

The Assessment of Fatigue and its Related Factors in Patients with Cancer

Moloud Sharifi Rizi¹, Atefeh Ghanbari khanghah^{2*}, Masoumeh Adib³, Ehsan Kazem Nejad Leili⁴

¹Department of Nursing (Medical _ Surgical), Instructor, School of Nursing, Babol University of Medical Sciences, Ramsar, Iran

²Social Determinants of Health Research Center (SDHRC), Associate Professor, Guilan University of Medical Sciences, Rasht, Iran

³Department of Nursing (Medical _ Surgical), Instructor, School of Nursing and Midwifery, Guilan University of Medical Sciences, Rasht, Iran

⁴Social Determinants of Health Research Center (SDHRC), Bio-Statistics, Associate Professor, Guilan University of Medical Sciences, Rasht, Iran

*Corresponding author: Social Determinants of Health Research Center (SDHRC), Rasht.

E-mail: at_ghanbari@gums.ac.ir

Received: 2015 May 18; Accepted: 2016 December 11

Abstract

Introduction: Cancer is a major health issue in Iran and in the rest of the world. Fatigue is one of the most complex and the most prevalent cancer-related problems that can affect various aspects of life for cancer patients. It can cause numerous problems.

Objective: The aim of this study was to determine the level of fatigue and its associated factors in patients with cancer.

Materials and Methods: In this descriptive-analytical study, 90 cancer patients referred to the oncology department in one of the teaching hospitals were assessed. The data collection tool was a questionnaire based on demographic information and the fatigue severity scale (FSS). This questionnaire consisted of nine questions with a numeric scale for answers ranging from 0 to 7. A score of 7 indicates the highest level of fatigue and 1 indicates no fatigue. The patients with above-average scores were considered to have fatigue and those with lower scores were considered to have no fatigue. To analyse the data, descriptive and inferential statistics (chi-square test, one-way ANOVA, and logistic regression) were used.

Results: The mean age of the patients was 52.1 ± 14.4 years. The majority of the subjects were women (58.9%), married (91.1%), and with an educational level below diploma (40%). The average score of fatigue was 5.8 ± 0.54 out of 7. The results of the logistic regression model showed that the factors influencing cancer-related fatigue were the variable of unemployment ($p=0.034$, $\beta= 1.1$) and haemoglobin levels ($p=0.049$, $\beta= 0.33$).

Conclusion: The results showed that in addition to providing physical care and nursing interventions, it is important to consider demographic factors and psychological interventions for the comprehensive management of problems in cancer patients, particularly fatigue.

Keywords: Neoplasms, Patients, Fatigue

Introduction

Cancer is a major health concern around the world. Cancer is the second leading cause of mortality in America and the third leading cause of mortality in Iran (1, 2). Cancer is a global problem that affects all individuals, regardless of race, gender, age, socio-economic status, or culture, and kills 552,200 people annually, the world over (3). Cancer will be an important factor in the global burden of disease in the coming decades and it is expected that the number of new cases will rise to 15 million by 2020. Also, it is estimated that about 60% of the new cases will occur in the less developed countries of the world (2). For the treatment of cancer, based on the stage of the cancer and the patient's medical history, different strategies can be used. These may include surgery, radiotherapy, chemotherapy, and hormone therapy (1). Among the various methods of cancer treatments, chemotherapy is the most commonly used method that (similar to other cancer treatment methods) can cause side effects, including nausea, vomiting, loss of appetite, an increased chance of infection, bleeding, and fatigue (4). Among these complications, fatigue is mostly observed in chemotherapy, compared to the other methods of treatment. In fact, about 60% to 93% of the patients undergoing radiation experience fatigue, while this level in the patients undergoing chemotherapy is 80% to 96% (3, 5). Therefore, cancer-related fatigue is one of the most complex and most common problems that can affect various aspects of the patients' lives and can lead to serious problems (6). Cancer-related fatigue is a multidimensional concept that can be analysed from the physical, psychological, and social aspects (7). So, fatigue can be considered the most common and the most worrying side effect of cancer treatment (8).

Cancer-related fatigue differs from the fatigue experienced before cancer. The patients describe it as a severe, chronic, and disappointing fatigue, which does not get better with rest (9). Fatigue has severe detrimental effects on performance and quality of life, and is associated with reduced social activity. Moreover, fatigue has profound and complex effects on the mental, physical, social, and cognitive states of cancer patients, which, in turn, can cause depression and may reduce life expectancy (10, 11). Since this factor deals with the subjective experience of the patient, the assessment and the awareness of healthcare providers regarding fatigue and its treatment are vital. These are the most important steps in professional interventions that can provide optimal fatigue care (12). The best strategy for managing the patients' symptoms is having a correct understanding of the signs and symptoms of fatigue. Thus, before any therapeutic intervention, the factors that are associated with fatigue must be correctly identified (13).

Many factors exacerbate the symptoms of fatigue in patients. On the basis of the severity of the disease, fatigue-related factors can be associated with very broad aspects such as the socioeconomic factors (gender, level of education, having a permanent job) or the clinical characteristics of the disease (duration of diagnosis, diet therapy, the physical condition of the patient, and the type of cancer) and each can affect the level of fatigue in the patient (14). Although the possible roles of some variables such as the stage of disease, the type of cancer, and anaemia have been reported in cancer-related fatigue, there is insufficient evidence yet. Therefore, with regard to the role of these variables, the aim of this study was to determine the level of cancer-related fatigue and its relationship with the

clinical and demographic characteristics of the patients with cancer.

Materials and Methods

This analytical cross-sectional study was conducted on 90 cancer patients referred to the oncology department in one of the teaching hospitals in Rasht in 2014. The sample was selected by the convenience sampling method. The sample size was determined (n=90) according to the study by Moradi et al. (13), based on average fatigue. The subjects were divided into the intervention group and the control group. The purpose of the study was explained to the patients and then, the patients' oral consent for their participation in this study was obtained.

The inclusion criteria included age over 20 years, no prior history of psychological problems as disclosed by the patient or their family, a definitive diagnosis of cancer based on the information contained in the medical records, the absence of any underlying diseases, and the willingness to voluntarily participate in the study. The demographic and clinical information was collected using a questionnaire. The questions included age, gender, place of residence, education level, marital status, number of children, employment status, duration of disease, type of cancer, body mass index, haemoglobin and haematocrit levels, and the type and dosage of medication therapy. In the second part, the fatigue severity scale (FSS) was used to measure the level of fatigue in the patients.

The FSS questionnaire was introduced by Krupp in 1988. He was a neurologist and designed this instrument to measure fatigue in patients with multiple sclerosis (MS). This questionnaire measures general fatigue in a quick manner. The advantages of this questionnaire are as follows: The score obtained is entirely proportional to the intensity and the level of fatigue in the patients; it does not make the patients

more tired; it is easy to understand for all patients; and 98% of patients are able to respond to the questions without assistance. The psychometric evaluation of this questionnaire was performed by Shahvareghi et al. (2012) in patients with multiple sclerosis and the Cronbach's alpha coefficient was 0.96 (15). This instrument consists of nine questions with a rating scale from 0 to 7. This scale measures all the dimensions of fatigue (physical, mental, emotional, behavioural, and social). It should be noted that five questions basically measure the quality of fatigue, three questions measure physical and mental fatigue and the effect of fatigue on the social status of the person, and one question compares the severity of the fatigue with other symptoms in the patient. The score of each question ranges between 1 and 7. Here, 1 suggests that a person strongly disagrees and the score 7 represents complete agreement. The total score is calculated by dividing the sum of the scores by 9. This score also ranges from 1–7. A score of 7 represents the highest level of fatigue and a score of 1 represents no fatigue. The FSS is calculated based on the average obtained. People with scores above the average are considered to be fatigued and those with scores below the average are considered to have no fatigue. In this study, the mean fatigue score was 5.8.

The data was analysed by the SPSS software version 21. When the normal distribution of the data was confirmed, the relationship between the demographic and the clinical variables was assessed using descriptive statistical tests, and the chi-square, ANOVA, and logistic regression tests.

Results

The results of this study showed that 41.1% of the patients had no fatigue and 58.9% had fatigue. The age of the patients ranged from 24 to 84 years and the mean

Table 1. Distribution of fatigue score in terms of individual and social factors

| Variables | Level of Fatigue | | Sig. | |
|-----------------------|---------------------|------------------|----------|--------|
| | No fatigue (%) | With fatigue (%) | | |
| Gender | Female | 26(49.1) | 27(50.9) | 0.045* |
| | Male | 26(70.3) | 11(29.7) | |
| Marital Status | Single | 5(71.4) | 2(28.6) | 0.385* |
| | married | 47(57.3) | 35(42.7) | |
| | Widow | 0(0) | 1(100) | |
| Place of Residency | City | 33(55) | 27(45) | 0.451* |
| | Village | 19(63.3) | 11(36.7) | |
| Employment Status | Employed | 24(77.4) | 7 (22.6) | 0.006* |
| | Unemployed | 28(47.5) | 31(52.5) | |
| Occupation | Unemployed | 28(47.5) | 31(52.5) | 0.06** |
| | Employee | 5(62.5) | 3(37.5) | |
| | Retired | 3(100) | 0(0) | |
| | Freelance | 10(83.1) | 2(16.7) | |
| | Farmer | 6(75) | 2(25) | |
| Education | Illiterate | 13(59.1) | 9(40.9) | 0.66** |
| | Below Diploma | 21(58.3) | 15(41.7) | |
| | Diploma | 12(50) | 12(50) | |
| | Academic | 6(75) | 2(25) | |
| Cancer Type | Colon | 14(70) | 6(30) | 0.12** |
| | Breast | 9(45) | 11(55) | |
| | leukemia | 4(44/4) | 5(55.6) | |
| | Lymphoma | 2(33.3) | 4(66.7) | |
| | Stomach | 4(66.7) | 2(33.3) | |
| | Liver | 1(50) | 1(50) | |
| | Multiple myeloma | 0(0) | 3(100) | |
| | Osteosarcoma | 4(100) | 0(0) | |
| | Lung | 7(87.5) | 1(12.5) | |
| | Ovary | 1(33/3) | 2(66.7) | |
| | Cervix | 0(0) | 1(100) | |
| | Prostate | 2(100) | 0(0) | |
| | Larynx | 1(50) | 1(50) | |
| | Testis | 3(75) | 1(25) | |
| Duration of Diagnosis | Less than 6 months | 24(7) | 12(33.3) | 0.11** |
| | 6 months to 2 years | 17(58.6) | 12(44.4) | |
| | 2 years to 3 years | 2(100) | 0(0) | |
| | More than 3 years | 9(39.1) | 14(60.9) | |

Table 2. The Relationship between Fatigues with Variables

| Variables | Fatigue Status | Mean±SD | Type of Test and the level of Significance |
|---------------------------------------|---------------------|-------------|--|
| Age (year) | No fatigue | 52.42±14.38 | 0.9* |
| | Presence of fatigue | 51.71±14.60 | |
| Number of child | No fatigue | 3.50±2.98 | 0.23* |
| | Presence of fatigue | 3.02±2.38 | |
| Height (cm) | No fatigue | 167.82±9.58 | 0.19* |
| | Presence of fatigue | 1611.68±9 | |
| Weight (kg) | No fatigue | 72.63±16.68 | 0.26* |
| | Presence of fatigue | 64.26±16.74 | |
| BMI (kg / m ²) | No fatigue | 25.69±4.99 | 0.76* |
| | Presence of fatigue | 24.53±5.13 | |
| hemoglobin (Milligrams per deciliter) | No fatigue | 11.70±1.46 | 0.55* |
| | Presence of fatigue | 10.86±1.46 | |
| Hematocrit | No fatigue | 36.03±4.4 | *0.08 |
| | Presence of fatigue | 40.72±41.24 | |

*chi square

Table 3. Multivariate regression analysis of independent factors affecting the fatigue score in patients referred to teaching hospitals

| Variables | Regression Coefficient | The Standard Error | Significance Level | Confidence Interval95% | |
|------------|------------------------|--------------------|--------------------|------------------------|-------|
| | | | | Lower | Upper |
| Unemployed | 1.10 | 0.52 | 0.034 | 1.08 | 8.32 |
| hemoglobin | -0.33 | 0.16 | 0.049 | 0.51 | 0.99 |
| Constant | 2.63 | 1.98 | 0.18 | | |

age of the patients was 52.1 ± 14.4 years. The majority of the subjects were female (58.9%), married (91.1%), and with an education level below high school diploma (40%). In addition, 66.7% of the subjects lived in the city and were unemployed (65.6 %). In 40% of the patients, the duration of the disease was less than six months. Colon and breast cancer accounted for 22% of the cancers in the patients.

The assessment of the disease-related indices revealed that the average number of chemotherapy sessions was 4.8 ± 2.74 times and the average duration of the cancer diagnosis was 3.3 ± 0.48 months. The mean body mass index of the subject was 25.2 ± 5.05 , and the average amounts of haemoglobin and haematocrit were 11.34 ± 1.51 and 35.13 ± 4.47 , respectively. The mean and the standard deviation of the fatigue score of the subjects was 5.8 ± 0.54 . Considering the fact that the mean score of fatigue in this study was 5.8, the variables and the effective factors were assessed at two levels—for less than average fatigue and for above-average fatigue. In this study, 50.9% of the subjects who had fatigue were women, 42.7% were married, 52.5% were unemployed, 50% had a high school diploma, and 45% lived in the city. Those who were diagnosed with cancer over three years ago (60.9%) reported above-average fatigue. Among these factors, there were statistically significant relationships of gender ($p = 0.045$) and unemployment ($p = 0.006$) with fatigue levels (Table 1). But there were no statistically significant relationships between fatigue and the other variables (Table 2).

In this study, logistic regression was used to determine the factors affecting cancer-related fatigue. In this model, haemoglobin ($p = 0.049$) and unemployment ($p = 0.034$) were the only variables that were statistically significant (Table 3).

Discussion

The results of this study showed that the level of fatigue in a majority of the subjects was more than the average level. This is consistent with the results of other studies. In a study by Zeighami et al., the average fatigue was reported to be 5.5 and 37.2% of the patients had moderate fatigue (8). In addition, in a study by Hasanvand et al. that aimed to evaluate cancer-related fatigue, the mean severity of fatigue was reported to be 4.36 (1). In another study conducted by Ghaffari et al., the majority of the patients suffered from a moderate level of fatigue (6). Farajollahi et al. also reported a moderate level of fatigue in cancer patients undergoing chemotherapy (3). Besides, in the study by Timothy et al., 40% of patients had moderate fatigue levels (16).

Regarding the relationship between the individual and social factors, the results showed a significant relationship between the occupation and fatigue severity; fatigue severity was higher among the unemployed. In a study by Ghaffari et al., there was a meaningful relationship between the severity of fatigue and the economic status of the patients. This means that people who had a job and a good economic situation experienced less fatigue (6). It can be concluded that due to the high costs of treatment and other costs that are imposed on a patient, unemployment can adversely affect the economic status of families. This issue has several psychological consequences and following these psychological damages, physical problems such as fatigue may also occur in a patient.

Furthermore, in this study, there was a significant relationship between gender and the severity of fatigue. The level of fatigue was higher in women. In contrast, Ghaffari et al. reported no significant relationship between the variables of gender and fatigue (6). This might be due to the fact that women have lower physical strength than men and, hence, they

experience a higher level of fatigue compared to men.

In this study, a significant relationship was observed between fatigue and haemoglobin levels. A reduced level of haemoglobin was related to the increased severity of fatigue. This result is in line with the results of other studies. For instance, Ghaffari et al. reported that there is a significant relationship between fatigue and haemoglobin, and an increase in the haemoglobin levels is associated with reduced fatigue levels (6). Zeighami et al. also showed a significant association between haemoglobin levels and fatigue (8). The results of the study by Cella et al. showed that there is a positive correlation between the severity of fatigue and haemoglobin levels, in such a way that the severity of fatigue in patients with greater than or equal to two grams per decilitre change in haemoglobin was lower (17). Therefore, it can be said that decreased levels of haemoglobin has physiological effects on the body and can cause higher levels of fatigue in patients.

In this study, the level of fatigue in the patients who lived in the city was more than those who lived in the villages, but the difference was not statistically significant and, overall, there was no meaningful relationship between place of residence and fatigue. However, in a study by Lou et al., the level of fatigue in the urban patients was more than in the rural patients; in the regression model, the place of residence was regarded as a factor influencing fatigue (18). Therefore, it can be concluded that an environment away from the stresses of cities or a quiet rural atmosphere brings about higher focus and more peace of mind for the patients, which can affect the level of fatigue. Perhaps in this study, due to a smaller sample size, this influence has been less significant.

Moreover, in this study, no statistically significant relationship was observed between the body mass index and fatigue severity. However, Zeighami et al. reported that people with a lower body

mass index experience more fatigue (8). It can be said that the subjects in this study underwent at least one chemotherapy regimen, and as the chemotherapy has an impact on the weight, there was no dispersion in mean body weight scores between the group with fatigue and the group with no fatigue. Thus, the difference between the two groups was not significant.

The results of this study also indicated that the patients who were diagnosed with cancer three years ago or even before, experience more fatigue. However, the difference in the level of fatigue between the patients with differing durations of disease diagnosis was not statistically significant. Chehregosha et al. and Servaes et al. (19) also observed no significant relationship between the duration of diagnosis and fatigue (9). Maybe the slight difference in the average observed in the present study was due to the side effects of chemotherapy, frequent referral for treatment, mood, and physical changes during treatment. However, this was not a statistically significant difference.

In this study, there was no significant association between fatigue and other variables like age, marital status, gender, the number of children, and education. Sadler et al. too had observed no significant relationship between the severity of fatigue and age, sex, and the number of children (20).

In conclusion, it seems that despite the dramatic advances in the medical sciences for the treatment of cancer and the progress in controlling cancer-related symptoms such as pain, nausea, and vomiting, fatigue is often overlooked. Appropriate measures are not taken to identify and treat fatigue in cancer patients. However, there are several, very simple methods to alleviate fatigue. Also, the clinical and therapeutic characteristics of the patients should be considered when assessing the status of fatigue in the patients. In addition, the role of demographic factors, the psychological

and social support extended by the families, the financial burden caused by the disease, and the economic status of the patient and the family should not be overlooked. Perhaps, the medical team involved in the patient care, especially the nurses, can handle this effectively. By providing patient-oriented care and by taking into account all the factors involved in the patient's life, they can provide a higher quality of care and more effective programmes to the cancer patients, helping them overcome the problems caused by cancer and its treatment interventions. The limitations of this study were the small volume of the sample and the lack of supportive-palliative care assessment.

Acknowledgment

This study is part of a research project approved by the Social Determinants of Health Research Center and derived from the master's thesis in nursing, with the code of ethics 2930330307. Hereby, the authors express their appreciation for the Vice Chancellor for Research and Technology, Guilan University of Medical Sciences, and thank all the participants who assisted us in implementing this project.

References:

1. Hasanvand S, Ashktorab T, Jafari Z, Salmani N, Zeinab S. Cancer-related fatigue and its association with health-related quality of life and functional status of cancer patients. *Journal of School of Nursing and Midwifery, Beheshti University of Medical Sciences and Health Services*. 2013;24(85):21-30. [In Persian].
2. Ministry of Health and Medical Education .Cancer Office Iranian Annual National Cancer Registration Report. Tehran:Ministry of Health and Medical Education of Iran; 2007.p. 2. [In Persian].
3. Farajollahi M, Alikhani M, Farmani F, Hosseini F. Fatigue in cancer patients receiving chemotherapy. *Iranian Journal of Nursing*. 2004;8(36):8. [In Persian].
4. Hajebi G. *Advanced Cancer*. Tehran: Baran Andishe; 2011.p.41. [In Persian].
5. Huang X, Zhang Q, Kang X, Song Y, Zhao W. Factors associated with cancer-related fatigue in breast cancer patients undergoing endocrine therapy in an urban setting: a cross-sectional study. *BMC cancer*. 2010;10:453.
6. Ghaffari F , Fotokian Z, Karimi M, Keihanian SH, Karimi H. The relationship between anemia-related fatigue and quality of life in canceric patients. *Journal of Qazvin University of Medical Sciences*. 2009;13(1):34-41. [In Persian].
7. SafaeeA, TabatabaeeH, Moghimi-DehkordiB, ZeighamiB. Cancer-related fatigue in breast cancer patients under chemotherapy. *Jouranal of semnan university of medical*. 2010;11(4). [In Persian].
8. Zeighami.Sh, Hoshmand.Pori, Jafari.Fatemeh. Relationship between anemia and fatigue and quality of life of cancer patients undergoing chemotherapy. *Journal of Mashhad School of Nursing & Midwifery*. 2009;9(1):59-64. [In Persian].
9. Chehrehgosha M, Dastourpour M, Sanagu A, Azam M. Cancer-related Fatigue and its Relationship with Demographic and Clinical Characteristics in Cancer Patients. *Journal of Student Research Committeeof Golestan university of medical sciences*. 2013;8:1-8. [In Persian].
10. Rad M, Borzoe F, Shahidsales S, Tabarraie Y,Varshoe F. The Effects of Humor Therapy on the Fatigue in Breast Cancer Patients Undergoing External Radiotherapy . *Journal of Babol University of Medical Sciences*. 2015;16:45-52. [In Persian].
11. Haghghat S, Akbari ME, Holakouei K, Rahimi A, Montazeri A. Factors predicting fatigue in breast cancer patients. *Supportive Care in Cancer*. 2003;11(8):533-8. [In Persian].
12. Mays SR, Hymes SR, Cole KC, Kuerer HM. *Dermatologic Emergencies*. In: Manzullo EF, Gonzalez CE, Escalante CP, Yeung S-CJ, editors. *Oncologic Emergencies*. New York: Springer, New York; 2016. p. 349-70.
13. Beyrami M, Zeinali Sh, Ashrafian P,Nikanfar A. The role of anxiety in predicting depression and fatigue in patients with breast cancer. *Journal of breast disease*. 2013;7:50-6. [In Persian].
14. Mota DD, Pimenta CA, Caponero R. Fatigue in colorectal cancer patients: prevalence and associated factors. *Revista latino-americana de enfermagem*. 2012;20(3):495-503.
15. Shahvarughi Farahani A, Azimian M, Fallahpour M, Karimlou M. Evaluation of Reliability and Validity of the Persian Version of Fatigue Severity Scale (FSS) among Persons with Multiple Sclerosis. *Rehabilitation Sciences*. 2013;13(54):84-91. [In Persian].
16. Timothy ECPDH, Uwe LRMPP, Shashah RD, Wilkinson NTP. *Standard of care for cancer-*

- related anemia: improving hemoglobin levels and quality of life. *Optimizing Hemoglobin Levels and Beyond: Strength for Living and Meaningful Survival*. 2005;68(1):22-32.
17. Cella D, Kallich J, McDermott A, Xu X. The longitudinal relationship of hemoglobin, fatigue and quality of life in anemic cancer patients: results from five randomized clinical trials. *Annals of Oncology*. 2004;15(6):979-86.
 18. Lou Y. Self-management of cancer treatment-related fatigue, nausea, vomiting and oral mucositis in Chinese cancer patients [PhD Thesis]. Australia: School of Nursing and Midwifery, Faculty of Health ,Institute of Health and Biomedical Innovation, Queensland University of Technology;2011.
 19. Servaes P, Verhagen S, Bleijenberg G. Determinants of chronic fatigue in disease-free breast cancer patients: a cross-sectional study. *Annals of Oncology*. 2002;13(4):589-98.
 20. Sadler IJ, Jacobsen PB, Booth-Jones M, Belanger H, Weitzner MA, Fields KK. Preliminary evaluation of a clinical syndrome approach to assessing cancer-related fatigue. *Journal of pain and symptom management*. 2002;23(5):406-16.

Archive of SID