocial support programs that specifically aim to cultivate optimism and enhance psychological well-being. Such interventions might include cognitive-behavioral therapy techniques, positive psychology exercises, mindfulness practices, or supportive counseling tailored to encourage positive future expectancies and resilience.

Looking forward, the study highlights the need for future research to examine these relationships over longer periods through longitudinal studies. This would help clarify the durability and trajectory of optimism and psychological well-being's effects on depression and quality of life throughout different phases of cancer treatment and survivorship. Additionally, intervention-based studies should be prioritized to evaluate the effectiveness of various psychosocial strategies in boosting optimism and psychological well-being, thereby providing evidence-based recommendations for

clinical practice. Expanding research in these areas will not only deepen scientific understanding but also enhance holistic sscaare models that prioritize mental health alongside physical treatment outcomes for cancer patients.

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