

Original Research Article

A study in cancer patients with radiotherapy assessing effectiveness of nutritional supplement and ambulation in improving fatigue and physical activity

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ABSTRACT

Background: Patients receiving radiation therapy suffer from ill effects of cancer as well as the side effects of radiation therapy. In this study, we prepared a nutritional supplement therapy and ambulation plan for the patients and assessed the improvement in physical activity and decrease in fatigue.

Methods: The patients who had completed at least 3 sittings of radiotherapy in the oncology ward were selected by non-probability purposive sampling method. 60 patients were divided equally into experimental and control group. In the experiment group patients were given porridge three times a day and made to walk after drinking the porridge every day for 25 days. In both groups, post test was conducted. The data obtained was analyzed using descriptive and inferential statistics.

Results: All the patients in both the groups had fatigue before the intervention. After the intervention on 30th day, 7 (23.3%) patients had mild fatigue, 23 (76.70%) had moderate fatigue and there was none with severe fatigue in the experimental group. In the control group, fatigue level became severe in 3 (10.00%) patients and remained same in others. In the experimental group, significant improvement was shown in performing physical activities after the intervention. 9 (30%) showed good physical activity, 12 (40.00%) showed moderate activity after the intervention in the experimental group.

Conclusions: As there was a significant reduction in the level of fatigue and improvement in the level of physical activity in the experimental group after the intervention which could be attributed to the effect of nutritional supplement therapy and ambulation.

Keywords: Cancer related fatigue, Fatigue, Nutrition, Physical activity, Radiotherapy

INTRODUCTION

Cancer-related fatigue (CRF) is the most common and among the most debilitating symptoms and side effects of cancer and its treatment.¹ CRF is different than other types of fatigue because it is persistent, doesn't improve with rest and interferes with activities of daily life.² CRF can negatively affect your plans to return to work,

relationships and quality of life after cancer treatment as it can persist for weeks or even several years.² There are many causes of CRF that can be difficult to untangle and therefore make CRF challenging to manage.³ Causes of CRF could include the cancer itself, cancer treatments, symptoms and side effects, medications, hormonal changes, pain, infection, depression, anxiety or anaemia. CRF is becoming more common as cancer treatments

become more intense and targeted and combine different types of treatments (such as chemotherapy and radiation together).⁴ Very little research has been conducted on nutritional strategies to manage cancer-related fatigue.⁵ It has been suggested that adequate nutrition support during radiotherapy can decrease the impact of side effects, minimise weight loss, improve quality of life and help patients to recover from the radiotherapy more quickly.^{6,7}

CRF is characteristically different from the fatigue experienced by healthy individuals in its severity, its impact on quality of life, and its lack of alleviation by rest or sleep.⁸⁻¹¹ CRF often requires that survivors depend on others for simple activities of daily living, such as transportation, preparing food, or bathing.

Many patients who are undergoing radiation therapy will benefit from nutritional supplements between meals. Maintaining a healthy diet can help the body repair the damage, and certain foods can alleviate some symptoms. A high calorie, increased protein diet is often recommended to cancer patients receiving radiation therapy.

Exercise has been shown to be useful in alleviating CRF and may be particularly helpful in preserving muscular strength, balance, and functional status among elderly cancer patients.^{11,12}

METHODS

Research design

A quasi-experimental pre-test and post-test non-equivalent control group design was used to test the effectiveness of nutritional supplement therapy and ambulation on level of fatigue and physical activity.

Experimental group 01 -----X-----02

Control group 01-----02

01 = Assessment of level of fatigue and level of physical activity of experimental and control group before intervention.

02= Assessment of level of fatigue and level of physical activity of experimental after 25 days of intervention and control group without intervention.

X= Nutritional supplement therapy and ambulation for experimental group. Nutritional supplement in the form of porridge (150 ml) three times a day (morning 8.00 am, forenoon 11.30 am and evening 5.00 pm), followed by walking in the hospital premises for 15-20 minutes.

Experimental group

30 patients who had undergone 3 sittings of radiation therapy were included. An initial assessment of their level of fatigue and level of physical activity was done. They

were provided nutritional supplement therapy in the form of porridge 3 times a day and ambulated with the help from attenders for 15-20 minutes daily. At the end of 25 days, an assessment was done again for the level of fatigue and physical activity.

Control group

30 patients who had undergone 3 sittings of radiation therapy were included. An initial assessment of their level of fatigue and level of physical activity was done. No intervention was done in these patients and assessment of the level of physical activity was done after 25 days.

Variables in the study

The independent variables included in the study were, nutritional supplement therapy and ambulation. The dependent variables were the level of fatigue and the level of physical activity.

The study was conducted in a selected private Multi Specialty Hospital in Kanyakumari, Tamilnadu. It is a 500 bedded hospital and has a separate oncology department with all the facilities for cancer treatment. The population of the study included all the patients diagnosed as having cancer and admitted for radiation therapy who fulfilled the eligibility criteria in the selected hospital at the time of the study.

The sample of the present study consisted of 60 cancer patients receiving radiation therapy as in patients who fulfilled the criteria for sample selection. (30 in the experimental group and 30 in the control group).

Sampling technique

A non-probability purposive sampling technique was used. The samples were selected from general and private ward and every 5th patient was assigned to the experimental and control group.

Sampling criteria

The inclusion criteria were both male and female patients who were undergoing radiation therapy in oncology ward, the patients who had undergone a minimum of 3 sittings of radiation therapy, the patients who spoke Tamil or English and the patients who were willing to participate in this study.

The exclusion criteria were the patients who were critically ill, the patients who had visual or hearing defects and the patients who were able to do daily activities by themselves.

Scoring of modified brief fatigue inventory

The original tool was developed by Charles S. Cleeland.¹³ It is used rapidly to assess the severity of fatigue and the

impact of fatigue on daily functioning. It consisted of the following items namely, presence of unusual fatigue in the last week, current level of fatigue, usual level of fatigue and worst level of fatigue during past 24 hours, general activity, mood, walking ability, normal work (includes both work outside the home and daily chores), relations with other people and enjoyment of life. The tool's reliability was tested by Cronbach Alpha reliability, which ranged from 0.82 to 0.97.

It is a 10 point rating scale, ranging from 0 to 10. The numbers were considered for severity of fatigue. It is anchored by two words, (0= does not interfere, 10= completely interferes). The person, whose fatigue level is going to assess by this tool has to circle the number that best describes their level of fatigue.

Modified brief fatigue inventory contained 10 questions. Each carry a subscale with 10 points (0-10). It is categorized into mild, moderate, severe by taking the average of 10 subscales which is represented as 3 point scale. In this the minimum score is 0 and the maximum score is 100.

The reliability of the modified brief fatigue inventory and observation schedule was tested in a private oncology hospital. The reliability of the modified brief fatigue inventory tool was checked by test- retest method. The test was administered to 8 patients. The retest was conducted after 14 days. Correlation co-efficiency was calculated by Karl Pearson's method. The obtained 'r' value was (0.8). The observation schedule's reliability was checked by inter rater method. The researcher along with another investigator recorded the physical activity of samples independently and simultaneously. Correlation co-efficiency was calculated by Karl Pearson's method. The obtained 'r' value was (0.9). A very high correlation was found which confirmed the stability and equivalence of the tool.

Refer Appendix 1, 2 and 3 for original and modified brief inventory, observation schedule.

Table 1: Scoring of modified brief fatigue inventory.

Score	Scoring interpretation
0-3	Mild fatigue
4-7	Moderate fatigue
8-10	Severe fatigue

While answering all the 10 questions, each question is scored up as mild fatigue with total score 0-3, moderate

fatigue with score 4-7 and severe fatigue with score 8-10. Then sum of scores for all the questions is taken which can be from 0-100.

Scoring of physical activity observation schedule

A response in the "unable to do" column scored as 0. "With assistance" column scored as 1. "By self" column scored as 2. In this the minimum score is 0 and the maximum score is 24.

Table 2: Scoring of physical activity observation schedule.

Score	Scoring interpretation
0-8	Poor physical activity
9-16	Moderate physical activity
17-24	Good physical activity

Nutritional supplement therapy

The nutritional supplement used in the study was in the form of porridge. The ingredients used were ragi, bajra, green gram dhal, almond, amaranth, milk, dates syrup, and rice bran oil.

Preparation of porridge

Ragi (25 gm), bajra (25 gm), green gram dhal (25 gm) was soaked in the water over night. Next day morning, after draining the water, the cereals and dhal were wrapped in a clean wet cotton cloth for germination over 24 hours. After removing the sprouted growth, the ingredients were allowed to dry by microwave oven in order to save time and made into powder. Amaranth (15 gm) was cut into small pieces and made to dry by using microwave oven and was powdered by using mixer grinder. Almond (10 gm) powder was also added. By following the same above proportion, the huge amount of powder was prepared in order to make the preparation easy for porridge at each time.

Each time 30 gm of powder was taken for preparing one time porridge for one patient along with 25 ml of milk, 5 ml of dates syrup and 1 ml of rice bran oil and sufficient amount of water were added and cooked as a porridge.

150 ml (per serving) of porridge was served to the patients three times in a day at morning 8.00 am, forenoon 11.30 am and also evening 5.00pm by the researcher.

Table 3: Nutritive value of porridge at one serving.

Ingredients	Amount (gm)	Energy (k.cal)	Protein (gm)	Carbohydrate (gm)	Fat (gm)
Ragi , bajra, green gram dhal, almond and amaranth	30	98.64	4.04	15.30	2.35
Dates syrup, milk & rice bran oil	31	40.49	0.84	5.02	1.90
Total		139.13	4.88	20.32	4.25

The daily record of the amount of porridge taken was maintained.

Table 4: The nutritive value of the porridge taken in a day.

Energy	417.39 k.cal
Protein	14.64 gm
Carbohydrate	60.96 gm
Fat	12.75 gm

Development of ambulation plan

After 30 minutes of feeding, assist the patient to sit on the bed and help him/her to get out of bed. Make the patient to stand for some time near the bedside. Assist the patient to walk for some distance according to his/her ability. Make the patient to sit in a chair for some time in between walking, if they need. Assist the patient to get back to bed. Maintain the daily record of walking.

There is no fixed distance and duration of walking and it is only based on the ability and willingness of the patients. During these steps continuously motivate the patient to walk and also provide needed support for walking. Increase the duration and distance of walking day by day. The patients should not be coerced when he/she unable to walk.

Data collection method

The main study was conducted in September 2012. Data was collected after obtaining informed consent from the subjects. The respondents were assured the anonymity and confidentiality of the information collected from them.

The patients who fulfilled the criteria were selected by non-probability purposive sampling method. First, the patient was given porridge 3 times a day and helped to get up from the bed and to sit in a bed for some time, and assisted to walk for some distance everyday. No intervention was provided to control group. In both groups, after 25 days the investigator conducted the post-test by using the same tool.

By keeping the ethical consideration in mind, the method of preparation of nutritional supplement and the importance of ambulation during radiation therapy were taught to the control group after the completion of study.

Plan for data analysis

The data obtained was analyzed using descriptive and inferential statistics using paired and unpaired "t" test for significance and chi square test for the variables.

RESULTS

Demographic characteristics of the samples

Age

The age of patients ranged from 21 to 60 years and above. In the experimental group 12 patients (40%) were in the age group of 51-60 years, and 10 (33.30%) were more than 60 years of age and 8 (26.70%) were in the age group of 41-50 years. In the control group 8 (26.70%) were equally distributed in the age group of 41-50 years and 51-60 years, 11 (36.70%) were more than 60 years of age and remaining 2 (6.70%) and 1 (3.30%) in the age group of 20-30 years and 31-40 years respectively.

Gender

In the experimental group, majority of the patients 18 (60%) were females and rest 12 samples (40%) were males. Where as in control group more than half 16 (53.30%) were males and rest 14 (46.70%) were females.

Education

9 patients (30%) both in experimental and control group were illiterate. 8-13 patients both in experimental and control group (26.70-43.30%) had completed their primary education. 8-10 patients both in experimental and control group (26.70-33.30%) had completed secondary education. 3 samples (10%) were graduates in control group.

Income

Income ranged from less than Rs. 2000 to more than Rs. 6000 per month. Nearly half 14 (46.70%) in experimental group and 7 (23.3%) in control group had a monthly income of less than Rs. 2000, 8 samples (26.70%) in experimental and 7 (23.3%) in control group were earning an income of Rs. 2001 to 4000 and the rest had an income between Rs. 4001 to 6000 and above.

Previous treatment of cancer

Majority of the patients 24 (80%) in experimental and 23 (76.70%) in control group had undergone treatment for cancer before starting radiation therapy. Rest of 6 patients (20%) in experimental and 7 (23.30%) in control group had not received any treatment prior to radiation therapy.

Type of treatment

Among 24 patients who had received treatment for cancer, nearly half 13 (54.16%) in experimental group and above half 17 (73.91%) in control group had undergone surgery for cancer, the rest 11 (45.83%) in experimental and 6 (26.08%) in control group received chemotherapy treatment.

Table 5: Mean fatigue score in experimental and control group before and after intervention and the level of significance (n=60).

Intervention	Experimental group (n=30)				Control group (n=30)			MD	Unpaired 't' value, p<0.05 d f=58
	Max. score	Mean score	MS	SD	Mean score	MS (%)	SD		
Before intervention	100	51.93	51.93	09.93	46.10	46.10	11.84	05.83	2.06*
After intervention	100	38.63	38.63	07.64	46.30	46.30	11.13	07.67	3.11*

*significant; df= degree of freedom; table value=2.002

Table 6: Mean physical activity score in experimental and control group before and after intervention and the level of significance (n=60).

Level of physical activity	Experimental group (n=30)				Control group (n=30)			Unpaired 't' value; p<0.05, df=58
	Max. score	Mean score	MS (%)	SD	Mean score	MS (%)	SD	
Before intervention	24	05.16	21.50	04.50	05.26	21.91	05.26	00.07NS
After intervention	24	12.30	51.25	04.65	05.30	22.08	04.60	05.85*

*significant; NS- Not Significant; table value=2.002.

Duration of treatment

In both experimental 24 (100%) and control group 23 (100%) all the patients had undergone treatment within the last six months.

History of taking any health drink

Most of the patients 21 (70%) in experimental and 27 (90%) in control group were taking health drink. The rest 3-9 samples (10-30%) were not taking any health drink.

Name of health drink

Different types of drinks like Bournvita, Complan, D Protein, Horlicks and Nutra fit were taken by experimental and control group. Among this maximum 9 (33.3%) patients were taking horlicks in both experimental and control group.

Frequency of taking health drink

Out of 21-27 patients, half of the patients 15 (55.55%) in control and 12 (57.14%) in experimental group were taking health drink twice a day. 7 (25.92%) in both groups were taking thrice a day. Rests of the patients were taking once a day.

Assessment of fatigue of patients in experimental and control group before and after giving nutritional supplement therapy and ambulation

The mean fatigue score of experimental group before the intervention was 51.93, where as in control group it was 46.10. There was a significant difference in the mean

fatigue score between the two groups before intervention. The experimental group had more fatigue than the control group. After the intervention, mean fatigue score was reduced from 51.93 to 38.60 in experimental group with a difference of 13.30 score. Statistically the difference was significant (t=2.06; p<0.05; df=58). In case of control group, it remained the same.

Assessment of physical activity of patients in experimental and control group before and after nutritional supplement therapy and ambulation.

Before the intervention, the mean physical activity score was 21.50% in experimental group. On baseline observation it was 21.91% in control group. Statistically, the difference was not significant in the mean physical activity score before intervention (t=00.07 NS; p<0.05; df=58).

The mean physical activity score was 51.25% in experimental group after intervention and it was 22.08% in control group on subsequent observation. Statistically, the difference was significant in the mean physical activity score after intervention (t=05.85; p<0.05; df=58).

This table concludes that, there was a significant improvement of physical activity in experimental group compared to control group.

Correlation of fatigue level with level of physical activity in experimental and control group

Correlation was examined between the level of fatigue and the level of physical activity among experimental group by Karl Pearson's correlation co efficient.

Table 7: Correlation between fatigue and physical activity of experimental group before and after intervention (n=30).

Intervention	Fatigue		Physical activity		'r' value	Paired 't' value P<0.05; df=29
	Mean score	MS (%)	Mean score	MS (%)		
Before intervention	51.93	51.93	05.16	21.50	-00.61	03.96*
After intervention	38.63	38.63	12.30	51.25	-00.64	04.10*

*significant; df = degree of freedom; Table value=2.04

Table 8: Correlation between fatigue and physical activity of control group at baseline and subsequent observation (n=30).

Observation	Fatigue		Physical activity		'r' value	Paired 't' value p<0.05; df=29
	Mean score	MS (%)	Mean score	MS (%)		
Base line observation	46.10	46.10	05.26	21.91	-00.91	08.90*
Subsequent observation	55.00	55.00	05.86	24.41	-00.89	05.35*

*significant; df=degree of freedom; Table value=2.04

Before intervention the relationship between the level of fatigue and level of physical activity showed a mild negative correlation r value (-0.61). Statistically the relationship was significant ('t' value=3.96, p<0.05, df=29).

After intervention, the relationship between level of fatigue and level of physical activity showed a mild negative correlation r value (-0.64). Statistically the relationship was significant ('t' value=4.10, p<0.05, df=29).

Correlation was examined between the level of fatigue and the level of physical activity among control group by Karl Pearson's correlation co efficient.

On base line observation the relationship between the level of fatigue and level of physical activity showed a mild negative correlation r value (-0.91). Statistically the relationship was significant ('t' value=8.90; p<0.05; df=29).

On subsequent observation relationship between the level of fatigue and the level of physical activity showed a mild negative correlation r value (-0.89). Statistically the relationship was significant ('t' value=5.35; p<0.05; df=29).

DISCUSSION

This study is focused on assessing the effectiveness of nutritional supplement therapy and ambulation on the level of fatigue and level of physical activity of hospitalized cancer patients undergoing radiation therapy in a selected hospital.

In both experimental and control group, most of the patients (66.70%) were aged between 51-60 years, females, and primary educated. Most of the patients in

both the group had undergone surgery or chemotherapy treatment within the last six months. 80% of the patients were taking some kind of health drink two times in a day.

All the patients in both the groups had fatigue before the intervention. After the intervention on 30th day, 7 (23.3%) samples had mild fatigue, 23 (76.70%) had moderate fatigue and there was none with severe fatigue in the experimental group. In the control group, 3 (10.00%) samples fatigue level became severe on subsequent observation and rest of the samples remained in the same.

Majority of the patients 23 (76.70%) had poor physical activity on both the groups before intervention. In the experimental group, significant improvement was shown in performing physical activities after the intervention. 9 (30%) showed good physical activity, 12 (40.00%) showed moderate activity after the intervention in the experimental group. This shows the effectiveness of nutritional supplement and ambulation.

One third of patients 10 (33.3%) in both the group had moderate physical activity before the intervention. Among all the aspects, climbing stairs and going to radiation department by walk were found to be significant. Mean score of climbing stairs and going to radiation department by walk were 0.20 before intervention. It increased to 0.60 after the intervention. In the control group there were no changes in the level of physical activity in baseline and at subsequent observation on 30th day.

Head and neck cancer survivors are at an increased risk for physical and psychological burden into survivorship, with many complications related to weight loss and muscle wasting.¹⁴⁻²⁰ This has direct implications on patient quality of life, rehabilitation, and return to work.¹⁵⁻¹⁹

An observational study of Nurses' Health Study participants who were diagnosed with invasive breast cancer suggested that consuming a healthy diet (high in fruits, vegetables, whole grains) may or may not lower cancer-specific mortality but significantly lowers mortality from other disease (15% reduction in all-cause mortality) as compared to a typical western diet.²¹

Providers should counsel survivors to achieve a dietary pattern that is high in vegetables, fruits, and whole grains, and consume at least 2.5 cups of fruits and vegetables a day.²²

Physical activity and exercise have beneficial effects on health-related quality of life domains in cancer survivors, including fear of recurrence (e.g., breast cancer), body image/self-esteem, emotional well-being, sexuality, sleep disturbance, social functioning, anxiety, fatigue, and pain.^{23,24} The benefits of physical activity and exercise are further strengthened by results of observational studies reporting that regular physical activity (3-5 days/week for at least 30 min per session, 50-70% of heart rate reserve) is associated with reduction in cancer-specific mortality and all-cause mortality in early-stage breast, prostate and colorectal cancer.²⁵⁻²⁸

CONCLUSION

The findings of the study concluded that there was a significant reduction in the level of fatigue and improvement in the level of physical activity in the experimental group where nutritional therapy and physical activity were employed as intervention. This kind of intervention can be utilized by all institutes to proactively involve the patients in physical activity providing nutritional supplements post radiotherapy sessions.

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APPENDIX 1

BRIEF FATIGUE INVENTORY

Brief Fatigue Inventory

STUDY ID# _____ HOSPITAL # _____

Date: ____/____/____ Time: _____

Name _____
 Last First Middle Initial

Throughout our lives, most of us have times when we feel very tired or fatigued. Have you felt unusually tired or fatigued in the last week? Yes ☐ No ☐

1. Please rate your fatigue (weariness, tiredness) by circling the one number that best describes your fatigue right NOW.

0 1 2 3 4 5 6 7 8 9 10
 No As bad as
 Fatigue you can imagine

2. Please rate your fatigue (weariness, tiredness) by circling the one number that best describes your USUAL level of fatigue during past 24 hours.

0 1 2 3 4 5 6 7 8 9 10
 No As bad as
 Fatigue you can imagine

3. Please rate your fatigue (weariness, tiredness) by circling the one number that best describes your WORST level of fatigue during past 24 hours.

0 1 2 3 4 5 6 7 8 9 10
 No As bad as
 Fatigue you can imagine

4. Circle the one number that describes how, during the past 24 hours, fatigue has interfered with your:

A. General activity
 0 1 2 3 4 5 6 7 8 9 10
 Does not interfere Completely Interferes

B. Mood
 0 1 2 3 4 5 6 7 8 9 10
 Does not interfere Completely Interferes

C. Walking ability
 0 1 2 3 4 5 6 7 8 9 10
 Does not interfere Completely Interferes

D. Normal work (includes both work outside the home and daily chores)
 0 1 2 3 4 5 6 7 8 9 10
 Does not interfere Completely Interferes

E. Relations with other people
 0 1 2 3 4 5 6 7 8 9 10
 Does not interfere Completely Interferes

F. Enjoyment of life
 0 1 2 3 4 5 6 7 8 9 10
 Does not interfere Completely Interferes

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APPENDIX 2

MODIFIED BRIEF FATIGUE INVENTORY

Throughout our lives, most of us have times when we feel very tired or fatigued.

Have you felt unusually tired or fatigued in the last week? Yes/no

Modified brief fatigue inventory

1. Please rate your fatigue (weariness, tiredness) by circling the one number that best describes your fatigue right **NOW**.

0	1	2	3	4	5	6	7	8	9	10
No										As bad as you
Fatigue										Can imagine

2. Please rate your fatigue (weariness, tiredness) by circling the one number that best describes your **USUAL** level of fatigue during past 24 hours.

0	1	2	3	4	5	6	7	8	9	10
No										As bad as you
Fatigue										can imagine

3. Please rate your fatigue (weariness, tiredness) by circling the one number that best describes your **WORST** level of fatigue during past 24 hours.

0	1	2	3	4	5	6	7	8	9	10
No										As bad as you
Fatigue										can imagine

4. Circle the one number that describes how, during the past 24 hours, fatigued has interfered with your:

A. General activity

0	1	2	3	4	5	6	7	8	9	10
Does not										Completely
Interferes										interferes

B. Mood

0	1	2	3	4	5	6	7	8	9	10
Does not										Completely
Interferes										interferes

C. Walking ability

0	1	2	3	4	5	6	7	8	9	10
Does not										Completely
Interferes										interferes

D. Concentration

0	1	2	3	4	5	6	7	8	9	10
Does not										Completely
Interferes										interferes

E. Communication

0	1	2	3	4	5	6	7	8	9	10
Does not										Completely
Interferes										interferes

F. Memory

0	1	2	3	4	5	6	7	8	9	10
Does not Interferes										Completely interferes

G. Patience

0	1	2	3	4	5	6	7	8	9	10
Does not Interferes										Completely interferes

SCORING

Part II Modified brief fatigue inventory contains 10 questions. Each carry a subscale with 10 points (0-10). It is categorized into mild, moderate, severe by taking the average of 10 subscales which is represented as 3 point scale.

Mild	Moderate	Severe
(0-3)	(4-7)	(8-10)

GRADING SCORE

Mild fatigue: 0-3

Moderate fatigue: 4-7

Severe fatigue: 8-10

APPENDIX 3

OBSERVATION SCHEDULE

Physical activity**Instruction**

Please put a tick mark (✓) in an appropriate column.

S.no	Physical activity	Pre test			Post test		
		By self	With assistance	Unable to do	By self	With assistance	Unable to do
I	Personal activities						
1	Moving in and out of bed or chair						
2	Brushing teeth						
3	Taking bath						
4	Dressing						
5	Combing the hair						
6	Eating						
7	Going to toilet						
II	Other activities						
8	Going to radiation department by walk						
9	Going to hospital worshipping place						
10	Involving in recreational activity (watching television, reading news paper, listening music)						
11	Turning in bed						
12	Climbing stairs						

Scoring key

By self :2

With assistance :1

Unable to do :0

Grading scale

Poor	Moderate	Good
(0-8)	(9-16)	(17-24)

Grading score

Poor: 0-8

Moderate: 9-16

Good: 17-24