

Establishing and implementing of nursing management protocol to radiotherapy induced fatigue in cancer patients

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Abstract: Background: Fatigue is one of the most common and distressing symptoms experienced by cancer patients. Research conducted over the past few years has documented that initiation of radiation therapy typically results in significant increases in fatigue severity. Efforts to manage fatigue in cancer patients should focus on patient education; Preliminary evidence suggests that moderate exercise during radiation therapy may also be helpful in relieving fatigue. Therefore, the aim of the study was to *Establish and implement nursing management protocol to radiotherapy induced fatigue in cancer patients*. **Methods** Quasi-experimental research design was conducted in the Clinical Oncology and Nuclear Medicine Department at Main Mansoura University Hospital. The data were collected from 200 adult patients of both sexes randomized selected who corresponded to inclusion criteria and divided into two groups. **Results** the result indicates increased total knowledge score for patients at post test more than follow up test. Also it was found decreased incidence and severity of fatigue at post and follow up tests. There were a positive relation between severity and incidence of fatigue of studied patients in relation to their knowledge.

Conclusion The implementation of nursing management protocol has a positive effect on the studied patients' total knowledge scores and decrease incidence and severity of fatigue in the study group.

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1. Introduction

Cancer- related fatigue (CRF) is the most commonly reported side effect of cancer treatment, occurring in up to 90% of patients (*Mock, 2005& Mock et al., 2011*). *Roxanne (2008)* added that, with receiving radiation therapy, fatigue gradually increases as treatment progresses, peaks in the last week of treatment, and slowly returns to pretreatment levels 3 months after treatment ends. Patient education regarding fatigue is essential in allaying the fears that this symptom heralds the return or spread of cancer. Strategies for preventing minimize or coping with fatigue are discussed with the patient and family before treatment begins (*Cosentino, 2007*). *Morrow and Hickok (2010)* founded that, Alternating periods of rest and activity are beneficial. Regular, light exercise may decrease fatigue and facilitate coping, whereas lack of physical activity and “too much rest” can actually contribute to deconditioning and associated fatigue. Patients are encouraged to maintain as normal a lifestyle as possible by continuing with those activities they value and enjoy (*Barsevick et al., 2004*).

Aim of the study

The study was conducted to establish and implement of nursing management protocol to radiotherapy induced fatigue in cancer patients.

2- Materials and Method

Materials:

Research design

Quasi-experimental research design was utilized in this study.

Subjects:

Sample of this study comprised 200 adult patients of both sexes randomized selected. They were diagnosed as having cancer and planned to receive radiotherapy

Setting of the study

The study was carried out in the inpatients ward and radiotherapy administration setting (out patients) of the Clinical Oncology and Nuclear Medicine Department at Main Mansoura University Hospital.

The study subjects were consisted of two equally groups:

The study subjects were divided randomly into two equal groups: **Group (A):** study group, consisted of 100 adult patients were followed nursing management protocol to radiotherapy side effects.

Group (B): Control group, consisted of 100 adult patients were followed routine hospital care.

Criteria for selection:

- Adult patients ranged from 20 to 65 years.
- Scheduled for receiving radiotherapy.
- Patients free from side effects of external radiotherapy (fatigue, nausea, vomiting, diarrhea, stomatitis, and skin complications).
- Free from associated chronic diseases such as cardiac, renal and diabetes diseases, which make patient at more risk to radiotherapy side effects (**Barbra& Nancy, 2010**).

Tools of the study

For collection the necessary data and achieving the aim of the study two tools were utilized by the researcher in an Arabic form. These tools were:-

Tool I: Structured Interviewing questionnaire.

Structured Interviewing questionnaire was developed by the researcher after reviewing the relevant literature. This tool included two parts:

Part 1: Biosociodemographic data and medical data sheet.

This part was developed by the researcher; it aimed to collect personal, social and medical patient data. Questions about patient's age, sex, level of education, occupation, marital status, duration of disease, data related to previous hospitalization, family history related to disease, diagnosis, grade of cancer, previous methods of treatment if present, type of radiotherapy used, schedule of sessions of radiotherapy planned to take, and problems (side effects) occur during radiotherapy e.g. fatigue.

Part 2: Patient's knowledge related to side effects of radiotherapy.

It was used to examine the patient's knowledge in-relation to radiotherapy side effects (fatigue), and self care measures to manage that radiation side effect. Then follow up the progress in the level of patient's knowledge through four assessment sheets (pre test, post test, follow up1, and follow up2) to make comparison between them.

Tool II: Fatigue Severity Scale (Krupp *et al.*, 1989).

This tool was developed by Krupp *et al.*, 1989. This scale was translated to Arabic by Gamiel, 2002 and adapted by the researcher to assess and measure fatigue severity. It consisted of 9 items. The patient was asked to read each statement or the researcher read to him in case of illiterate patient, then the patient choose the number from 1 to 5 that best described his degree of agreement with each

statement, however, 1 indicates strongly disagree (low fatigue level) and 5 indicates strongly agree (high fatigue). The total score ranged from 9 to 45 however, the score from 13.5 to 22.5 means mild fatigue, score from 23 to 31.5 means moderate fatigue, and score more than 31.5 means severe fatigue. This scale was used in all phases of assessment in this study for the two groups (study and control groups).

Method

A permission to conduct the study was obtained from the Oncology and Nuclear Medicine Department administrator and head of department at Mansoura University Hospital. An informed written consent was taken from the study sample before inclusion in the study, after explanation the purpose of the study. The researcher emphasized that participation in the study was entirely voluntary and anonymity, each patient was informed that refusal to participate in the study wouldn't affect their care. At any time of the study the patient has the right to withdraw from the study. Subjects of control group followed a routine hospital care while subjects in study group followed the nursing management protocol to radiotherapy side effects along with routine hospital care. Nursing management protocol was conducted for the study group patients before their starting in radiotherapy sessions. The data for the two groups (study and control) were collected throughout four phases of assessment and scheduled as following: The first phase was done prior to conducting the nursing management protocol, The second phase was done immediately post implementing nursing management protocol, The third phase was done two third of radiotherapy sessions, and the fourth phase was done immediately after finishing the course of radiotherapy sessions. Implementation of nursing management protocol, the implementation phase was done through five major sessions; each session was conducted for 5 to10 patients sometimes for each patient individually according his condition, one session per day; the time allowed varies between 20-50 minutes. All sessions were ended before second phase of assessment. Patients perform progressive relaxation technique to reduce fatigue.

3- Results:

The data collected were analyzed statistically and the results are categorized into 3 main parts which are: Assessment part, Impact of implementing nursing management protocol part, relation part.

Table 1 revealed that, 52% of patients in the study group were in the age group of 50 years and over with mean age (46.92±8.64 years). Forty nine percent of patients in the control group were in the same age group with a mean age (45.53±10.84 years).

Most of study subjects were females. They constituted 60% of the study and 58% of the control group. Concerning level of education, Secondary education was prevailing among 38% of the study group and 40% of the control group. Thirty percent of the study group and 24% of the control group were illiterate. The majority of patient in the study and control groups (80% and 86%) were married.

Table 2: reveals that, breast cancer and GIT cancer were the most prevailing among the study group (40% and 28%) and (28% and 38%) of the control group. In relation date of disease discovery, less than one year discovery were prevailing among 70% and 78% of the study and control groups respectively. In relation to grades of cancer, grade 2 was the most prevalent in the study subjects; they constituted 78% of the study group and 82% of the control group. Grade 3 represented 20% of the study group and 17% of the control group. Concerning the site of radiotherapy, chest wall radiation was prevailing among 50% of the study group and 43% of the control group. Twenty two percent of the study group and 27% of the control group were prone to pelvic radiation.

Table 3: revealed that, post implementing nursing management protocol; patients in the study group had a highly statistically significant improvement in total knowledge score about radiotherapy (54.84 ± 7.81), with a highly statistical significant difference at pre vs. post test ($t = 28.018$ at $p \leq 0.001^{**}$) and the gains were maintained throughout the period of follow up tests (follow up I 53.44 ± 8.1 and follow up2 52.1 ± 8.88). It could be mentioned that, the differences between the study and control groups at post, follow up1, and follow up2 tests were statistically significant ($p \leq 0.001^{**}$) respectively. Also the table revealed that, no statistically significant difference was found between the study and control groups as regards knowledge score about radiotherapy at pre test ($t = 3.76$ at $p > 0.05$).

Table 4: clarifies that, there were significant differences between scores of the study group pre (0.98 ± 0.79) and post (5.92 ± 0.27) implementation of nursing management protocol in relation to items of dealing with fatigue as radiotherapy side effect where $t = 57.39$ at $p \leq 0.001^{**}$. Regarding pre applying

nursing management protocol sessions the table revealed that, the difference between scores of the study and control groups were not statistically significant in items of fatigue radiotherapy side effect ($p > 0.05$). on the other hand, differences between scores of fatigue radiotherapy side effect of the study and control groups in post, follow up1, and follow up2 testes after applying nursing management protocol were statistically significant where ($p \leq 0.001^{**}$).

Table 5: It was observed from the table that, there was no statistical significant difference between the study and control groups pre starting relaxation technique with mean scores (9.0 ± 0.0 & 9.0 ± 0.25) respectively. Concerning to incidence of fatigue at post, follow up1 and follow up 2 testes, patients in the study group showed slight increase in their mean scores regarding incidence of fatigue according fatigue severity assessment scales post implementing relaxation technique (9.16 ± 0.54 , 10.18 ± 0.65 , and 10.38 ± 1.67) respectively, while incidences of fatigue showed marked increase for those in the control group in post, follow up1, and follow up2 testes as revealed in table (5). In addition, at post, follow up1, and follow up2 testes there were highly statistically significant differences between the study and control group where p value was found to be ($\leq 0.001^{**}$).

Figure 1: Show severity of fatigue as radiotherapy side effect of the study and control groups at the end of study (follow up 2). It appears from the figure that, there was significant increase in fatigue severity in the control group; 48% mild, 39% moderate, and 13% severe fatigue, compared to 90% with no fatigue and only 10% mild fatigue in the study group at follow up 2.

Table 6: In relation to fatigue severity scale, the table revealed that decrease level of fatigue in the study group patients than control group with a highly statistical significant difference ($p \leq 0.001^{**}$). Also it showed that 90% of patients had no fatigue, 10% had mild fatigue in the study group after implementing of nursing management protocol. Forty eight percent of patients had mild fatigue, 39% had moderate fatigue and 13% suffering severe fatigue in the control group.

Table (I): Distribution of sociodemographic characteristics among the study and control groups.

Sociodemographic Data	GROUPS		Total	
	Study group N= 100	Control group N= 100		
Age group	N&%	N&%	N&%	
20-	4	10	14	7.0
30-	20	17	37	18.5
40-	24	24	48	24.0
50-	52	49	101	50.5

Mean± SD	46.92 ± 8.64	45.53± 10.84		
Gender				
Male	40	42	82	41.0
Female	60	58	118	59.0
Residence				
Rural	62	58	120	60.0
urban	38	42	80	40.0
Level of education				
Illiterate	30	24	54	27.0
Read & write	8	9	17	8.5
Secondary	38	40	78	39
University	24	27	51	25.5
Marital status				
Single	10	12	22	11
Married	83	82	165	82.5
Widow	7	6	13	6.5
Divorced	0.0	0.0	0.0	0.0
Occupation	N&%		N&%	N&%
Employee	22	14	36	18.0
Student	4	6	10	5.0
Worker	18	19	37	18.5
Farmer	4	5	9	4.5
House wife	50	52	102	51.0
Other	2	2	4	2.0
Occupation state				
Not affected	2	2	4	2.0
Affected (take vacation)	24	16	40	20.0
Not work	74	82	156	78

Table 2: Distribution of health relevant data among the study and control groups.

Health relevant data	GROUPS		Total	
	Study group N= 100	Control group N= 100	N&%	
Medical diagnosis	N&%	N&%	N&%	
Head& neck cancer	16	17	33	16.5
Breast cancer	40	28	68	34.0
GIT cancer	28	38	66	33.0
Bladder cancer	6	3	9	4.5
Lung cancer	8	10	18	9.0
Cervix cancer	2	4	6	3.0
Date of disease discovery				
Less than one year	70	78	148	74.0
More than one year	30	22	52	26.0
grades of cancer				
G 2	78	82	160	80.0
G 3	20	17	37	18.5
G 4	2	1	3	1.5
Site of radiotherapy				
Chest	50	43	93	46.5
Abdominal	12	13	25	12.5
pelvic	22	27	49	24.5
pelvic	22	27	49	24.5

Table (3): Mean score, standard deviation and test of significance of patient's total knowledge score about radiotherapy of the study and control groups' pre, post, and follow nursing management protocol implementation.

Total	Item	Study group	Control group	t	X ²	P- value
		Mean ± SD	Mean ±SD			
Knowledge score						
Pretest		22.92 ± 7.9	18.3 ±9.02	3.76	2.020	>0.05
Post test		54.84 ± 7.81	24.15 ± 8.86	25.986	194.7	≤ 0.001**
Pre vs. post	t	28.018	4.321			
	p	< 0.001**	< 0.01			
Follow up 1		53.44 ± 8.1	27.8 ± 8.72	21.479	180.3	≤ 0.001**
Follow up 2		52.1 ± 8.88	30.27± 9.47	16.812	148.2	≤ 0.001**

- X²: chi- square test
- *Significant (p< 0.05)
- ** High significant (p<0.01*)

Table (4): Mean score, standard deviation and test of significance of patient's knowledge concerning dealing with fatigue as radiotherapy side effect of the study and control group pre, post, nursing management protocol implementation.

Fatigue and risk for infection radiotherapy side effects	GROUPS		t	P
	Study group Mean± SD	Control group Mean± SD		
Fatigue				
Pre test	0.98±0.79	0.87 ±0.46	0.218	>0.05
Post test	5.92± 0.27	1.97± 1.04	36.766	≤ 0.001**
Pre vs. post	t	57.39	7.143	
	p	≤ 0.001**	≤ 0.001	
Follow up1	5.90 ± 0.30	2.59±1.22	26.268	≤ 0.001**
Follow up2	5.82± 0.39	2.74± 1.34	22.117	≤ 0.001**

Table (5): Impact of relaxation technique on incidence of fatigue as radiotherapy side effect of the study and control groups' pre, post, and follow up tests

Fatigue severity scale	Pre test 1 st assess	Post test 2 nd assess	Follow up1 3 rd assess	Follow up2 4 th assess
Study group Mean± SD	9.0±0.0	9.16±0.54	10.18±0.65	10.38±1.67
Control group Mean± SD	9.0±0.25	14.77±4.39	20.11±4.05	24.0±5.73
t		12.669	24.217	22.810
p		≤ 0.001**	≤ 0.001**	≤ 0.001**

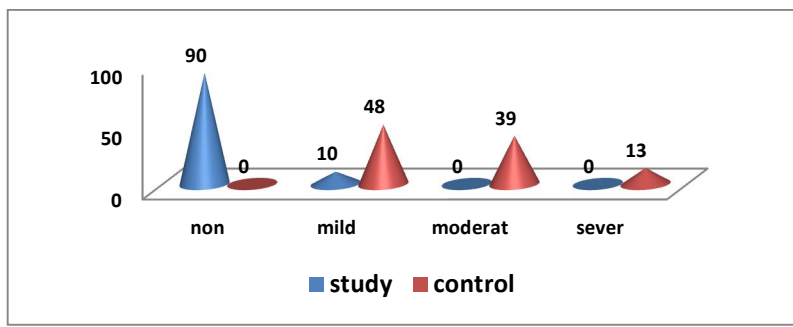


Figure (1): Show severity of fatigue as radiotherapy side effect of the study and control groups at the end of study (follow up2).

Table (6): Relation between incidence and severity of fatigue as radiotherapy side effect according criteria assessment scales and the patient's total knowledge score at pre, post, and follow up tests.

Fatigue severity scale	Total knowledge score				t	P
	Study		Control			
	Incidence N	Mean ± SD	Incidence N	Mean ± SD		
Non	90	5.82±0.38	0	0.0	7.087	≤0.001**
Mild	10	5.8±0.42	48	2.79±1.32		
Moderate	0	0.0	39	3.13±0.92		
Sever	0	0.0	13	1.38±1.66		

4- Discussion:

Fatigue is a highly prevalent condition among cancer patients treated by radiotherapy. Although most cancer patients reported that fatigue is a major obstacle for maintaining normal daily activities and quality of life (*Strieker et al., 2009*).

Nursing care of the patient receiving radiation therapy focuses on preparing the patient physically and psychologically for therapy. Pretreatment assessment includes knowledge of the treatment plan and goal of therapy. Wengstrom & Frosberg (2008) found that the provision of information about presentation, prevalence, and duration of side effects reduce the patient's anxiety level, enhances self-care and improve patient outcome. Therefore, the aim of the present study is establishing and implementing of nursing management protocol to radiotherapy incidence fatigue in cancer patient. The present study findings revealed that, nearly one half of the study subjects were in the age group of 50 years and more. This in agreement with, American Cancer Society (2011) it reported that, most cases occur in adults who are middle aged or older, about 78% of all cancers are diagnosed in persons 55 years of age and older. Females constituted about two third of the study subjects, this may be related to the high incidence of breast cancer among cancer patients according to Mansoura University hospital statistical report 2011. This finding is contradicted by Brenner et al. (2009) who agreed with American Cancer Society (2009) that, the incidence of cancer is higher in men than in women. Concerning to the level of education the present study revealed that most of the study subjects had middle level of education, this is may be related to the fact that, majority of the study subject came from rural area with low socioeconomic level, interested in manual and farmer work.

Incidence of breast cancer and gastrointestinal cancer were higher in the Egyptian population (National Cancer Institution, 2011). This goes with the finding of the present study where more than one third of the subjects had breast cancer and about one third had GIT cancer. In the present study about three quadrante of the study subjects were discovered with

incidence of disease time less than one year. This is in line with the Canadian Cancer Society which indicates that, with time there will be an increase in the rates of incidence of cancer for both males and females (Johnson & George, 2010). Also this in harmony with report of National Cancer Institution (2010) who found that, about 100,000 new cases of cancer discovered per year in Egypt.

In the same point Julie et al. (2005) studied the effect of patient education on coping more effectively with treatment-related stresses and complications. This study added additional empirical support to claims for the value of procedural and sensory information provided before a stressful medical procedure. The results of this study indicated that, patient education in a radiation therapy setting can effectively increase patients' treatment-related knowledge and ameliorate the degree of side effects and general emotional distress experienced during treatment. Although the educational intervention consisted of a relatively simple audiovisual presentation at the beginning of treatment, it yielded of treatment and in general condition.

The present study revealed that there was a highly statistical significant improvement in the total knowledge score of the study group after applying nursing management protocol sessions in comparing with the control group. This in harmony with the study done by Caroline Häggmark et al. (2011) who noted that, knowledge scores were consistently increased for the nursing consultation group. Also this study shown that, the patient information was a significant important in preparing the patients for the procedure of receiving radiation therapy.

Concerning the control group, the present study found that, there is no improvement in total knowledge score when assessed at the same time with the study group, this may be due to many of reasons as large numbers of patient, greet shortage in nursing number with many responsibilities, also no unite, center or person responsible for patient education. Regarding the patient knowledge related to side effects of radiotherapy and measures to over come, the present study clarifies a highly improvement in patient knowledge with a highly statistical significant

difference between the study group and the control group after implementation of nursing management protocol sessions. These go in line with Glanz et al. (2008) who noted that education plays a vital role in helping patients and their families to become involved in their cancer treatment and dealing with side effects. On the same line McPherson et al. (2011) reported that, cancer patients who have an educational session with oncology nurses in advance of the initiation of treatment will learn how to reduce the risk of and manage adverse effects and maximize well-being. Helping patients to manage their side effects reduces adverse events and recognize the need for urgent or inpatient care.

Concerning to fatigue severity scale, the present study found a decrease in fatigue severity in the study group with a highly statistical significant difference between the study group who follow nursing management protocol as progressive muscle relaxation technique, patient education about diet, life style modification, and the control group at post test. This result comes inconsistent with Winningham (2009)& Berger (2010) who concluded that, education about fatigue greatly benefits cancer patients. Milne et al. (2008) added that information provided for cancer patient may be useful in developing a management plan that modifies specific activities and incorporates appropriate periods of rest. Additionally Ream et al. (2009)& Given et al. (2011) found that, shift in responsibility for side effects control from the health care professional to the individual is important. It is imperative that individuals with cancer are educated to develop the self-care abilities necessary to cope with fatigue.

On the other hand, Mock et al. (2011) found that, an improvement of health perception, and increased activity level and a tendency to less fatigue after 4 weeks of regular exercise compared to baseline and compared to a non trained group. Regular aerobic exercise improved both mood and quality of life in patients (Mutrie et al., 2007& Matthews et al., 2007, Daley et al. (2007), and Alfano et al. (2007). Mock et al. (2010) confirmed that, exercise improved functions in patients treated for breast cancer and increased physical activity was consistently related to both improved physical functioning and reduced fatigue.

This finding is contradicted by Mattie (2009) who reported that, no significant differences were found between the experimental and control group on fatigue and physical performance with exercise and progressive muscle relaxation technique.

Concerning to relation of patients knowledge to severity of radiotherapy side effects the present study revealed, decreased incidence and severity of radiotherapy side effects for the study group at post,

and follow up tests than control group. In agreement with this result Ashing-giwa et al. (2006) confirm that, lower level of knowledge resulting in lack of awareness about cancer and available treatment, while knowledgeable patient are more aware about disease, side effects, and better access to care and its benefits.

5- conclusion:

Based on the present study findings, it can be concluded that a marked gap in the knowledge of cancer patient there was receive radiotherapy. Moreover, the implementation of a nursing management protocol based on their profiles and needs was successful in improving patient's knowledge score of the study group. Furthermore, these benefits are maintained to the end of radiotherapy course.

In addition, the results of the current study revealed that, both incidence and severity of fatigue were significantly decreased in the study group after implementation of nursing management protocol.

Recommendations:

Based on the results of the present study, the following recommendations are suggested:

1. Cancer patients should be given a written instruction plan for their radiotherapy steps and self- management measures to radiotherapy.
2. Family and significant members should be actively participating in planning the care for the cancer patients who receive radiotherapy so that they can support and encourage them to manage and decrease their problems.
3. Nursing management protocol should be integrated within the plan of care for cancer patients going to radiotherapy. This protocol should emphasize patients' education about the disease process, treatment modalities, behavior and life style modification, different relaxation techniques, psychological support, financial support, and coping behaviors that the patients can integrate into their lifestyle.
4. Development of cancer education center in nuclear- medicine department is essential to provide inpatient and outpatients nursing management protocol for cancer patient receive different type of treatment modalities.
5. Developed illustrated booklet should be available and distributed for each cancer patient admitted to the hospital.

Further researches:

- More researches are needed to investigate the long –term effect of such educational intervention.

- Further research is needed to document the positive effect of self care on the prevention of radiotherapy fatigue.

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