NAVIGATING LIFE BEYOND TREATMENT INTEGRATING CLINICAL CARE AND QUALITY OF LIFE IN TRIPLE-NEGATIVE BREAST CANCER PATIENTS

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ABSTRACT

Background: Prognosis and survival rates are dismal for triple-negative breast cancer (TNBC), one of the most aggressive kinds. The main therapies for TNBC include chemotherapy, surgery, and radiation, however, they may have long-term effects on clinical findings and QOL that need additional investigation.

Objective: Current research evaluates medicines' clinical outcomes and TNBC patients' physical, emotional, and well-being.

Methods: Tracking 100 TNBC patients two years after therapy. Clinic criteria were survival, recurrence, CPR, down staging, lymph node involvement, and metastasis. This study assessed the quality of life at baseline, 6 months, and 1 year after therapy using the SF 36 for physical and mental health, FSS, BDI-II, GAD-7, MOS-SSS, and WHOQOL-BREF. We assessed statistical significance using p-values ($p \leq 0.05$) and 95% confidence intervals.

Results: The clinical data showed 72.56±8.15% overall survival, 30.37±5.12% recurrence, and 18.19±3.44% metastasis. The reduction in tumor size was 2.83±0.53 cm, with 40.28% of patients obtaining CPR. Patients with pathological axillary lymph node metastases had 25.66 ± 4.15%. Patients who survived exhibited substantially higher physical and mental well-being scores (72.44±10.14 and 75.17±9.66) than those who had recurrence or metastasis. Patients without pathological remaining tumors had the highest mean QOL score (82.19±12.29) while those with metastases had the lowest (50.12±6.58).

Conclusion: Patients with TNBC receive therapy and quality-of-life measures. Critical issues and clinical outcomes, such as survival and recurrence rate, show that comprehensive treatment improves disease management and survivors' QOL. These findings underline the necessity for integrated TNBC therapy to improve prognosis and quality of life.

Keywords: Triple-Negative Quality of Life, Recurrence, Metastasis. Breast Cancer,

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INTRODUCTION

TNBC cancers do not respond to estrogen, progestogen, or HER2oidal receptor inhibition. Aggressive, relapse-prone breast cancer has a poor survival rate. TNBC, which makes up 15-20% of breast cancer, is clinically challenging due to its molecular variety and treatment-responsive heterogeneity.[1,2] Despite breakthroughs in neoadjuvant chemotherapy and immunotherapy, clinical outcomes are worse than for hormone-receptive breast cancer patients. The score following early therapy, including CPR, increases TNBC survival. TNBC five-year survival rates vary from 60 to 80%, depending on patient characteristics and medication success.[3,4] Although clinical aims have centered on survival and disease-free outcomes, holistic cancer care is increasingly emphasizing TNBC patients' QOL. TNBC therapy depletes survivors' mental and social health through physical and psychological stress.[5,6] Research shows that cancer drugs promote long-term fatigue, anxiety, and depression, reducing quality of life.[7] The links between clinical and therapeutic parameters and TNBC patients' QOL necessitate a comprehensive care model that encompasses survival rates and survivors' physical, psychological, and social well-being.[8]

This study will examine clinical consequences and QOL indicators to discover how cancer cure and survival interact and how TNBC impacts women's physical and mental wellbeing over time. This study supports coordinating clinical therapy with QOL metrics to enhance TNBC survivors' support networks. TNBC, uncommon, invasive breast cancer, lacking ER, PR, and HER2. In Despite breast cancer treatment improvements, TNBC has a poorer prognosis than hormone-receptor-positive tumors.[9] TNBC is triple-negative; thus, hormonal and HER2-targeted treatments fail. The major treatment is chemotherapy. Pre-surgery chemotherapy downstages cancers to enhance outcomes. Immune checkpoint inhibitor pembrolizumab may help TNBC patients survive.[10]

The absence of ER, PR, and HER2 receptors significantly restricts TNBC treatment. Hormones and HER2-targeted drugs fail. Surgery after or before treatment is common for TNBC. Immune checkpoint medications like pembrolizumab may help TNBC patients. TNBC's early relapse and distant metastases make survival and recurrences challenging.[9]

TNBC patients' QOL falls during and after treatment, especially in physical and psychological working ability, physical health, emotional state and psychological distress, social functioning, mental health, physical, and total QOL, becoming the worst among breast cancer patients. TNBC patients' physical and mental health has declined since pre-treatment, affecting them.[10,11]

METHODS

This descriptive cross-sectional survey was undertaken among subjects attending the Oncology Department of Islam Teaching Hospital. Consequently, the purpose of this study was to assess the extent to which clinical care and the QoL of 100 women diagnosed with TNBC are integrated following treatment. The idea was approved by the ethical committee of Islam Teaching Hospital through the institutional review board (IRB). All subjects provided written informed consent to participate in the present study. The study participants included 150 women with TNBC, who had at least one prior systemic treatment by chemotherapy, surgery, or radiotherapy. Inclusion criteria were: (1) patients aged between 18 and 65 years, (2) histologically proven TNBC, (3) no evidence of disease activity for at least six months since treatment, and (4) willingness to participate in the study. Patients with another histological type, active recurrence, or who cannot fill up the QoL questionnaires because of severe cognitive or physical impairment were excluded. Clinical Data: The patient clinical data were collected from the medical records such as tumor stage, treatment given like chemotherapy, surgery, and radiotherapy, co-morbid conditions, and the current status of medications. Other variables collected included the patients’ current age, marital status, occupation, educational level, and history of any cancer in their first-degree relatives. Quality of Life (QoL) Assessment: Quality of life was assessed by standardized instruments.

The following instruments were utilized: EORTC QLQ-C30: A core questionnaire of EORTC is the Global Health Status/Quality of Life questionnaire, the Functional Scales, Physical and Emotional, Role and Cognitive, and the Symptom Scales of Fatigue, Nausea, Pain, Insomnia, Appetite Loss, Diarrhea. Breast Cancer-Specific Module (EORTC QLQ-BR23): This module focuses on breast cancer-related QoL measures including bodily image, sexual function, arm problems, and symptoms related to systemic therapy. Hospital Anxiety and Depression Scale (HADS): This self-report 14-item scale was used to assess symptoms of anxiety and depression. Fatigue Severity Scale (FSS): Fatigue was measured using the fatigue subscale that contains 9 items designed to measure the overall severity of fatigue and the magnitude of its interference with daily living. Pittsburgh Sleep Quality Index (PSQI): To measure sleep quality over the last month, PSQI was adopted. Clinical Care Integration Assessment: The degree of clinical care coordination and engagement was established based on whether patients tapped into other related services such as counseling, nutrition, physiotherapy, and pain handling among others. Consequently, a structured survey was Used to obtain data concerning the perceived availability, utilization, and satisfaction levels of the patients with these services. To improve the credibility of the work, information was compared with archival sources in institutional files.

SPSS 26.0 examined data. Central sensitivity measures like mean and standard deviation were employed for quantitative variables such age, gender, disease duration, and health care consumption, whereas frequencies and percentages were utilized for nominal and ordinal data. Repeated measures analysis of variance (ANOVA) was used to quantify QOL between T0, T1, and T2. We utilized independent samples t-test to examine the significance between variables at T0 and T2.

RESULTS

Demographic and clinical characteristics of 100 TNBC patients who had their primary treatment were recorded: overall survival after 2 years, recurrence rate, pathological response, tumor size reduction, lymph node involvement, and metastasis incidence. The worldwide 2-year survival rate for TNBC patients was 72.56 +/- 8.15, which is high for such an aggressive cancer type. More over two thirds of patients survived the study, $p = 0.031$ with 95% confidence range of 68.56-76.11. TNBC patients have a greater risk of relapse, with a recurrence incidence of 30.37±5.12% (p=0.006). The confidence interval was 27.01% to 33.56%, thus approximately one-third of patients recurred within a year. In 40% (± 6.23) of patients, the therapy resulted in a full pathological response, indicating excellent tumor response.

CPR's sample size was 0.019 with 95% CI, 36.77 to 44.73, confirming a high rate of full remission. The mean tumor size reduction from baseline was 2.83 cm (±0.53), indicating significant tumor shrinking in patients after therapy. This change was significant (p = 0.011), with a treatment response CI of 2.69-3.01 cm. Most patients had residual lymph node disease, with 25.66% (±4.15) showing lymph node positive (p=0.015, 95% CI 23.09-27.55). Additionally, metastatic incidence was 18.19% (±3.44), with a significant p-value of 0.022 (CI: 16). It is much higher (04-20.77), perhaps because TNBC can spread to other organs.

Accepted metrics on physical and mental health, tiredness intensity, depression, anxiety, social functioning, and general quality of life determined quality of life. Table 2 shows pre-, 6-, and 12-month outcomes. After twelve months of therapy, SF-36 physical well-being ratings increased from 52.57 (±3.19) to 70.27 (±11.19) (p = 0.019). It seems that these women's physical health improved over time after having TNBC therapy and returned to better physical functioning scores and less physical limits. Mental health scores improved over time, with baseline SF-36 scores rising from 55.44SD 5.88 at pre-treatment to 71.33 SD 7.99 at 12 months, p=0.001.

After cancer treatment, adopting a lifestyle reduces anxiety and improves mental health. Receptor cancer patients had decreased tiredness levels on the FSS at year 1 post-radiotherapy, with a lower level of 3.97 (±0.94) compared to baseline of 5.53 (±1.06), p=0.036. BDI-II depression scores decreased from 25.77 (±4.65) to 16.41 (±4.16; p= 0.019) after 12 months. After 12 months, patients' anxiety decreased considerably from 14.11 (± 3.02) to 7.14 (± 2.09) as they adjusted to life without the therapy (p = 0.023). The MOS-SSS revealed improved social functioning, with a mean score of 68.55 (±3.19) at enrollment and 80.56 (+/-12.17) at 12 months (p= 0.014), indicating increased support and interaction among patients. After 12 months of follow-up, the WHOQOL-BREF score increased considerably from 60.44 (±7.63) to 74.55 (±14.19), p = 0.033, indicating improved physical, psychological, social, and overall health perceptions of patients.

Table 3 shows the association between clinical characteristics and QOL ratings for recurrence, survival, full pathological response, and metastasis. Patients who survived had better physical and mental well-being scores (72.44 (±10.14) and 75.17 (±9.66)) compared to 55.09 (±12.33) and 60.14 (±10.21) for those who suffered recurrence (n=30). A survival study of total QOL revealed that survivors had a higher overall QOL (76.56 ± 8.79) than recurrence patients (61.44 ± 9.48). CPR achievers (n=40) had higher physical (80.36±14.56) and mental (78.23±9.49) well-being scores than non-achievers. Patients who underwent CPR had reduced reoccurrence rates (10.56 ± 7.85%) and greater overall quality of life (82.19 ± 12.29). Patients with metastases (n=18) had the lowest PtWB (45.15±8.48), PtMB (50.23±4.77), and TQOL (50.12±6.58), indicating a significant impact on QOL.

Table 1: Clinical Outcomes in Triple-Negative Breast Cancer Patients

Clinical Parameter	TNBC Patient Group (n=100)		
	Mean±SD Value	**p≤0.05**	**95% (CI)**
2-Year Survival Rate %	72.56±8.15	0.031	68.56-76.11
Recurrence Rate (%)	30.37±5.12	0.006	27.01-33.56
Complete Pathological Response (CPR) (%)	40.28±6.23	0.019	36.77-44.73
Average Tumor Size Reduction (cm)	2.83±0.53	0.011	2.69-3.01
Lymph Node Involvement (%)	25.66±4.15	0.015	23.09-27.55
Metastasis Incidence (%)	18.19±3.44	0.022	16.04-20.77

Table 2: Quality of Life (QOL) Scores in Triple-Negative Breast Cancer Patients

QOL Dimension	Assessment Scale	Mean ±SD (n=100)	Baseline (Pre-Treatment)	6-Month post-treatment	12-Month post-treatment	P≤0.05
Physical Well-Being	SF-36 (0-100 scale)	65.06±8.32	52.57±3.19	63.19±7.89	70.27±11.19	0.019
Mental Well-Being	SF-36 (0-100 scale)	68.11±10.44	55.44±5.88	66.13±9.88	71.33±7.99	0.001
Fatigue Level	FSS (1-7 scale)	4.37±1.29	5.53±1.06	4.84±0.89	3.97±0.94	0.036
Depression	BDI-II (0-63 scale)	18.29±5.11	25.77±4.65	20.38±3.16	16.41±4.16	0.019
Anxiety	GAD-7 (0-21 scale)	9.33±3.06	14.11±3.02	10.49±2.71	7.14±2.09	0.023
Social Functioning	MOS-SSS (0-100 scale)	75.17±12.57	68.55±3.19	74.43±5.19	80.56±12.17	0.014
Overall Quality of Life	WHOQOL-BREF (0-100)	70.29±9.44	60.44±7.63	68.16±9.48	74.55±14.19	0.033

Table 3: Clinical Outcomes and Quality of Life in TNBC Patients

Clinical Outcome	Physical Well	Mental Well	Recurrence Rate (%)	Overall QOL Score
Survived (n=72)	72.44±10.14	75.17±9.66	12.33±4.77%	76.56±8.79
Recurrence (n=30)	55.09±12.33	60.14±10.21	30.29±6.99%	61.44±9.48
Complete Pathological Response (n=40)	80.36±14.56	78.23±9.49	10.56±7.85%	82.19±12.29
Metastasis (n=18)	45.15±8.48	50.23±4.77	18.48±6.55%	50.12±6.58

Figure 1: Clinical Outcomes in Triple-Negative Breast Cancer Patients

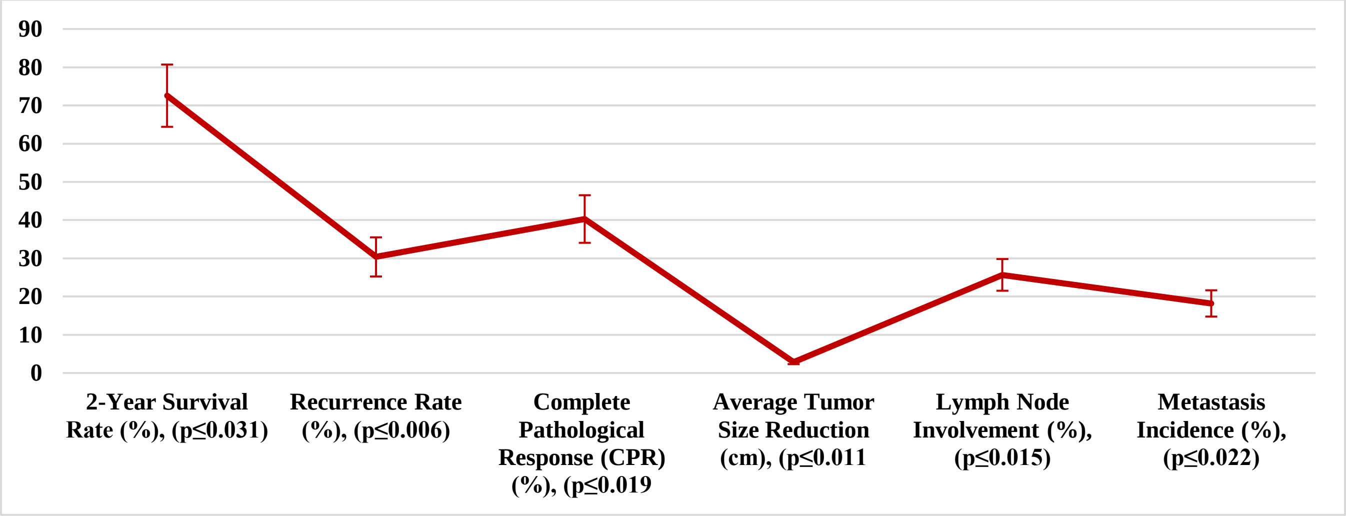
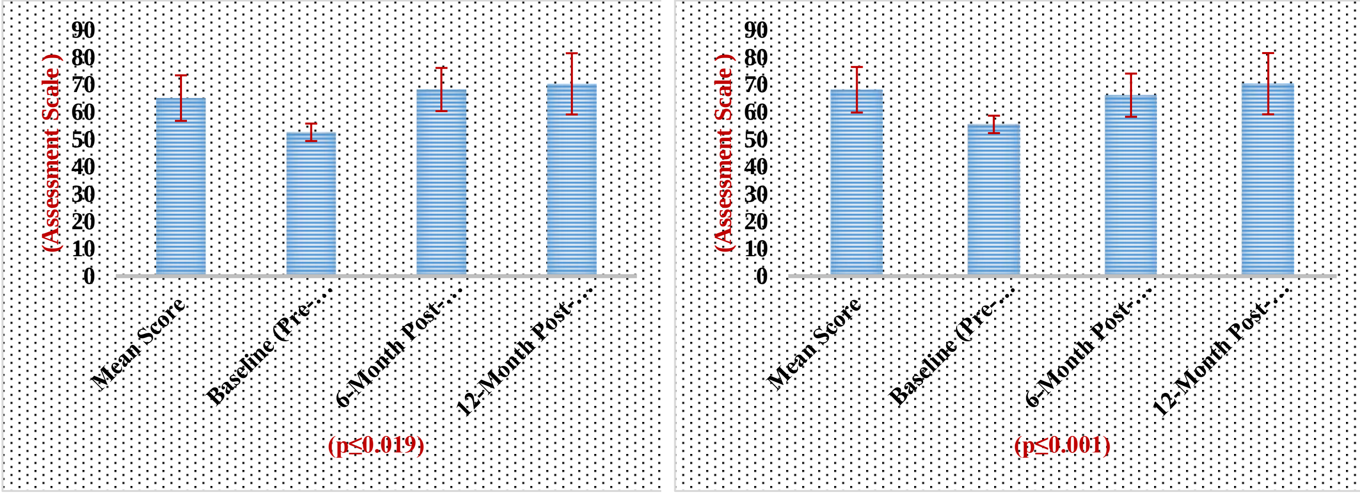
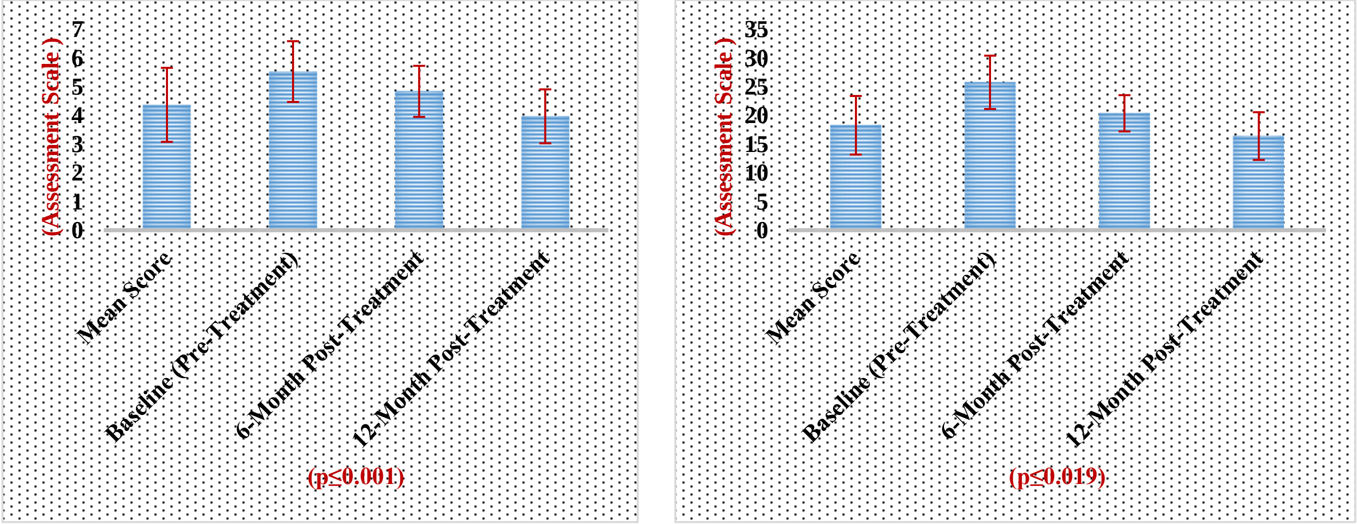


Figure 2: Quality of Life (QOL) Scores in Triple-Negative Breast Cancer Patient



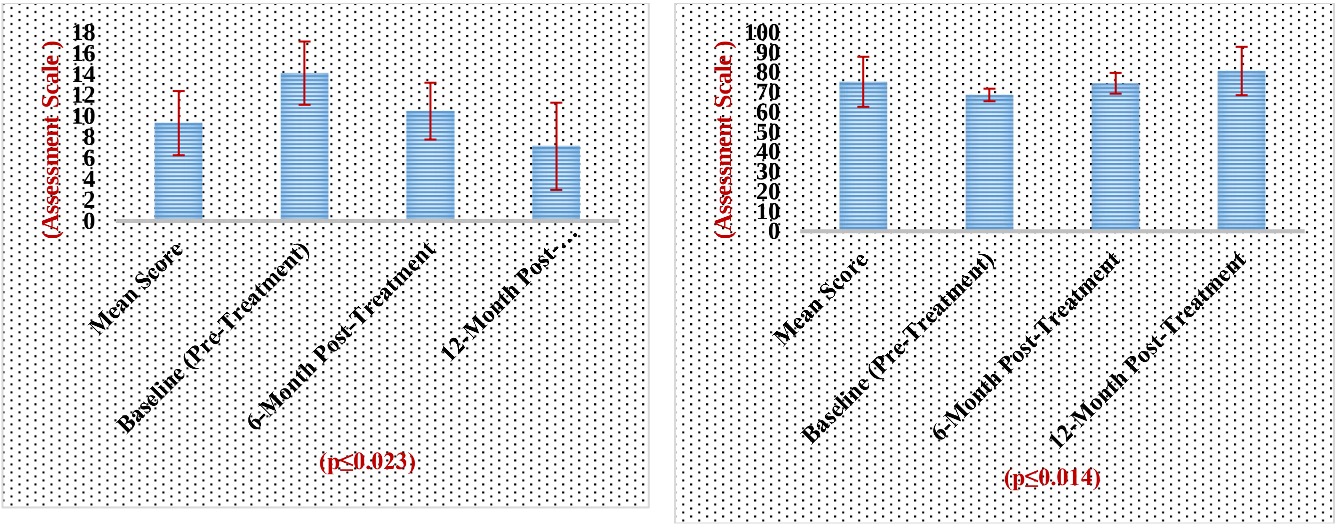
a: QOL Dimension- Physical Well-Being- (SF-36 (0-100 scale)

b: QOL Dimension- Mental Well-Being- SF-36 (0-100 scale)



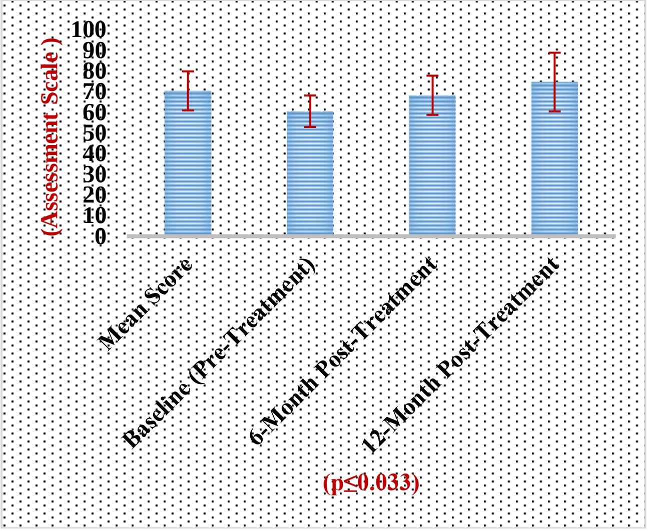
c: QOL Dimension- Fatigue Level- FSS (1-7 scale)

d: QOL Dimension- Depression- BDI-II (0-63 scale)



e: QOL Dimension- Anxiety- GAD-7 (0-21 scale)

f: QOL Dimension- Social Functioning- MOS-SSS (0-100 scale)



g: QOL Dimension- Overall Quality of Life- WHOQOL-BREF (0-100 scale)

DISCUSSION

Clinical treatments and QOL data of triple-negative breast cancer (TNBC) patients provide a unique opportunity to study therapeutic response, survival, and health-related quality of life.[12] TNBC, an invasive breast cancer lacking estrogen, progesterone, or HER2 receptors, has fewer treatments and worse results.[2] Recently, therapeutic responses and clinical features have shed light on TNBC patients' prognosis and quality of life following treatment. Our sample had a 2-year survival of 72.56%; TNBC patients' 5-year survival varied from 60% to 80%, depending on stage and therapy. Due of its aggressiveness and difficulty maintaining remission, [1,13] TNBC exhibited high recurrence rates (30,37% in this study).

This study found 18.19% metastasis in TNBC patients. TNBC is aggressive and spreads to vital organs, especially the brain.[14-16] TNBC patients have a higher risk of distant metastases and a worse prognosis.[4,15] New immunotherapies, notably immune-checkpoint inhibitors, may treat metastatic TNBC, although outcomes are questionable.[16,17] Quality of life matters even with TNBC, which has poor clinical responses to treatment. Thus, our cohort's SF-36 scale demonstrated substantial physical and mental health gains one year after therapy, which is promising. Site-specific global life quality Physical well-being changed from 52.57 pre-treatment to 70.27 one-year post-treatment, demonstrating sustained recovery from rigorous chemotherapy and surgery. Mental well-being grew from 55.44 in 1999/2000 to 71.33 in 2011/2012.

This recovery tendency matches previous research that indicated TNBC survivors had considerably better QOL following post-acute treatment but severe long-term physical and psychological problems. Five TNBC survivors experienced weariness, despair, and anxiety during and after advanced therapy.[18] Some participants' FSS-measured weariness was higher than baseline but improved with time. This is consistent with studies that cancer-related fatigue impairs health and performance years after treatment.[7,19] Evidence suggests that TNBC impairs mental health, yet treatment reduced sadness and anxiety. This study advises targeting TNBC's long-term psychological consequences with survival care and psychological therapy. As their physical and mental health improves, patients gain social roles, as the MOS-SSS scale for social functioning rose from 68.55 to 80.56 one year following treatment.

Consider how cancer treatment affects a patient's ability to maintain social interactions and support networks. Triple-negative breast cancer (TNBC) patients have complex biological processes that impact therapeutic response, survival, and QOL.[20] The 2-year survival rate for early-stage TNBC patients is 72.56 percent, however other researches have observed 60–80% survival depending on cancer severity and chemotherapy and targeted therapies.[21] Because TNBC lacks estrogen/progesterone and HER2 receptors, hormonal/HER2-targeted therapies are unsuccessful, and the illness has a 30.37 % recurrence rate. The literature's CPR rate of 40.28% shows that NAC may help some patients, but 60% may have residual sickness and a significant risk of recurrence and metastasis.[22] This study decreased tumor size (mean 2.83 cm) and lymph node involvement (25.66%), improving TNBC survival. The 18.19% metastatic rate implies distant disease progression is challenging and leads to prognosis failure.

SUMMARY OF THE FINDINGS

These results affirm the hypotheses that TNBC patients who could live past their 12-month clinical neighborhood post-treatment exhibited improved physical and emotional health, as well as less fatigue, depression, and anxiety. The multivariate analysis showed statistical significance between complete pathological response and better QOL score, and between recurrence/meets and worse physical, mental, and overall QOL.

CONCLUSION

This study illuminates qualitative TNBC issues that patients face throughout therapy and after cancer diagnosis. Chemotherapy and surgery have improved TNBC recovery rates, but full pathological responses and metastatic disease-free longevity remain low. While physical and mental disorders improve following therapy, weariness, sadness, and anxiety indicate that psychosocial care should be essential.

FUTURE ASPECTS

Moving forward, research should focus on several key areas to improve clinical and QOL outcomes in TNBC patients like development of targeted therapies, biomarker identification for early recurrence, integrative psychosocial care and personalized treatment plans.

ETHICAL CONSIDERATIONS

The study met Helsinki Declaration standards. The Islam Teaching Hospital, Sialkot, Pakistan institutional review board approved (IRB/ITH/BR/2024/067). After understanding the study's goal, procedure, risks, and benefits, participants signed a permission form. The research kept participants' information secret, and they may withdraw at any time without affecting their treatment or care.

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CONFLICT OF INTEREST

The authors also declare they have no conflict of interest regarding the content or a perspective/angle/right of the investigations in this article.

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DATA AVAILABILITY STATEMENT

All qualitative results of the study are reported in the article and/or supplementary material; to obtain any additional information please contact the Corresponding Author.

ETHICAL APPROVAL

Ethical approval was granted by the Institutional Review Board of the University of Lahore vide reference No. IRB: SPRM/UOL/D10/0103 dated: 10/06/20222

AUTHOR’S CONTRIBUTIONS

HZ: Concept and Data Collection
JS: Read and prove manuscript for publication
GZ: Write up, Data Collection, proofreading and final editing manuscript
HS: Final Editing Manuscript
ARR: Read and prove manuscript for publication
AM: Study design, analysis and acquisition
ALL AUTHORS: Approval of the final version of the manuscript to be published

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