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Cancer Detection Cancer and Classification Radiotherapy Treatment

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ABSTRACT

Aim: *The aim of this study were to correlate Jordanian cancer patients' quality of life and fatigue with selected variables (age, sex, religion, marital status, level of education, type of cancer, number of people living in the same household, type of radiotherapy, dose of radiotherapy, and hemoglobin level).*

Background: Radiotherapy and chemotherapy remain devastating agents that altered patients' normal lives.

Methods: A correlational design was used in this study to 80 cancer patients and required radiotherapy treatment using a convenience sampling procedure.

Results: No significant differences were found in the relationship between quality of life scores and selected variables. A significant negative relationship was found between quality of life scores and the side effects of radiotherapy treatment. Significant positive relationships were found between fatigue scores measured by Piper Fatigue Scale and cancer complications , and radiotherapy side effects.

Conclusion: Cancer patients' quality of life and fatigue are affected by radiotherapy's side effects and cancer complications.

Implications for Nursing: Nurses should try to prevent and manage the negative side effects of radiotherapy and complications of cancer. Such an initiative would serve to design specific nursing interventions that have the potential to help patients enjoy their lives and perform their activities.

Keywords*: Cancer patients, fatigue, Piper fatigue scale, quality of life, radiotherapy.*

INTRODUCTION

Cancer is a pervasive cluster of disease touching the lives of many individuals and families (Ng et al. 2013).

It was found that fatigue occurs in 65-100% of patients receiving radiotherapy treatment (Xin-lin, et al. 2014). Patients receiving radiotherapy alone, or in conjunction with other treatment modalities, are at risk of experiencing heightened levels of fatigue, which can last months or years after treatment (Xin-lin, et al. 2014). The impact of fatigue on QOL in cancer clients is significant and is not acknowledged adequately. On the other hand, the fatigue in these clients may begin with a reduction in actual activity and it continues to include a variety of side effects. These side effects usually influence a patient's prognosis and lead to a decreased sense of control and isolation. QOL is a multidimensional construct; its components differ considerably between a healthy and a medically ill population (Eyigor et

al. 2010). While the ability to care for oneself and fill social roles may be taken for granted in good health, the ability to live fully is of paramount importance in the presence of disease (Eyigor et al. 2010).

Designing interventions for specific and pressing clinical problems that may affect QOL, such as fatigue, nausea, pain, and sexual dysfunction is one of the major nursing roles (Xin-lin, et al. 2014). Currently, oncology nurses have significant QOL research outcomes available in the area of pain (Oliveira et al. 2014); and bone marrow transplantation (Janicsák, et al. 2013). However, a few studies have systematically assessed the impact of fatigue on the cancer population (Oliveira et al. 2014).

A debate around the impact of radiotherapy and other treatment modalities on different aspect of QOL among prostate-cancer patients has been increased. Guren et al. (2003) examined symptoms and the Health Related Quality of Life (HRQOL) of 42 patients treated with radiotherapy for prostate and rectal cancer. They found that the mean scores of fatigue, diarrhea, physical function, and social function had significantly increased at the end of treatment (P=0.01) compared with pre-treating scores. HRQOL scores had returned to pre-treatment levels 4-6 weeks after radiotherapy. They concluded that the QOL for patients receiving radiotherapy treatment was impaired by radiotherapy's side effects.

The impact of fatigue on in-patients undergoing transplantation has been studied. Winnie et al. (2003) explored the effects of fatigue on QOL in Chinese adult bone marrow transplantation (BMT) recipients. The findings showed that patients reported a moderate level of fatigue (Mean total fatigue score=4.7, SD=1.7). More than 15% reported a high level of fatigue showing statistically significant deterioration of physical, global of QOL, cognitive, sexual and social functioning as compared with patients who reported mild degrees of fatigue. Older, women, married, non-employed, non-educated and low-income patients were more likely to identify perceiving a high level of fatigue. It is reasonable to conclude that increasing a nurse's knowledge about the impact of fatigue on QOL in BMT survivors is an important step toward choosing appropriate nursing interventions to relieve such fatigue.

Obead et al. (2014) conducted a study about the effect of radiotherapy on Jordanian cancer patients' quality of life and fatigue. Interestingly, a significant differences were found between pre- and post- radiotherapy QOL mean total scores (t=19.3, df=79, P<0.05), as well as physical, emotional, sexual, and functional wellbeing dimensions. Statistically significant differences were found between pre- and post- radiotherapy fatigue mean total scores (t=-8.95, DF=79, P<0.05), as well as on behavioral, affective, sensory, and cognitive dimensions of PFS. Quality of life total scores correlated significantly and negatively with total fatigue scores (P<0.01).

There is a lack of knowledge about the relationship of Jordanian cancer patients' QOL and fatigue with selected demographic variables. This study is an attempt to fill these gaps, with particular relevance to the knowledge levels of Jordanian nurses. Therefore, this study aimed to investigate the relation between patient-relevant selected variables, their fatigue levels and QOL.

ISSN No. 2395-0900
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METHODS

Design

A correlational design was used in this study.

Sample and setting

A convenience sampling procedure was used to recruit potential participants for this study. The inclusion criteria were as follows: (a) 20-60 years old, (b) had no history of psychiatric or mental problems, (c) had radiotherapy for the first time, (d) was treated with radiotherapy only, (e) was able to read, write and understand Arabic, (f) had a Hemoglobin (Hb) level above 12 g /dl at the beginning of the study, (g) had no history of cardiac, respiratory or medical illnesses and (h) was able to give verbal consent to participate in this study.

The sample size was determined by Cohen's (1992) formula. Cohen identified three levels for the effect of the sample size when using Pearson's Product Moment Correlation: small 0.1, medium 0.3, and large 0.5. Based on this classification and literature review, the medium effect correlation between fatigue and QOL was anticipated for this study. Testing a one-tailed hypothesis at significant level of alpha 0.05, the sample size was determined to be 80 participants. Therefore, the convenience sample of 80 participants, who were treated with radiotherapy at AlBashir hospital and met the inclusion criteria, agreed to participate, and who were able to complete the study measurements, participated in this study. Two participants, who had met the inclusion criteria and agreed to participate, were unable to complete the study. Therefore, their data were not included in the analysis. Transfer of the participants to another institution was the reason for not completing the study. All participants were treated with external radiotherapy at Albashier hospital.

INSTRUMENTS

The following instruments were used to collect data from all participants in this study:

1. Clinical and Demographic Data Sheet (DDS)

The clinical and demographic data sheets were developed by the researchers to elicit background information about the patients. The DDS include questions related to age, marital status, gender, level of education, occupation, religion, number of people living in the same household, type of cancer, complications of cancer, type of radiotherapy, place of radiotherapy treatment, dose of radiotherapy, radiotherapy side effects, hemoglobin level at the beginning of treatment, and distance between home and hospital.

2. Functional Assessment of Cancer Therapy-General

The Functional Assessment of Cancer Therapy-General (FACT-G) was used to elicit data about QOL from Jordanian cancer patients receiving radiotherapy. The permission of the original author was obtained to be used in this study before the beginning of the study. This instrument was originally developed by Cella et al. (2003) to measure four cornerstone dimensions of QOL: physical well being, 6 items; social wellbeing, 6 items; emotional wellbeing, 7 items; and functional wellbeing, 7 items. The FACT-G is a 27 item, self-administered Likert type generic format. Each item is rated on a 5 point scale from 0-4, where 0= not at all, 1= a little bit, 2= somewhat, 3= quite a bit and 4= very much. An additional item related to sexual activity was used to measure sexual satisfaction with score ranges between 0-4, with higher score indicates a

higher degree of sexual satisfaction. The total scores of the Arabic version of FACT-G range from 0-108, with higher rating scores reflecting higher QOL. The Arabic version of FACT-G is reported to have high scores of reliability and validity. The content validity index was reported to be 0.95. Cronbach's alpha for internal consistency was 0.967 for total scale and from 0.89-0.98 for subscales (Zhang, 2014).

3. Piper Fatigue Scale (PFS)

The Piper Fatigue Scale (PFS) is a multidimensional tool designed to measure the level of fatigue subjectively, and has been widely used in research. It has the potential to differentiate three levels of fatigue: mild, moderate and severe (Lundgren-Nilsson et al. 2014). The Piper Fatigue Scale (PFS) is congruent with the conceptual framework of this study, which acknowledges fatigue as a subjective phenomenon.

The scoring procedure of the PFS is as follows: to obtain the total fatigue score the researcher needs to add scores of all items and divide them by 22 to keep the score on the same numeric 0-10 scale. The scores can be categorized into four levels: 0 none, 1-3 mild, 4-6 moderate and 7-10 severe.

The test-retest reliability coefficient for the PFS was 0.98; Cronbach's alpha for each dimension (subscale) ranged between 0.89-0.98 (Lundgren-Nilsson et al. 2014).

Before embarking on the full study, a pilot test was conducted with 10 participants within the target population to ensure that the tool is readable and can be understood by those who will use it. The pilot study indicated that the Arabic version of the PFS was readable, and easily understood. Participants did not request any additional information to be included in the questions. Structured interviews for each participant required from 10 to 15 minutes. Reliability coefficient alpha was calculated for total PFS scores and subscales scores. The results showed that the Arabic version of PFS is a reliable instrument, with internal consistency of the entire Arabic version of PFS (alpha =0.947), and for the four subscales: behavioral, affective, sensory, and cognitive dimension (alpha = 0.915, 0.807, 0.952, and 0.864) respectively.

Ethical consideration:

Approval from the Institutional Review Board at the Ministry of Health, Jordan and Albashier hospital's administration was received for conducting the study. Researchers explained the aims of the study and obtained consent from participants; the latter being guaranteed that involvement was voluntary. Patients were informed that they were free to withdraw at any time. Participants were confident that their answers would be handled in complete confidence and any details that might expose their identification would not be documented.

Data collection procedure:

Daily visits were made to the setting to check for participants who met the inclusion criteria. Once a participant was identified, consent was acquired after delivering sufficient details about the importance and reasons of the study. The researcher interviewed each participant twice, using the designated questionnaires FACT-G, PFS, and DDS; immediately before receiving their first cycle of radiotherapy and after the end of their treatment.

Data analysis

Descriptive statistics were used to determine the characteristics of participants. Pearson's Product Moment Correlation was used to find the correlation between QOL scores as measured by FACT-G and fatigue measured by PFS with selected variables on continues (for you to sort)

level (age, number of people living in the same household, dose of radiotherapy, hemoglobin level, and distance between home and hospital).

A Biserial Correlation Coefficient was used to find the correlation between QOL and fatigue with selected variables on nominal and dichotomous levels (sex, marital status, educational level, religion, job, family care provider, patient care provider, type of cancer, complication of cancer, place of radiotherapy, side effect of radiotherapy, and type of transportation).

RESULTS

The age of participants ranged from 20 to 60 years (M=43.13, SD=8.998). Most participants were female (n=53, 66.25%), married (n= 64, 80%), unemployed (n=48, 60%), diagnosed with breast cancer (n=43, 53.75 %), and cared for by a spouse (n=56, 70%). (See table 1)

Table I
Socio-demographic Characteristic of the Sample

Character	Category	Frequency	%	Mean	Standard Deviation	Range
Sex	Male	27	33.75			
	Female	53	66.25			
Age in years				43.13	8.998	60-20
Marital Status	Married	64	80			
	Single	12	15			
	Widow	4	5			
Level of Education	0-11 years	44	55			Illiterate-18
	≥12 years	36	45			
Occupation	Unemployed	48	60			
	Skilled work	13	16.25			
	Unskilled work	19	23.75			
Patient Care Provider	Father/ Mother	9	11.25			
	Brother/ Sister	4	5			
	Son/ Daughter	6	7.5			
	Husband/Wife	56	70			
	Patient himself	4	5			
	Others	1	1.25			
Family Care Provider	Father/ Mother	14	17.5			
	Son/ Daughter	2	2.5			
	Husband/Wife	36	45			
	Patient himself	28	35			
Family N				5.15	1.9656	2-11
Hemoglobin level				12.93	0.965	12-16
Type of Cancer	Breast	43	53.75			
	Bladder	2	2.5			
	Larynx	9	11.25			

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	Lymphoma	2	2.5			
	Prostate	4	5			
	Others	20	25			
Cancer Complication	Abdominal pain	13	16.25			
	Constipation	6	7.5			
	Back pain	10	12.5			
	Brain metastasis	6	7.5			
	Urine retention	9	11.25			
	SOB	16	20			
	Fatigue	20	25			
Type of Radiotherapy	External	80	100			
Dose of Radiotherapy				125.575	125.575	900-88
Place of Radiotherapy	Chest wall	43	53.75			
	Whole brain	6	7.5			
	Abdomen	9	11.25			
	Larynx	9	11.25			
	L1-L4	2	2.5			
	Right Dog Leg	6	7.5			
	Modified	3	3.75			
	Others	2	2.5			
Side Effect of Radiotherapy	GI disturbance	15	18.75			
	Skin problem	8	10			
	Depression	4	5			
	Urine retention	12	15			
	Dizziness	5	6.25			
	Fatigue	36	45			

Biserial Correlation Coefficient showed significant negative relationship between QOL scores and side effect of radiotherapy treatment ($r=-0.223$, $P< 0.01$) (see table 2).

Table 2

Results of Biserial Correlation Coefficient between QOL Scores as measured by FACT-G and Sociodemographic Variables on Nominal and Dichotomus Levels

Sociodemographic Variables	QOL Scores
Sex	-0.04
Marital status	0.024
Educational level	-0.207
Religion	0.070
Job	-0.135
Family care provider	-0.055
Patient care provider	0.030
Type of cancer	-0.118
Complication of cancer	0.216
Place of radiotherapy	0.016
Side effect of radiotherapy	-0.223**
Type of transportation	0.066

** Correlation is significant at 0.01 level.

The Biserial Correlation Coefficient was used to find the correlation between fatigue scores as measured by PFS and selected variables on nominal and dichotomous levels. The Biserial Correlation Coefficient showed a significant positive relationship between fatigue scores measured by PFS and cancer complication ($r=0.355$, $P<0.01$), and radiotherapy side effects ($r=0.231$, $P< 0.01$). The fatigue level is increased when patients suffer from radiotherapy side effects and cancer complications (see table 3).

Table 3

Results of Biserial Correlation Coefficient between Fatigue Scores as measured by PFS and Sociodemographic Variables on Nominal and Dichotomus Levels

Sociodemographic Variables	QOL Scores
Sex	0.148
Marital status	-0.084
Educational level	0.05
Religion	-0.035
Job	0.059
Family care provider	- 0.091
Patient care provider	-0.91
Type of cancer	0.74
Complication of cancer	0.355**
Place of radiotherapy	-0.063
Side effect of radiotherapy	0.231**
Type of transportation	-0.013

** Correlation is significant at 0.01 level.

DISCUSSION

A significant negative relationship was found between QOL scores and radiotherapy's side effects. In other words radiotherapy's side effects are associated with poorer QOL. These results are congruent with the findings of previous research studies (West et al. 2014; Bye et al. 2000; Abayomi et al. 2005). These results are most likely due to a failure to manage the side effects of radiotherapy adequately, which has a direct and profound influence on the QOL of patients. Therefore, nurses are encouraged to prevent and/or manage the negative side effects of radiotherapy in order to improve the QOL for their patients.

There are several factors which may have roles in the failure of managing fatigue in cancer patients such as lack of basic research describing side effects of radiotherapy and its associated pathology, lack of adequate instrumentation to measure the side effects, and the lack of interventional research (Eyigor et al. 2010). It was explained that most of the clinical practices in this field were based on the nurses' judgments, which were formed based on their (professional subjective) experiences and were not validated through research. Nurses often rely on their best clinical judgement; however, this judgement needs to be subjected to scientific testing (Yang & Thompson , 2011).

Biserial Correlation Coefficient showed that fatigue scores, as measured by PFS, correlated significantly and positively with cancer complications and radiotherapy's side effects. These findings mean that fatigue level increases significantly with the presence of cancer complication and radiotherapy's side effects. Fatigue is most likely due to chemical substances produced by tumors and released into the patient's blood stream, or maybe as an indirect result of radiotherapy treatment (Kwak et al. 2012). These results may be explained by the nature of the research sample, since the participants have different types of cancer, and are therefore receiving different doses of radiotherapy. Participants have variations in their coping strategies to deal with the side effects of radiotherapy and complications from cancer. Under these circumstances it is clear that fatigue has different origins in these patients (Franco et al. 2013).

The finding of this study is congruent with finding of previous research study (Bruheim et al. 2010). In this study there are no significant relationships between fatigue and age, marital status, employment status, and educational level. Comparisons of these findings can be made only with Winnie et al. (2003) who used the same instrument. They found that older, married, women, non-educated, non-employed, and low-income patients reported high scores of fatigue. The explanations for that may be the effects of variance in both culture and values in perceiving fatigue.

The use of a convenience sample and the small sample size were a major limitation since only 80 participants were able to complete this study. The inferential statistics performed on these data must, therefore, be interpreted with extreme caution, and no conclusions can be drawn with certainty.

CONCLUSION

In conclusion, fatigue may be negatively influenced by radiotherapy's side effects and cancer complications. Other variables such as age, sex, marital status, educational level, and employment status may not influence fatigue levels. Therefore, nurses have an obligation to take radiotherapy's side effects and cancer complications into account when caring for cancer patients.

Implications for Nursing & Health Policy

1. Cancer patients receiving radiotherapy are at risk of experiencing considerable treatment-related fatigue. Therefore, nurses should incorporate the issue of fatigue in routine assessments of patients who are being treated for cancer or being followed-up after completing treatment.
2. Fatigue may affect cancer patients' physical, emotional, and functional dimensions of QOL. Therefore, specific nursing interventions that have the potential to help patients enjoy their lives and perform their activities are encouraged.
3. Quality of life deteriorates as a result of radiotherapy's side effects. Therefore, nurses are encouraged to deal with the side effects of radiotherapy in order to improve the QOL for their patients.
4. Fatigue is influenced by cancer complications, and radiotherapy's side effects. Therefore, nurses have an obligation to take these variables into account when caring for cancer patients.

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