



# Effect of Multimodal Intervention on Cancer-Related Fatigue and Quality of Life among Patients Undergoing Cancer Treatment—Pilot Study (Part 1)

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## Abstract

**Background** Cancer-related fatigue (CRF) is the most common and devastating problem in cancer patients even after successful treatment. CRF has a severe impact on daily activities, social relationships, reintegration, and overall quality of life (QOL).

**Objective** This study was done to evaluate the effect of multimodal intervention (MMI) on CRF and QOL among cancer patients undergoing cancer treatment.

**Materials and Methods** One group before-and-after study (pre-experimental design) was conducted among cancer patients undergoing cancer treatment who met inclusion criteria and were selected using a purposive sampling technique, in selected hospitals. MMI consisted of exercise program, acupressure, and home care management guide. Pre-test CRF and QOL were assessed on first day using a FACIT-F scale (Functional Assessment of Chronic Illness Therapy: Fatigue) and Functional Assessment of Cancer Therapy: Fatigue (FACT-G) Version 4, respectively. Post-test for CRF was further determined after 7 days, 21 days, and 3 months and QOL was determined after 21 days and 3 months.

**Statistical Analysis** Demographic and clinical characteristics of the participants are presented as frequency and percentage. Comparison of pre-test and post-test means of CRF and QOL is done by repeated measures analysis of variance (ANOVA). Correlation between fatigue and QOL of cancer patients was found by using Pearson correlation test.

**Results** The mean pre-test fatigue score of the cancer patients (pre-test mean = 25.21) was lower than their mean post-test fatigue scores (post-test 1 = 25.83, post-test 2 = 28.28, and post-test 3 = 34.72). There was a significant difference in CRF and QOL scores between before and after the MMI. In the repeated measures ANOVA, *p*-value is less than 0.05 (level of significance  $p < 0.05$ ).

**Conclusion** Regardless of mechanism of occurrence of fatigue, most patients living with cancer suffer with persistent CRF. Yet it is often not assessed, has limited

## Keywords

- acupressure
- cancer-related fatigue
- exercise program
- home care
- nonpharmacological therapies
- quality of life

treatment options, there is a need to assess the state of fatigue in cancer patients. They do need intervention to reduce the fatigue and to improve the QOL. Nonpharmacological therapies are the best strategies to manage the fatigue among cancer patients without any safety issue.

## Introduction

Inflicting widespread agony on people of all ages, cancer rips through society. Consequently, cancer is a complicated global health issue that still has to be addressed.<sup>1</sup> After cardiovascular disorders, cancer is the second most prevalent cause of mortality in many nations. Cancer has already surpassed cardiovascular disease as the leading cause of death in many regions of the world, and this trend is expected to continue. Due to the increased prevalence of ageing population and the fact that cancer most frequently affects the elderly, it will continue to be a major worldwide health concern.<sup>2</sup> Worldwide, cancers account for a significant portion of the burden of disease, and estimates indicate that this burden will increase for at least the next two decades.<sup>3</sup> Worldwide, there were 9.5 million cancer-related deaths and 18.1 million new cases in 2018. It is anticipated that by 2040, there would be 16.4 million cancer-related deaths and 29.5 million new incidences of cancer annually.<sup>4</sup> Cancer is a significant public health issue in India, where 8 to 9 lakh cases are reported annually. According to estimates, there are approximately 25 lakh cancer cases in the nation at any given moment, and 4 lakh people die from the disease each year.<sup>5</sup>

Depending on the kind and stage of the disease, various single or combined therapies, such as surgery, radiation therapy, chemotherapy, hormone therapy, or immunotherapy, may be used to remove the tumor or reduce its growth.<sup>6</sup> Fatigue, nausea, vomiting, hair loss, anemia, anorexia, infertility, bleeding, mental stress, diarrhea and constipation, and stomatitis are just a few of the adverse effects that cancer therapies might bring on. The most frequent occurrence is when side effects start during therapy and get better with time. However, for some patients, serious side effects continue for months or even years after the end of their treatment. The quality of life (QOL) for patients is harmed by these side effects.<sup>7</sup>

Cancer-related fatigue (CRF) is a side effect of all cancer treatments that is virtually always documented. CRF, often known as the fatigue of cancer, is distinct from general fatigue. People with CRF do not experience the fatigue they recall having before to developing cancer. People describe it as feeling “washed out,” “weak,” “listless,” or “depleted.” Some individuals could be too exhausted to eat, go to the restroom, or even operate the TV remote. It does not go away with rest, and even a little exercise might be taxing. This particular type of fatigue might be more upsetting to some people than pain, sickness, nausea, or vomiting. The root causes of CRF are not completely known. The cancer or the cancer treatment could be the cause. Multiple factors can contribute to fatigue. CRF can be brought on by a number of

factors, including anemia, pain, emotional distress, sleep issues, and medicines.<sup>8</sup> CRF results from a variety of interconnected processes that include immunological, muscular, endocrinal, and neurochemical alterations in any specific individual.<sup>9</sup>

About 25 to 80% of cancer patients experience moderate-to-severe chronic CRF,<sup>10</sup> which can remain for up to 10 years after the completion of treatment. However, it frequently goes undiagnosed, has few therapeutic choices, and is linked to major obstacles to using current therapies.<sup>11</sup> There is no one proven treatment for CRF, in contrast to opioids for severe pain and antiemetic medications for nausea or vomiting. The National Comprehensive Cancer Network (NCCN) and the Oncology Nursing Society have both developed general supportive care for CRF in patients and survivors. The recommendations provide a treatment plan in which patients are assessed for fatigue regularly using a quick screening tool and are treated according to their level of CRF once it causes distress or impairs daily functioning. The current approaches to CRF management tend to concentrate on patient and family education and counselling, physical activity and other behavioral interventions, psychostimulants, and treatment of contributory variables such as pain, mental distress, sleep disturbance, anemia, and hypothyroidism.<sup>12</sup>

CRF is a common and debilitating symptom that can influence QOL in cancer patients.<sup>13</sup> The deterioration in the QOL kicks off following diagnosis of the malignancy and lingers due to the vigorous nature of the treatment.<sup>14</sup> The effects on the QOL are complex and include the physical well-being of the patients, their mental well-being, role functioning, and levels of emotional distress.<sup>13</sup> Correlation between CRF and QOL in cancer survivors was surveyed on patients visiting affiliated cancer rehabilitation centers in and around Pune. Negative correlation ( $r = -0.64$ ) is observed between CRF and QOL and study concluded that, CRF affects QOL in cancer survivors.<sup>15</sup>

Currently, nonpharmacological therapies are recommended as first line of therapy. There are various nonpharmacological therapies available to treat CRF; however, the best ones are still debatable and not specified in the guidelines. Yoga, acupressure, dance therapy, exercises, music therapy, acupuncture, and other complementary and alternative medicine interventions have all been studied for CRF, and a few studies have used a combination of therapies.<sup>16</sup> In this study, investigator was interested to evaluate the combination of therapies (exercise program, acupressure, and home management guide along with individualized teaching) that can be easily practiced by the patients in their

homes after providing individualized teaching to make the patients to understand the benefits of the intervention. According to the investigator's knowledge by the review of literature, this combination of nonpharmacological therapies to reduce CRF is not attempted. Hence, this study was aimed to determine the effect of multimodal intervention (MMI) on CRF and QOL in patients undergoing cancer treatment.

## Materials and Methods

This research is a part of the pilot study titled "Effect of Multimodal intervention Vs Exercise Program on Cancer-Related Fatigue and Quality of Life among Clients Undergoing Cancer Treatment" whose general objective was to evaluate the effect of multimodal intervention versus exercise program on CRF and QOL among clients undergoing cancer treatment. In this study, only one group is analyzed.

### Study Design, Settings, Participants

In order to accomplish the main objectives of the study, a quantitative research approach was adopted. This study was conducted between June 2022 and September 2022 in a selected oncology hospital of Mangaluru district of Karnataka state, India, by using one group before-and-after study design (pre-experimental design).

### Eligibility Criteria

The inclusion criteria were as follows: both male and female patients with breast cancer/gynecological cancer/head and neck cancers undergoing cancer treatment, in the age between 18 and 65 years; those who were admitted in the hospital for minimum of 3 days; those who have undergone minimum of one cycle of chemotherapy or radiation, willing to participate in the study and attend all programs. Patients in any stage of cancer except with bone metastasis and those who were able to perform exercises were included and also patients receiving all kinds of treatment were included in the study.

### The Exclusion Criteria

The exclusion criteria were as follows: patients who were already undergoing intensive aerobic training; receiving erythropoietin or transfusions; having active infection, musculoskeletal problems, lower limb amputation; having neurological or cognitive disorders with functional deficits were excluded. Cancer patients diagnosed with bone metastases, thrombocytopenia, uncontrolled hypertension, unstable angina, uncontrolled diabetes, cardiac insufficiency, lumbar disc osteoarthritis, peripheral arterial disease, chronic obstructive pulmonary disease, and renal insufficiency and hypothyroidism or hyperthyroidism were excluded.

### Sample Size

Sample size was calculated for the main study that will be conducted with two groups. Below mentioned sample size calculation was done on the basis of reference study.<sup>17</sup>

### Sample Size Formula

$N = 2(Z_{\alpha} + Z_{\beta})^2 \sigma^2 / d^2$  where  $Z_{\alpha} = 1.96$  at 95% confidence level,  $Z_{\beta} = 0.84$  at 80% power

$\sigma^2$  = Combined standard deviation,  $d$  = Mean difference

Mean  $\pm$  SD of intervention group:  $51.93 \pm 9.93$

Mean  $\pm$  SD of control group:  $46.10 \pm 11.84$

$$7.84 \times 2 \times 352.31 / 58.82 = 93$$

With 95% confidence level and 80% power with reference to the study, sample size was estimated as 90 in each group. With 10% attrition rate sample size for each group was approximated to 100. For pilot study when  $1/10^{\text{th}}$  of the sample was calculated, it was 10 per group but it was decided to increase to 30 participants in each group for the purpose of accurate statistical analysis. But in the present study only one group is analyzed.

For this study, 30 cancer patients undergoing cancer treatment in selected hospitals were selected using a purposive sampling technique (one of the participants failed to follow-up).

### Interventions

MMI includes exercise program, acupressure, and home management guide.

**Exercise program:** Exercise program was planned by the investigator with the guidance from the physiotherapist. Video of the exercise performed by the investigator was recorded by the expert videographer for the clarity and validated by the experts. Duration of video is 6 minutes and 11 seconds. Exercises were taught by the investigator to the patients individually and redemonstration of exercise by the patients was done in separate room in the hospital for the purpose of privacy. On third day, during data collection, exercise video will be uploaded to either patient's or caregiver's smartphone.

**Acupressure:** Investigator underwent acupressure training course module for 5 days under professor in acupuncture and acupressure. Course included theories of acupressure, demonstration of various acupressure devices, manual acupressure application techniques, duration of acupressure procedure in various conditions, anatomical location study on St.36, G.B. 34 and L.I. 11 points, indications of St.36, G.B. 34 and L.I. 11 points, and application of pressure and holding.

**Home management guide:** It included causes of CRF, signs and symptoms of CRF, general measures to manage fatigue, benefits of exercise, types of exercises to manage CRF with the pictures, acupressure points for CRF with the pictures, how to perform acupressure, and role of nutritional therapy including locally available foods to reduce CRF. Content validation was done by the experts in the field.

### Data Collection Methods

Data was collected by using sociodemographic proforma which consisted of age, sex, marital status, level of education,

occupation, monthly income, and type of family; clinical proforma consisted of location of cancer, stage of cancer, type of cancer treatment, and comorbid conditions.

Functional Assessment of Chronic Illness Therapy: Fatigue (FACIT-F) and Functional Assessment of Cancer Therapy: General (FACT-G) scales are standardized scales used to assess fatigue and QOL, respectively. License to use the tools was obtained by the FACIT organization. FACIT-F scale<sup>18</sup> was used to measure the severity of fatigue level among the clients who report fatigue. Questions measure the respondents' fatigue state over the last 7 days. It has 13 items with two positive and 11 negative statements. Each of which is answered using a 5-point Likert scale ranging from 0 (not at all) to 4 (very much). Negative statements were scored in reverse order and scores were interpreted as higher the score lesser the fatigue.

The FACT-G Version 4 was used to measure the QOL of cancer patients.<sup>19</sup> It has 27 questions, each of which is answered using a 5-point Likert scale ranging from 0 (not at all) to 4 (very much). Questions are phrased so that higher numbers indicate a better health state, leading to some items being reverse-scored. Questions measure the respondents' health state over the last 7 days in four subscales: Physical well-being (PWB, 7 questions), social/family well-being (SWB, 7 questions), emotional well-being (EWB, 6 questions), and functional well-being (FWB, 7 questions). Scoring the FACT-G is performed through a simple sum of item scores. Each subscale is scored, and a total score for the FACT-G is obtained by adding each of the subscale scores.

Content validity of the sociodemographic proforma, clinical parameters, home care management guide, and exercise video were done by giving it to two experts in the field of radiation oncology, one expert in the field of physiotherapy, and six experts in the field of nursing. The tools and interventions were translated into Kannada and retranslated back to English by the language experts.

Reliability of the scales was done on 20 cancer patients who were undergoing treatment and yielded a "r" value 0.763 and 0.965 for FACIT-F scale and FACT-G scale, respectively. Reliability was calculated using Cronbach's alpha.

Permission was obtained from the Institutional Ethics Committee (IEC, AJEC/REV/292/2019). IEC updating was not done as no change was made in methodology later. Prior written permission was taken from the concerned authorities of the hospital and the head of the department of oncology. Informed consent was obtained from study participants after explaining the purpose of the study. All the study participants involved in the study were able to read and write Kannada

On day 1 morning: the pretest was done by administering sociodemographic proforma, clinical proforma, FACIT-F and FACT-G scale. Sociodemographic proforma, FACIT-F and FACT-G scale were rated by the participants and clinical proforma was filled by the investigator from the patient record. The average time taken to complete this was 10 to 15 minutes. After the pretest, MMI was provided by the investigator. (MMI included exercise program, acupressure, and home management guide on CRF). Investigator provided

individualized teaching on benefits of MMI. Followed by five basic exercises such as ankle exercise, knee flexion exercise/extension, static quadriceps, abduction/adduction and deep breathing exercise were taught (15–20 minutes). Acupressure was provided and taught by the investigator for three acupoints (ST.36, GB.34, and LI.11) with each acupoint for 3 minutes after 10 minutes of exercise.

On day 2: remaining five exercises, namely straight leg exercises, inner range quadriceps (lying on a bed), inner range quadriceps (sitting on a chair), arm exercise, and sit to stand were taught. Patient was advised to repeat the exercise five times each along with the basic exercises, twice a day till 3rd day. Acupressure was provided and taught (3 minutes for each acupoints) after 10 minutes of exercise.

On day 3: patient demonstrated the self-acupressure; investigator observed and advised to perform the acupressure on alternate days in the morning for 3 months. Home care management guide was given to the patient on 3rd day.

On day 4 onwards: all 10 exercises were performed for 10 times, twice a day and acupressure on alternate days by self for 3 months. Client was advised to maintain the diary of exercise and acupressure performed with date and time. A short message system alert was sent to the patient's or the caregiver's mobile phone number as a reminder to complete the MMI. Also, it was suggested that the patient's caretaker check for MMI. Post-test was conducted to assess the long-term effect of MMI. Post-test for fatigue was assessed three times (7th, 21st, and 90th day) and for QOL two times (21st and 90th day). Post-tests were conducted during their scheduled revisits either in day care visit for chemotherapy or in the ward when admitted for chemotherapy or radiation therapy or in outpatient department during follow-up visit.

## Results

Data was analyzed by using Statistical Package for Social Sciences SPSS-24 software.

### Sample Characteristics

► **Table 1** depicts majority (51.7%) of the respondents were more than 50 years of age (mean age was  $51.48 \pm 8.47$ ). Maximum percentage of the sample (69%) were females and rest of them were males and equal percentage of respondents (44.8%) were in the income group of Rs 15001 to 20000 and more than Rs 20000.

► **Table 2** reveals the clinical characteristics of the respondents. Equal percentage (31%) of the respondents had breast cancer and gynecological cancer and least percentage (10.3%) had neck cancer. Majority (65.5%) of the patients with cancer were in stage III, while majority (79.3%) had illness for 1 to 3 months of duration. Maximum (41.4%) of the respondents were on chemotherapy.

### CRF and QOL Scores of Cancer Patients Before and After the MMI

► **Table 3** shows the mean and standard deviation of the CRF score at post-test 3 ( $34.72 \pm 7.950$ ) that was higher than the

**Table 1** Distribution of patients based on the demographic characteristics

Demographic variable		f-Value	%
Age	a) ≤50	14	48.3
	b) > 50	15	51.7
Gender	a) Male	9	31.0
	b) Female	20	69.0
Marital status	a) Married	25	86.2
	b) Unmarried	–	–
	c) Divorced/separated	–	–
	d) Widow/Widower	4	13.8
Income/ month in rupees	a) <10,000	–	–
	b) 10,000–15,000	3	10.3
	c) 15,001–20,000	13	44.8
	d) >20000	13	44.8

pre-test mean and standard deviation ( $25.21 \pm 7.083$ ). Scores are interpreted as higher the score, lower the fatigue level, indicating that MMI is effective in reducing CRF.

► **Table 4** shows the mean and standard deviation of the QOL score at pre-test and post-tests in different areas and also overall QOL. It shows that post-test mean scores are higher than the pre-test, interpreted as higher the score higher the QOL. It indicates that MMI is effective in increasing the overall QOL among cancer patients with CRF.

### Effectiveness of MMI on CRF and QOL of Cancer Patients

► **Table 3** shows the mean pre-test fatigue score of the cancer patients (pre-test mean = 25.21) was lower than their mean post-test fatigue scores (post-test 1 = 25.83, post-test 2 = 28.28, and post-test 3 = 34.72). In the repeated measures analysis of variance (ANOVA), *p*-value is less than 0.05 ( $p < 0.05$ ) and hence there was a significant difference between the fatigue scores before and after the MMI that indicates the effect of MMI on reduction of CRF among patients undergoing cancer treatment.

► **Table 4** shows the mean pre-test QOL scores of the cancer patients (pre-test mean = 44.55) were lower than their mean post-test fatigue scores (post-test 1 = 47.62 and post-test 2 = 57.55). In the repeated measures ANOVA, *p*-value is less than 0.05 (level of significance  $p < 0.05$ ) and hence there was a significant difference between the QOL scores before and after the MMI that shows the effect of MMI in improving the QOL among patients undergoing cancer treatment

### Relationship between Fatigue and Quality of Life of Cancer Patients

► **Table 5** depicts that there is a significant correlation between fatigue and QOL as the *p*-value is less than 0.05. (Fatigue scores are interpreted as higher the score, lower the fatigue level and maximum possible score is 52. QOL scores

**Table 2** Distribution of patients based on clinical characteristics

Clinical characteristics	f-Value	%
<b>Location of cancer</b>		
a) Breast cancer	9	31.0
b) Gynecological cancer	9	31.0
c) Head	8	27.6
d) Neck	3	10.3
<b>Stage of cancer</b>		
a) Stage I	1	3.4
b) Stage II	5	17.2
c) Stage III	19	65.5
d) Stage IV	4	13.8
<b>Duration of illness</b>		
a) 1–3 months	23	79.3
b) >3 months	6	20.6
<b>Type of cancer treatment currently receiving</b>		
a) Chemotherapy	12	41.4
b) Radiation	3	10.3
c) Surgery	–	–
d) Both a) & c)	6	20.7
e) Both b) & c)	8	27.6
f) Both a) & b)	–	–

**Table 3** Effect of MMI on CRF among cancer patients by using repeated measures ANOVA

Pre/Post-tests	Mean fatigue scores	SD	f-Value	p-Value
Pre	25.21	7.083	10.145	0.004 <sup>a</sup>
Post 1	25.83	7.569		
Post 2	28.28	8.589		
Post 3	34.72	7.950		

Abbreviations: ANOVA, analysis of variance; CRF, cancer-related fatigue; MMI, multimodal intervention; SD, standard deviation.

<sup>a</sup>Significant. ( $p < 0.05$ )

are interpreted as higher the score, higher the QOL and maximum possible score is 108.)

## Discussion

Supportive care is now heavily focused on CRF detection and treatment in modern oncologic therapy. According to recommendations from expert organizations, such as the American Society of Clinical Oncology (ASCO) and NCCN, screening for CRF is advised at the initial visit, following the conclusion of primary therapy, as clinically indicated (and at least annually) throughout the cancer survivor period, at the



**Table 4** Effect of MMI on QOL among cancer patients by using repeated measures ANOVA

Areas of QOL	Pre/Post-tests	Mean QOL scores	SD	f-Value	p-Value
Physical well-being	Pre	11.59	4.874	125.705	0.000 <sup>a</sup>
	Post 1	14.83	4.781		
	Post 2	20.86	3.681		
Social well-being	Pre	12.69	2.904	0.223	0.640
	Post 1	12.55	2.983		
	Post 2	12.52	3.572		
Emotional well-being	Pre	14.00	3.338	23.493	0.000 <sup>a</sup>
	Post 1	14.52	3.562		
	Post 2	16.45	3.135		
Functional well-being	Pre	6.28	5.849	5.022	0.033 <sup>a</sup>
	Post 1	5.72	5.706		
	Post 2	7.72	4.705		
Over all QOL	Pre	44.55	14.498	76.493	0.000 <sup>a</sup>
	Post 1	47.62	14.613		
	Post 2	57.55	12.240		

Abbreviations: ANOVA, analysis of variance; CRF, cancer-related fatigue; MMI, multimodal intervention; SD, standard deviation.

<sup>a</sup>Significant ( $p < 0.05$ ).

**Table 5** Correlation between fatigue and QOL of cancer patients

Variables	Mean scores	Pearson correlation	p-Value
Cancer related fatigue	25.21		
Areas of QOL			
Physical well-being	11.59	0.806 <sup>a</sup>	0.000
Social well-being	12.69	0.675 <sup>a</sup>	0.000
Emotional well-being	14.00	0.788 <sup>a</sup>	0.000
Functional well-being	6.28	0.803 <sup>a</sup>	0.000
Over all QOL	44.55	0.912 <sup>a</sup>	0.000

Abbreviation: QOL, quality of life.

<sup>a</sup>Correlation is significant at the 0.01 level (2-tailed).

time that advanced disease is diagnosed, and at all chemotherapy visits. Because fatigue may linger after the end of active treatment, patients who have finished primary treatment and are receiving post-treatment monitoring should continue to be watched.<sup>20</sup> Clinicians are dealing with an increasing number of patients who have fatigue due to cancer as the number of cancer survivors continues to rise (CRF). There may be many potential obstacles between the patient and the practitioner that could prevent this symptom from being recognized in a cancer survivor. It is crucial to assess patients for fatigue since it has a significant impact on their everyday life. CRF is caused by a variety of reasons. As a result, the clinician may encounter a formidable obstacle when attempting to treat CRF.<sup>21</sup> The symptoms of fatigue and whether the cause is known will determine how it is treated. Treatment for fatigue is typically administered to alleviate symptoms and teach coping mechanisms when the cause of fatigue is unknown.<sup>22</sup> A cross-sectional study conducted in

Punjab revealed that 83.3% of patients experienced fatigue according to brief fatigue inventory (BFI) scale.<sup>23</sup> Another multicenter observational study conducted in Japan in which mean global fatigue score was 4.1, and 9.8, 30.6, 38.7, and 20.8% of patients' fatigue severity were classified as none (score 0), mild (1–3), moderate (4–6), and severe (7–10), respectively.<sup>24</sup>

Similarly, a comparative controlled cohort study which was conducted in order to evaluate fatigability, depression, and self-esteem in head and neck cancer patients (HNC), who were older than 18 years, before undergoing concurrent chemoradiotherapy (CCRT), during, and after concurrent chemoradiotherapy period, in a private tertiary care hospital in India, which included all incident cases of Stage I to Stage IV B also revealed the experience of fatigue. Prior to the start of radiation, the study group's baseline values for fatigue ( $p < 0.001$ ) and depression scores ( $p < 0.001$ ) were significantly more among the study group compared to controls

prior to the radiation. Over the duration of CCRT for these patients, mean scores for fatigue and depression were found to be considerably increased ( $p < 0.001$ ).<sup>25</sup> In this study, mean pretest score was 25.21 (maximum possible score was 52 and interpreted as higher the score lesser the fatigue). This study also included patients with all the stages as in the supportive study.<sup>25</sup>

CRF is a prevalent and incapacitating condition that can affect a patient's QOL.<sup>13</sup> The decline in QOL begins after the diagnosis of the cancer and continues because of the aggressive nature of the treatment.<sup>14</sup> The intricate interactions between these factors and the patients' physical, mental, and functional well-being as well as their levels of emotional distress have an impact on their QOL.<sup>13</sup> According to a cross-sectional study on head and neck cancer patients conducted at the Pain and Rehabilitation Centre at Linköping University Hospital in Linköping, Sweden, after 2 weeks of radiotherapy, the severity of pain and depression had a detrimental impact on patients' QOL.<sup>26</sup>

Another study in North India concluded that there is a decline in the global QOL and social functioning in lung cancer patients following treatment.<sup>27</sup> Similarly in this study, mean overall QOL was 44.55 (maximum possible score was 108 and interpreted as higher the score, higher the QOL). It indicates that cancer patients experience fatigue during and followed by treatment and it declines the QOL of patients that needs preventive strategies to overcome.

Many studies have attempted various nonpharmacological approaches for treating CRF as a single therapy or combination of therapies. Few investigators have conducted a trial among the patients receiving single type of treatment either chemotherapy or radiation therapy and few have conducted with patients receiving combination of therapies. In this study, intervention included a combination of exercise program, acupressure, and individualized teaching with home management guide. As there is lack of studies available on literature review with this combination of nonpharmacological therapies, findings of the study are discussed with reference to other combinations or single therapy.

A randomized controlled trial (RCT) was done in South India to determine the effectiveness of pranayama on CRF among breast cancer patients receiving radiation therapy that enrolled the patients who were having locally advanced breast cancer and who underwent modified radical mastectomy or breast conserving surgery, followed by eight cycles of chemotherapy, and had reported the reduction in CRF experienced by the women who practiced pranayama than the women who had undergone radiation therapy alone.<sup>28</sup>

A prospective, parallel, interventional trial done in Germany among breast cancer survivors with chronic CRF, were allocated randomly or by patient preference to three groups; (a) MT (multimodal program; consisting of sleep education, psychoeducation, eurythmy, and painting therapy); (b) AT (aerobic training) alone; (c) CT [combination therapy (MT + AT)]. Primary outcome was a composite score

of the Pittsburgh Sleep Quality Index and the Cancer Fatigue Scale after 10 weeks of intervention (T1); a secondary outcome was a follow-up assessment after 6 months (T2). Study findings revealed that MT and CT were superior to AT at T1 and T2 (MT) or T2 alone (CT), respectively.<sup>29</sup>

A RCT was conducted in an academic center in collaboration with a regional cancer center in the southeastern United States among 256 breast cancer survivors in which the Breast Cancer Education Intervention (BCEI) was provided in three face-to-face sessions and five monthly follow-up sessions (three by telephone and two in person). The control group received four monthly attention control telephone calls and the BCEI at month 6. Data were collected at baseline, 3, and 6 months after the BCEI for the experimental group, and 1 month after the BCEI (at month 7) for the control group. The experimental group reported improved QOL at 3 months, whereas the control group reported a significant decline in QOL. The experimental group reported continued maintenance of QOL at 6 months. Although the control group stated improved QOL at 6 months, significant differences continued to exist between the two groups.<sup>30</sup>

As mentioned in above studies, interventions were provided during the cancer treatment<sup>28</sup> as well as continued after the treatment also.<sup>29</sup> In this study, intervention was provided during the treatment and followed up even after the completion of the treatment. This study findings are in consistent with above study findings that there was a reduction in the level of fatigue after the intervention. Study finding is also consistent with another study mentioned above<sup>30</sup> that there was improvement in QOL after 21 days and 3 months of intervention. Participants reported continued maintenance of QOL at 3 months.

The improvement in understanding of the impacts of cancer and its treatment-related side effects on patients' overall QoL is emphasized by the rise in survival time. To effectively manage CRF and lessen its detrimental effect on QOL, its complex etiology, which can be related to both the disease itself and its treatment as well as to a wide range of physical and psychological comorbidities, must be better understood. An observational study was carried out among 30 breast cancer patients who were receiving third cycle of chemotherapy from the cancer hospital, Ahmedabad, in which FACIT fatigue questionnaire, FACT B questionnaire, and 6-minute walk test were used for the assessment purpose of fatigue, QOL, and functional capacity, respectively. The Spearman correlation confirmed that the fatigue is having strong association with QOL and moderate effect with functional capacity in these patients.<sup>31</sup> This study findings also reveal significant correlation between CRF and QOL of the cancer patients. This indicates the need for proper rehabilitation to maintain the optimum level of QOL in these patients.

## Conclusion

Anticancer treatments have multiple side effects. CRF is due to the multiple interrelated factors in any given individual.

Regardless of mechanism of occurrence of fatigue, most patients living with cancer suffer with persistent CRF. Yet it is often not assessed, has limited treatment options, there is a need to assess the state of fatigue in cancer patients. They do need intervention to reduce the fatigue and to improve QOL. Nonpharmacological therapies could be used to manage the fatigue among cancer patients without any safety issue as an adjunct to alleviate the CRF and to maintain the QOL.

## Scope of the Study

Study findings would be helpful for the healthcare worker in understanding the fatigue status of cancer patients receiving treatment. Findings would reveal the existing relationship between the CRF and QOL. It would help in planning the combined nonpharmacological interventions to manage the CRF as an adjuvant therapy.

## Limitations of the Study

The study was limited to single setting. Patients aged between 18 and 65 years were only involved. Patients who were not having smartphones could not participate in the study. All the participants were not able to follow up till the completion of all the post test. Sustaining effect of intervention after 3 months was not assessed.

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### Conflict of Interest

None declared.

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