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Correlation between Fatigue Severity and Physical Performance among Breast Cancer Patients Receiving Palliative Physiotherapy

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ABSTRACT

Background- : Cancer-related fatigue (CRF) is one of the most prevalent and distressing symptoms experienced by patients undergoing cancer treatment, particularly those in palliative care. Globally, up to 80–90% of advanced cancer patients report significant fatigue, with profound effects on their functional capacity, mobility, and independence. Nationally, India faces a growing cancer burden with limited access to specialized palliative rehabilitation services, compounding the effects of fatigue on daily living.

Objectives -1.To assess fatigue severity using a validated fatigue scale.2.To assess physical performance using functional mobility and endurance tests.3.To analyze the correlation between fatigue and physical performance scores.

Method- In pre–post interventional (quasi-experimental) studyTotal 100 Subjects undergone surgery for breast cancer & now on chemotherapy was recruited. All received palliative physiotherapy intervention for 6 weeks.

Result -30 second sit to stand & the cancer fatigue scores has negative correlation (r = –0.11) which was statistically not significant (p = 0.6751)

Conclusion – Palliative physiotherapy significantly improved functional performance and reduced multidimensional cancer-related fatigue in breast cancer patients receiving palliative care. However, it was not significant correlation was observed between fatigue scores and functional performance, suggesting distinct underlying mechanisms.

KEYWORDS: Ca-Breast, Palliative Physiotherapy, Fatigue..

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INTRODUCTION

Breast Cancer is a major public health concern and remains one of the leading causes of morbidity and mortality globally. According to recent estimates, cancer incidence continues to rise worldwide due to population growth, aging, and lifestyle-related risk factors. Beyond the life-threatening nature of malignancy, patients also face a spectrum of distressing symptoms that compromise daily life, functional independence, and psychosocial well-being [1].

Among these, cancer-related fatigue (CRF) is one of the most common and debilitating symptoms experienced by individuals across all stages of the disease trajectory.The National Comprehensive Cancer Network (NCCN, 2021) defines CRF as “a distressing, persistent, subjective sense of physical, emotional, and cognitive tiredness or exhaustion related to cancer or cancer treatment that is not proportional to recent activity and interferes with usual functioning [2].”Unlike ordinary fatigue, which resolves with rest, CRF is persistent, poorly relieved by sleep, and often worsens with disease progression. This makes it a particularly challenging symptom to address in clinical care [3]. Studies report that CRF affects up to 80–90% of patients undergoing active treatments such as chemotherapy and radiotherapy and persists in over 70% of patients with advanced or terminal cancer [4].The etiology of CRF is multifactorial and complex. Biological contributors include pro-inflammatory cytokine release, neuroendocrine alterations, circadian rhythm disruption, and mitochondrial dysfunction [5]. Metabolic derangements, anemia, malnutrition, and cachexia further exacerbate energy depletion. In advanced cancer, physical inactivity and prolonged bed rest result in muscle wasting and deconditioning, perpetuating a vicious cycle of fatigue and reduced function [6]. Psychological factors such as anxiety, depression, and sleep disturbances also amplify fatigue severity [7]. This intricate interplay of biological and psychosocial factors underscores why CRF is considered one of the most multidimensional and burdensome symptoms in oncology.

This relationship becomes particularly significant in the palliative care setting, where the goals of care shift from cure to comfort, functional preservation, and quality of life. Palliative care emphasizes a holistic approach to symptom management, addressing

physical, emotional, and social dimensions of suffering. Within this framework, palliative physiotherapy has emerged as a crucial component. Unlike curative rehabilitation, which focuses on restoring lost function, palliative physiotherapy aims to maintain existing abilities, reduce distressing symptoms, and maximize participation in meaningful activities [8].

Evidence supports the value of physiotherapy interventions in alleviating fatigue and improving physical function even in advanced stages of cancer. A conducted a randomized controlled trial in patients with advanced disease and found that structured exercise led to reductions in CRF and measurable improvements in walking distance and muscular strength [9]. Similarly, a study reported that physiotherapy interventions, including aerobic and resistance exercises, significantly improved fatigue and overall quality of life in patients with advanced cancer [10]. Also, Oldervoll et al. (2006) further reinforced these findings, concluding that exercise-based physiotherapy programs are safe, feasible, and effective in palliative care [11]. Also, a study found that physiotherapy in palliative care settings reduced patient dependency, with significant improvements in the Barthel Index and walking ability [12].

Despite the availability of effective interventions, CRF often remains under-recognized and undertreated. Clinicians and caregivers may focus predominantly on pain and other somatic symptoms, overlooking fatigue as a major determinant of well-being (Stone et al., 2022).

Establishing this relationship provides both a clinical rationale and an evidence base for incorporating physiotherapy into multidisciplinary care models. By tailoring physiotherapy interventions to patients' fatigue severity and functional limitations, clinicians can improve mobility, autonomy, and quality of life during the palliative phase of care. Thus, understanding the correlation between fatigue severity and physical performance in cancer patients is essential for optimizing palliative care and enhancing patient-centered outcomes in advanced cancer.

METHODOLOGY

Present study aims at finding the relation between fatigue severity and physical performance in cancer patients receiving palliative care. This study was carried out in KH, MRC within Oct 2023 to July 2024, with 100 breast cancer patients selected who were receiving physiotherapy care in palliative setting.Participants aged 30–75 years, cognitively intact and medically stable, were included.

Inform consent was taken from the subjects before beginning the research study. Basic demographic information was obtained through data collection sheet. Further the subjects were given physiotherapy palliative care programme. Pre and post results were determined according to the cancer related fatigue scale and sit to stand test (30 second version) for lower limb strength. Data were entered in Microsoft Excel 2019 and analyzed using SPSS version 23. Continuous variables were expressed in mean and standard deviation (SD) whereas; categorical variables were shown in percentage and frequency. Continuous variables between groups were compared using a Paired't' test within group and Chi Square test as Required.

Ethical approval and participant consent

The ethical approvalfor undertaking the proposed study has been obtained from the Institutional Ethics Committee of Krishna Vishwa Vidyapeeth(Deemed to be University),Karad, Maharashtra.

Outcome measure

Cancer related Fatigue Scale

Sit to stand test (30 second version) for lower limb strength.

RESULTS

Age wise distribution of study population

Table 1. Age wise distribution of study population

Age (years)	Frequency (n)	Percentage (%)
31-40	26	26
41-50	31	31
51-60	28	28
61-70	15	15
Total	100	100

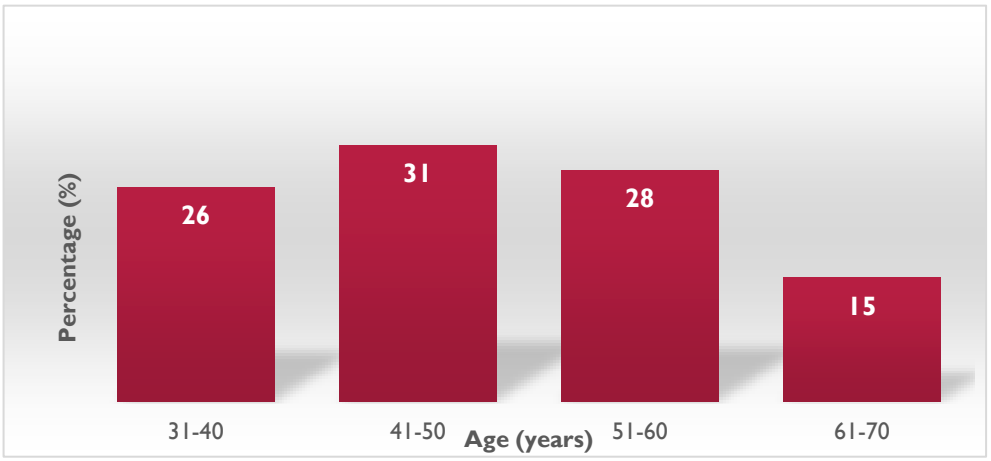

Figure 1. Age wise distribution of study population

The mean age of the study participants was 49.28±10.30 years. The highest proportion of participants (31%) belonged to the 41–50 years age group, followed closely by the 51–60 years group, which comprised 28% of the sample. The 31–40 years age group accounted for 26% of participants, while the remaining 15% were in the 61–70 years category (Table 1 and Figure 1).

Education status wise distributionof study population

Table 2. Education status wise distributionof study population

Education status	Frequency (n)	Percentage (%)
Illiterate	14	14
Primary	26	26
Secondary	16	16
Intermediate	26	26
Graduate	18	18
Total	100	100

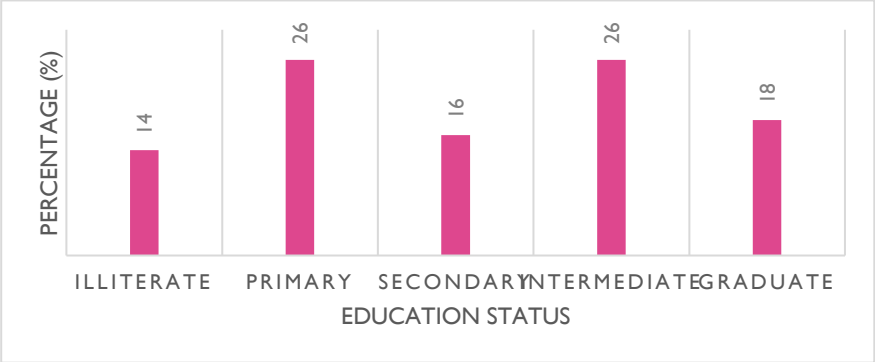

Figure2. Education status wise distributionof study population

Among the 100 breast cancer survivors included in the study, the largest proportions (26% each) had attained education up to the primary and intermediate levels. A smaller percentage of participants were graduates (18%) and those with secondary-level education (16%). Notably, 14% of the participants were illiterate (Table 2 and Figure 2).

30 seconds sit and stand test score

Table 3. Comparison of 30seconds sit and stand test score before and after intervention

Statistics	30 seconds sit and stand test score	
	Pre-intervention	Post intervention
Mean	5.43	8.68
SD	0.68	1.07
t-value	25.635	
df	198	
p-value	<0.0001	

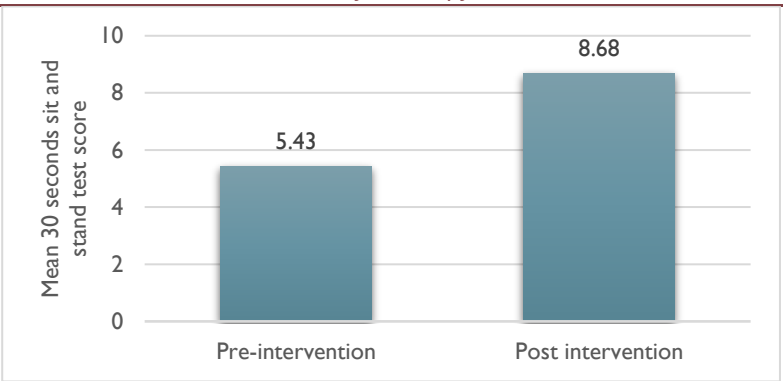

Figure 3. Comparison of 30seconds sit and stand test score before and after intervention

The table 3 and figure 3 presents the mean scores and standard deviations (SD) of the 30-second sit and stand test among breast cancer survivors before and after the palliative physiotherapy intervention. The pre-intervention mean score was 5.43 (SD = 0.68), which significantly increased to 8.68 (SD = 1.07) post-intervention. There is significant change in Pre and Post mean. ($t = 25.635$, degrees of freedom [df] = 198, $p < 0.0001$).

The Cancer related fatigue scale

Table 4. Cancer fatigue scale domain score

Cancer fatigue scale	Questions	Score (mean±SD)	
		Pre-intervention	Post intervention
Factor 1: Physical subclass	Do you become tired easily?	3.99±0.83	1.59±0.49
	Do you have the urge to lie down?	4.03±0.79	2.71±1.44
	Do you feel exhausted?	2.73±1.38	2.65±1.38
	Does your body felt heavy and tired?	2.82±1.38	2.73±1.59
	Do you feel fed-up?	3.94±0.87	1.62±0.48
	Do you feel reluctant?	4.04±0.85	1.59±0.49
	Do you feel such fatigue that you don't know what to do with yourself?	4.00±0.80	1.53±0.50
Factor 2: Affective subscale	Do you feel energetic?	1.55±0.59	2.3±0.57
	Do you feel interest in anything?	1.68±0.66	2.27±0.67
	Can you concentrate on certain things?	1.73±0.69	2.43±0.51
	Can you encourage yourself to do anything?	1.52±0.57	2.45±0.53
Factor 3: Cognitive subscale	Do you feel you have become careless?	3.39±0.76	1.86±0.79
	Do you feel that you more often make errors while speaking?	3.75±0.67	1.79±0.79
	Do you feel you have become forgetful?	3.9±0.75	1.99±0.82
	Do you feel that your thinking has become slower?	3.81±0.70	1.85±0.78

In the physical subscale, notable improvements were observed across multiple items. Participants reported becoming tired less easily (3.99 ± 0.83 to 1.59 ± 0.49) and experiencing a reduced urge to lie down (4.03 ± 0.79 to 2.71 ± 1.44). Feelings of being "fed up" and reluctance to engage in activities also decreased substantially (3.94 ± 0.87 to 1.62 ± 0.48, and 4.04 ± 0.85 to 1.59 ± 0.49, respectively). Moreover, extreme fatigue where individuals felt uncertain about what to do with themselves improved markedly (4.00 ± 0.80 to 1.53 ± 0.50). However, items related to exhaustion (2.73 ± 1.38 to 2.65 ± 1.38) and heaviness/tiredness of the body (2.82 ± 1.38 to 2.73 ± 1.59) showed only minimal improvement, suggesting these may be more persistent symptoms.The affective subscale revealed a positive trend toward improved emotional well-being. Patients reported higher energy levels post-intervention (1.55 ± 0.59 to 2.30 ± 0.57) and greater interest in activities (1.68 ± 0.66 to 2.27 ± 0.67). Concentration and self-motivation also improved significantly, with mean scores increasing from 1.73 ± 0.69 to 2.43 ± 0.51, and from 1.52 ± 0.57 to 2.45 ± 0.53, respectively. These findings indicate that the intervention not only reduced physical fatigue but also enhanced participants' psychological resilience. In the cognitive subscale, clear improvements were observed in aspects of mental clarity and cognitive functioning. The frequency of carelessness decreased (3.39 ± 0.76 to 1.86 ± 0.79), and participants reported fewer speech errors (3.75 ± 0.67 to 1.79 ± 0.79). Forgetfulness was also reduced (3.90 ± 0.75 to 1.99 ± 0.82), along with a decrease in the perception of slower thinking (3.81 ± 0.70 to 1.85 ± 0.78) (Table 4).

Comparison of factor wise total cancer related fatigue scale score

Table 5. Comparison of factor wise total cancer related fatigue scale score

Cancer related fatigue scale	Score (mean±SD)		t-value	Df	p-value
	Pre-intervention	Post intervention			

Factor 1: Physical subclass	20.98±1.97	3.76±1.58	-68.19	198	<0.0001
Factor 2: Affective subscale	13.17±1.33	10.12±1.04	-13.69	198	<0.0001
Factor 3: Cognitive subscale	11.4±1.47	3.53±1.55	-36.841	198	<0.0001
Total score	46.09±2.88	17.41±2.37	-76.90	198	<0.0001

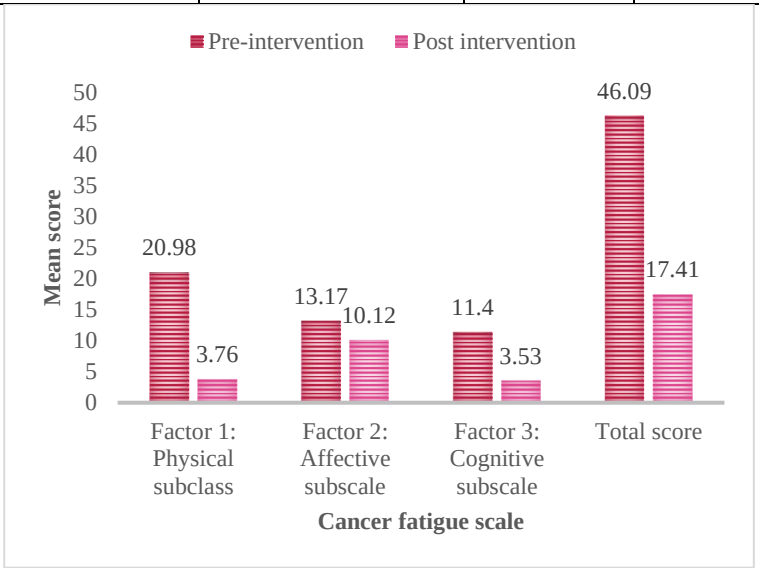

Figure 5. Comparison of factor wise total cancer related fatigue scale score

For the physical subscale, the mean score decreased markedly from 20.98 ± 1.97 at baseline to 3.76 ± 1.58 post-intervention. This large reduction was highly significant (t = -68.19, df = 198, p < 0.0001), suggesting a substantial alleviation of physical fatigue symptoms.In the affective subscale, scores also improved significantly, reducing from 13.17 ± 1.33 pre-intervention to 10.12 ± 1.04 post-intervention (t = -13.69, df = 198, p < 0.0001). This reflects enhanced emotional well-being, including improvements in energy levels, motivation, and interest in activities.The cognitive subscale demonstrated a notable improvement, with scores declining from 11.40 ± 1.47 to 3.53 ± 1.55. The change was statistically significant (t = -36.841, df = 198, p < 0.0001), indicating that participants experienced enhanced concentration, memory, and mental clarity following the intervention.The total fatigue score showed the most profound reduction, dropping from 46.09 ± 2.88 to 17.41 ± 2.37 (t = -76.90, df = 198, p < 0.0001). This highly significant improvement underscores the overall effectiveness of the intervention in reducing cancer-related fatigue across physical, affective, and cognitive domains (Table 5 and Figure 5).

Correlation between fatigue scale and 30 sec sit to stand test scores

The correlation between fatigue scale scores and 30-second sit-to-stand test performance was slightly stronger but still weak (r = –0.11), and the relationship was not statistically significant (p = 0.2723) (Table 6).

Table 6. Correlation between fatigue scale and 30 sec sit to stand test scores

Correlation variables	Correlation coefficient (r)	p-value
Fatigue scale and 30 sec sit to stand test	-0.11	0.2723

DISCUSSION

The present study evaluated the effects of palliative physiotherapy on functional performance and cancer-related fatigue among breast cancer survivors. The results demonstrated significant improvements in both domains, confirming the effectiveness of structured physiotherapy programs in enhancing physical and psychological outcomes in this population.

The mean age of the participants was 49.28 years, with the majority falling between 41 and 60 years. This distribution is consistent with epidemiological data showing breast cancer incidence peaking in middle-aged and older women. A considerable proportion of participants had low educational status, including 14% who were illiterate, suggesting that rehabilitation programs for this group must emphasize simple, practical instructions to ensure adherence and effectiveness.

Functional outcomes, assessed using the 30-second sit-to-stand test, showed a marked improvement from 5.43 pre-intervention to 8.68 post-intervention (p< 0.0001). This reflects enhanced lower limb strength, endurance, and mobility, which are often compromised in breast cancer survivors due to treatment-related fatigue and deconditioning. These findings are in line with earlier reports by Cheville et al. and Winters-Stone et al., who demonstrated that targeted physiotherapy and exercise interventions improve muscle strength, functional independence, and reduce fall risk in this group. Clinically, improved sit-to-stand performance is significant as it directly correlates with the ability to carry out daily activities and maintain independence.

Equally important, cancer-related fatigue decreased significantly across physical, affective, and cognitive domains. The physical fatigue score reduced substantially from 20.98 to 3.76, while affective and cognitive fatigue scores also declined notably, contributing to a drop in total fatigue score from 46.09 to 17.41 ($p< 0.0001$). These results suggest that physiotherapy not only addresses physical deconditioning but also improves motivation, concentration, and emotional well-being. Similar trends have been reported in previous studies, where structured exercise was identified as one of the most effective interventions for alleviating cancer-related fatigue.

Interestingly, no significant correlation was observed between fatigue scores and sit-to-stand performance ($r = –0.11$, $p = 0.27$). This indicates that although both domains improved, they may be influenced by different physiological and psychological mechanisms. While functional gains are likely mediated by enhanced muscular strength and endurance, fatigue reduction may involve broader adaptations such as improved circulation, neuroendocrine regulation, and psychological resilience. These findings are consistent with the multifactorial nature of cancer-related fatigue described in the literature.

The results of this study highlight the importance of integrating physiotherapy into routine survivorship and palliative care programs. By addressing both physical and psychological dimensions, physiotherapy contributes to improved quality of life, independence, and overall well-being in breast cancer survivors. However, the study is limited by the absence of a control group and short-term follow-up, which restrict the ability to generalize findings and evaluate long-term effects. Future research should employ randomized controlled designs with extended follow-up to confirm sustainability of benefits and explore mechanisms underlying the observed improvements.

In conclusion, palliative physiotherapy significantly improved functional performance and reduced multidimensional fatigue in breast cancer survivors.

CONCLUSION

This study found that a structured palliative physiotherapy program significantly improved functional performance and reduced multidimensional fatigue in breast cancer patients receiving palliative care. However, weak negative correlation was observed between fatigue reduction and functional gains, suggesting different underlying mechanisms. Physiotherapy should be integrated into palliative care to enhance function, reduce fatigue, and improve quality of life. Further controlled studies with longer follow-up are recommended.

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Conflicts of Interest

We claim that there are no conflicts of interest in the content of this study.

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