INSIGHTS-JOURNAL OF
HEALTH AND REHABILITATION

COMPARATIVE ANALYSIS OF PAIN-RELATED QUALITY OF LIFE IN PATIENTS WITH LYMPHOMA AND BREAST CANCER

Original Research

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Acknowledgement: The authors gratefully acknowledge the support of the participating hospitals and patients who contributed to this study.

Conflict of Interest: None Grant Support & Financial Support: None

ABSTRACT

Background: Cancer-related pain remains one of the most distressing and disabling symptoms experienced by patients, significantly compromising quality of life (QoL). It may arise from tumor progression, treatment-related effects, or long-term complications, affecting physical, psychological, and social well-being. Both breast cancer and lymphoma patients commonly report moderate to severe pain, yet the extent to which pain influences QoL may differ between these malignancies due to variations in disease characteristics, treatment modalities, and systemic involvement.

Objective: To compare the impact of pain on quality of life among patients with breast cancer and lymphoma, with particular emphasis on differences in pain severity and associated functional outcomes.

Methods: A comparative cross-sectional study was conducted in government hospitals of Lahore over a six-month period. A total of 62 patients were enrolled through purposive sampling, including 31 breast cancer and 31 lymphoma patients. Adult patients with stages I–III disease experiencing moderate to severe pain were included. Pain intensity was assessed using the Visual Analogue Scale (VAS), while quality of life was evaluated using the SF-36 questionnaire. Data were analyzed using IBM SPSS, with descriptive statistics and chi-square tests applied to determine associations between pain severity and QoL.

Results: The mean age was 55.3 years in lymphoma patients and 52.6 years in breast cancer patients. The mean VAS score was 6.39 ± 1.38 for lymphoma and 6.65 ± 1.54 for breast cancer patients, with an overall mean of 6.52 ± 1.46. Poor and below-average QoL was reported in 58.7% of lymphoma patients and 80.7% of breast cancer patients. A statistically significant association between pain severity and QoL was observed in lymphoma patients ($\chi^2 = 12.45$, $p = 0.048$), whereas no significant association was found in breast cancer patients ($\chi^2 = 9.83$, $p = 0.089$).

Conclusion: Pain demonstrated a differential impact on quality of life across cancer types, with a stronger and significant association observed in lymphoma patients. These findings underscore the need for tailored pain management strategies to improve patient-centered outcomes in oncology care.

Keywords: Breast Neoplasms; Lymphoma; Neoplasm Pain; Quality of Life; Surveys and Questionnaires; Visual Analog Scale

INTRODUCTION

Cancer remains a major global health burden, with more than 19 million new cases diagnosed annually, underscoring its profound medical and societal impact (1). Among the numerous complications associated with cancer, pain is one of the most prevalent and distressing symptoms, significantly impairing patients' quality of life (QoL). This pain may arise from tumor progression, treatment modalities such as chemotherapy, radiotherapy, and surgery, or long-term complications including lymphedema and neuropathy, particularly in breast cancer survivors (2). Importantly, pain is not always confined to the active phase of treatment; a substantial proportion of cancer survivors continue to experience persistent or chronic pain, with estimates suggesting that 20–50% endure moderate to severe pain that adversely affects their physical functioning, emotional well-being, and social interactions (3). The burden of pain varies across cancer types, influenced by disease characteristics and treatment-related factors. In lymphoma, patients often experience systemic manifestations such as fatigue, fever, weight loss, and night sweats, which, when combined with pain, further compromise overall well-being (4,15). Additionally, the heterogeneity of lymphoma, encompassing more than 80 subtypes with diverse biological and clinical profiles, adds complexity to symptom burden and patient experience (16). While epidemiological and clinical data provide insight into lymphoma progression and associated risk factors, there remains limited understanding of how pain specifically influences QoL in this population, particularly in comparison with other cancers (5).

In contrast, breast cancer—recognized as the most common malignancy among women globally—presents a distinct yet equally significant pain profile (8). Patients frequently report a combination of physical and psychological symptoms, including pain, fatigue, sleep disturbances, and emotional distress, all of which interact to shape overall QoL (6). Treatment-related factors such as surgery and chemotherapy contribute substantially to pain experiences, with nearly one in four women developing moderate-to-severe persistent post-surgical pain, and conditions such as post-mastectomy pain syndrome further exacerbating long-term discomfort (11,12). Moreover, the multifactorial etiology of breast cancer, involving genetic, environmental, and lifestyle influences, alongside challenges such as chemotherapy resistance and survivorship complications, highlights the complexity of managing both disease and symptom burden (7,10). Despite growing recognition of pain as a critical determinant of QoL in cancer care, comparative evaluations between different cancer populations remain limited. Existing literature has predominantly focused on single cancer types, leaving a gap in understanding whether and how the impact of pain differs between conditions such as lymphoma and breast cancer. Such comparative insights are essential for tailoring patient-centered pain management strategies and improving supportive care interventions across diverse oncological settings.

Therefore, this study seeks to investigate the differential impact of pain on quality of life among patients with lymphoma and breast cancer. It is hypothesized that there is a significant difference in how pain influences physical, emotional, and social domains of QoL between these two patient groups, challenging the null assumption of no difference. By identifying these variations, the study aims to contribute to more targeted and effective pain management approaches, ultimately enhancing the overall well-being and survivorship experience of cancer patients.

METHODS

A comparative cross-sectional study was conducted at tertiary care government hospitals in Lahore over a period of six months following formal approval of the research protocol. The study was designed to evaluate and compare the impact of pain on quality of life among patients diagnosed with breast cancer and lymphoma. A total sample size of 62 participants was determined using the Cochran sample size formula, comprising 31 patients with breast cancer and 31 with lymphoma. Participants were recruited through a non-probability purposive sampling technique, ensuring the inclusion of individuals who met predefined eligibility criteria and were accessible within the study setting. Eligible participants included adult patients (≥18 years) diagnosed with breast cancer or lymphoma in stages I–III who had been experiencing moderate to severe pain, defined as a score of ≥4 on a standardized pain scale, for a duration of at least one month. Patients undergoing active treatment, including chemotherapy or radiotherapy, as well as those in the recovery phase post-treatment, were included to capture a comprehensive spectrum of pain experiences. Only individuals who were cognitively capable of understanding and completing the assessment tools were enrolled. Exclusion criteria encompassed patients with pre-existing chronic pain disorders unrelated to cancer, such as fibromyalgia or primary neuropathic pain syndromes, as well as those with major psychiatric illnesses that could interfere with pain perception or self-reported outcomes. Additionally, pregnant or lactating women, patients receiving high-dose opioid analgesia, individuals in end-stage palliative care, and those with severe comorbid conditions such as advanced heart failure, end-stage renal disease, or prior stroke were excluded. Patients diagnosed with multiple concurrent malignancies other than breast cancer or lymphoma were also not considered for inclusion.

Data collection was carried out using validated and widely accepted instruments. Pain intensity was assessed using the Visual Analogue Scale (VAS), a reliable tool for quantifying subjective pain perception, while quality of life was measured using the Short Form-36 (SF-36) questionnaire, which evaluates multiple domains including physical functioning, emotional well-being, social functioning, and general health perception. Demographic and clinical data were also recorded through structured data collection forms to ensure completeness and consistency. Prior to participation, all patients were informed about the study objectives, procedures, potential risks, and benefits, and written informed consent was obtained in accordance with ethical research standards. The study protocol was reviewed and approved by the Institutional Review Board/Ethical Committee of the respective hospitals, ensuring adherence to the principles outlined in the Declaration of Helsinki. Confidentiality and anonymity of participant data were strictly maintained throughout the research process. Data analysis was performed using IBM SPSS Statistics software. Descriptive statistics, including means, standard deviations, frequencies, and percentages, were used to summarize demographic and clinical characteristics. For comparative analysis, appropriate inferential statistical tests such as the independent samples t-test or Mann–Whitney U test were applied to assess differences in pain scores and quality-of-life domains between the two groups. A p-value of less than 0.05 was considered statistically significant.

RESULTS

A total of 62 patients were included in the analysis, with equal representation from lymphoma (n=31) and breast cancer (n=31) groups. The mean age of patients with lymphoma was 55.3 years (range: 34–70), whereas patients with breast cancer had a slightly lower mean age of 52.6 years (range: 35–68), indicating a relatively comparable age distribution between the two groups. Pain intensity assessment using the Visual Analogue Scale (VAS) demonstrated that both groups experienced moderate to high levels of pain. The mean VAS score among lymphoma patients was 6.39 ± 1.38, while breast cancer patients reported a slightly higher mean score of 6.65 ± 1.54. The overall mean VAS score across all participants was 6.52 ± 1.46, reflecting a broadly similar burden of pain in both cohorts.

Evaluation of bodily pain-related quality of life revealed variability between the two groups. Among lymphoma patients, 16.1% were categorized as having poor health, 41.9% as below average, 29.0% as above average, and 12.9% as excellent. In contrast, breast cancer patients demonstrated a higher proportion in poorer categories, with 22.6% classified as poor and 58.1% as below average, while fewer patients reported above average (12.9%) and excellent (6.5%) health status. Overall, half of the study population (50.0%) fell into the below-average category, followed by 19.4% in poor, 21.0% in above-average, and 9.7% in excellent health categories. Among lymphoma patients, distribution across pain severity levels showed that individuals with mild pain (VAS ≤4) were more frequently associated with better quality-of-life categories, whereas those with moderate pain (VAS 5–7) were predominantly represented in poor and below-average QoL categories. Patients with severe pain (VAS ≥8) were distributed across all QoL categories, though a noticeable proportion remained in lower QoL groups. Statistical analysis using the Pearson Chi-square test yielded a value of 12.45 with 6 degrees of freedom and a p-value of 0.048, indicating a statistically significant association between pain severity and quality of life in lymphoma patients.

In the breast cancer group, patients with mild pain were more commonly associated with above-average and excellent QoL categories, whereas those with moderate and severe pain were more frequently observed in poor and below-average QoL groups. However, the Pearson Chi-square test produced a value of 9.83 with 6 degrees of freedom and a p-value of 0.089, suggesting that the association between pain severity and quality of life in breast cancer patients did not reach statistical significance at the 0.05 level.

Table 4.1: Age Distribution (Mean ± SD)

Group	N	Mean Age	Min	Max
Lymphoma	31	55.3	34	70
Breast Cancer	31	52.6	35	68

Table 4.2: Descriptive Statistics of Pain Intensity (VAS Score)

Group	N	Mean VAS Score	Std. Deviation
Lymphoma	31	6.39	1.38
Breast Cancer	31	6.65	1.54
Total	62	6.52	1.46

Table 4.3: Crosstab table

Bodily Pain Category	Lymphoma (n, %)	Breast Cancer (n, %)	Total (n, %)
Poor Health	5 (16.1%)	7 (22.6%)	12 (19.4%)
Below Average	13 (41.9%)	18 (58.1%)	31 (50.0%)

Above Average	9 (29.0%)	4 (12.9%)	13 (21.0%)
Excellent	4 (12.9%)	2 (6.5%)	6 (9.7%)
Total	31 (100%)	31 (100%)	62 (100%)

Table 4.4: Chi-Square Test for Lymphoma Patients

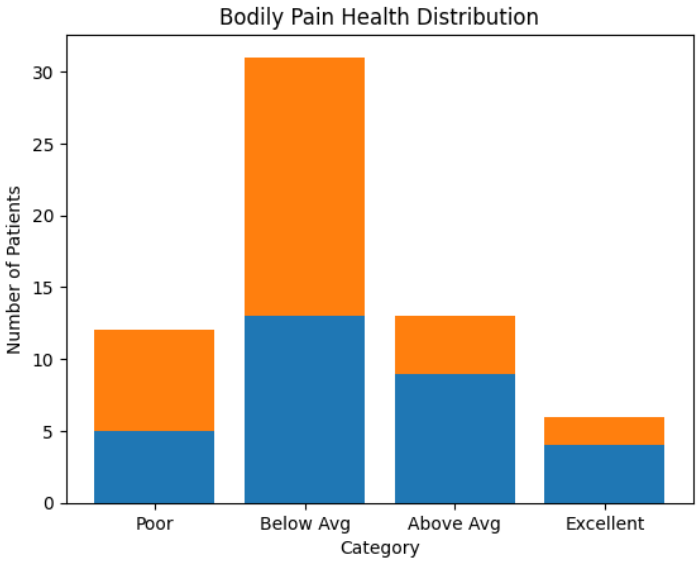
Pain Severity	Poor QoL	Below Average QoL	Above Average QoL	Excellent QoL	Total
Mild (VAS ≤ 4)	3	4	2	1	10
Moderate (VAS 5–7)	8	7	3	2	20
Severe (VAS ≥ 8)	3	3	4	1	11
Total	14	14	9	4	31

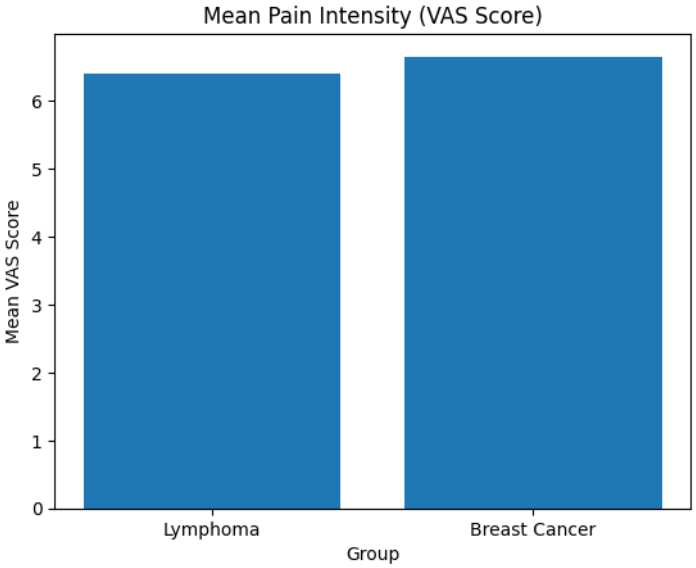
The Pearson Chi-Square test 12.45, 6 degrees of freedom, p-value of 0.048

Table 4.5: Chi-Square Test for Breast Cancer Patients

Pain Severity	Poor QoL	Below Average QoL	Above Average QoL	Excellent QoL	Total
Mild (VAS ≤ 4)	1	4	5	1	11
Moderate (VAS 5–7)	121`	8	4	1	25
Severe (VAS ≥ 8)	9	7	2	1	19
Total	11	10	15	5	31

The Pearson Chi-Square value 9.83, 6 degrees of freedom, p-value of 0.089





DISCUSSION

The present study examined the differential impact of pain on quality of life (QoL) among patients with lymphoma and breast cancer, demonstrating a statistically significant association between pain severity and QoL in lymphoma patients, whereas no such significant relationship was observed in breast cancer patients. These findings suggest that, although pain is prevalent in both conditions, its influence on overall well-being may be more pronounced and directly correlated with functional outcomes in lymphoma. This distinction highlights the importance of considering disease-specific factors when evaluating symptom burden and designing supportive care strategies. Pain is widely recognized as a multidimensional experience influenced by biological, psychological, and social factors. In the current analysis, both patient groups reported moderate to high pain intensity; however, breast cancer patients exhibited a higher proportion of poor and below-average bodily pain health. Despite this, the absence of a statistically significant association between pain and QoL in this group may reflect the role of structured survivorship care, including access to pain management protocols and psychosocial support systems. Previous research has indicated that breast cancer patients often benefit from well-established rehabilitation pathways and supportive interventions, which may buffer the overall impact of pain on daily functioning and emotional well-being (19).

In contrast, the significant association observed in lymphoma patients aligns with existing evidence emphasizing the systemic and multifactorial burden of hematological malignancies. Lymphoma is often accompanied by generalized symptoms such as fatigue, immunosuppression, and frequent hospitalizations, all of which may amplify the functional consequences of pain and contribute to a more pronounced decline in QoL (17,18). The variability in QoL outcomes among lymphoma patients further suggests that pain interacts with broader disease-related factors, leading to heterogeneous patient experiences. This interplay may explain why even moderate increases in pain intensity were associated with substantial reductions in quality of life within this group. The domain-specific findings indicated that physical functioning, role limitations, and vitality were notably affected in both cancer types, reinforcing the pervasive impact of pain on daily activities and energy levels. However, lymphoma patients demonstrated comparatively greater impairment in role-emotional functioning and general health perception, reflecting the compounded burden of systemic illness and symptom distress. Interestingly, emotional well-being appeared relatively preserved among some lymphoma patients, a finding that may be attributed to differences in disease trajectory, treatment expectations, or adaptive coping mechanisms. Evidence from prior studies suggests that certain lymphoma patients, particularly those achieving remission, may experience psychological recovery more rapidly than individuals with breast cancer, who often face prolonged treatment courses and persistent fear of recurrence (20).

Differences in treatment modalities may further account for the observed variations between the two groups. Breast cancer management frequently involves multimodal interventions, including surgery, chemotherapy, radiotherapy, and hormonal therapy, each associated with long-term physical and psychological sequelae (21). In contrast, lymphoma treatment protocols, although intensive, may allow for comparatively quicker recovery in certain QoL domains depending on disease subtype and treatment response. These distinctions underscore the need for individualized approaches to symptom management that account for both disease characteristics and treatment-related factors. The study possessed several strengths, including the use of validated assessment tools for both pain (VAS) and quality of life (SF-36), as well as the inclusion of two clinically distinct cancer populations for comparative analysis. This approach provided valuable insights into disease-specific patterns of symptom burden. However, certain limitations must be acknowledged. The relatively small sample size and use of non-probability purposive sampling may limit the generalizability of the findings and introduce selection bias. The cross-sectional design precluded assessment of temporal relationships or causal inferences between pain and QoL. Additionally, inconsistencies in reported data distributions and the absence of detailed analysis of individual QoL domains restricted the depth of interpretation. Potential confounding variables, such as stage-specific treatment differences, socioeconomic status, and psychological comorbidities, were not fully controlled and may have influenced the outcomes.

Future research should consider larger, multicenter longitudinal studies to better elucidate causal pathways and temporal changes in pain and quality of life. Incorporating comprehensive assessments of psychosocial factors, treatment regimens, and disease progression would provide a more holistic understanding of patient experiences. Furthermore, stratified analyses based on cancer stage, treatment phase, and demographic variables may help identify high-risk subgroups requiring targeted interventions. The integration of qualitative methodologies could also enrich the understanding of patient-reported experiences and coping mechanisms. Overall, the findings reinforce the clinical importance of pain as a determinant of quality of life, particularly in lymphoma patients, and highlight the necessity for tailored, multidisciplinary approaches to symptom management. Recognizing and addressing the nuanced differences between cancer types may contribute to more effective supportive care strategies and improved patient outcomes.

CONCLUSION

The findings of this study demonstrate that pain plays a critical role in shaping the quality of life among cancer patients, with a more pronounced and significant impact observed in individuals with lymphoma compared to those with breast cancer. While both groups experienced considerable pain, its influence on overall well-being, including physical, emotional, and functional domains, appeared more directly linked in lymphoma patients. These results highlight the importance of adopting disease-specific and patient-centered pain management strategies, emphasizing the need for comprehensive, multidisciplinary approaches to improve quality of life. By identifying variations in how pain affects different cancer populations, this study contributes to a more nuanced understanding of supportive care, reinforcing the necessity of targeted interventions to enhance patient outcomes and overall survivorship experience.

AUTHOR CONTRIBUTION

Author	**Contribution**
Hira Tariq	Conceptualization, Methodology, Formal Analysis, Writing - Original Draft, Validation, Supervision
Zohaib Shahid	Methodology, Investigation, Data Curation, Writing - Review & Editing
Sarah Ahmad	Investigation, Data Curation, Formal Analysis, Software
Huma Idrees	Software, Validation, Writing - Original Draft
Khadija Usman	Formal Analysis, Writing - Review & Editing
Umera Iftikhar	Writing - Review & Editing, Assistance with Data Curation
Samara Shaukat	Writing, Assistance with Data Curation

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