The Relationship Between Demographic And Clinical Factors And Cancer-Related Fatigue

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Abstract

Introduction and Objective: One of the most common and debilitating cancer-related problems experienced by patients at any stage of the disease is fatigue. The present study aimed at determining the relationship between demographic and clinical factors with cancer-related fatigue in patients referring to oncology clinics of selected hospitals affiliated with Shahid Beheshti University of Medical Sciences in 2018.

Methods: The present study is a descriptive-correlational one. As many as 160 cancer patients entered the present study. These patients had already referred to oncology clinics of selected hospitals of Shahid Beheshti University of Medical Sciences in 2018. The participants were selected based convenience sampling. Data collection tools included demographic information and a multidimensional fatigue symptom inventory short form, the validity of which was assessed by ten professors of the School of Nursing and Midwifery, at Shahid Beheshti University. Moreover, for the reliability of the questionnaire by internal consistency method, Cronbach's alpha coefficient was reported to be 81%. After collecting data, the data obtained from the study were analyzed using SPSS-22.

Results: According to the results of the present study in which 160 cancer patients entered, the mean age of patients was 55.51 ± 14.27 years; Most of the patients were married men. The results of independent t-test to compare the mean total score of fatigue in patients with a family history of cancer and patients without a history showed a significant difference ($P = 0.016$, $t = 2.429$). However, no significant difference was observed between the mean total score of fatigue in patients with a history of drug use and patients with no history of drug use ($P = 0.314$, $t = -1.010$). The results of one-way analysis of variance (ANOVA) showed that there was no significant difference between marital status and general level of fatigue ($P = 0.122$, $F = 1.961$).

Conclusion: In the present study, the type of treatment and family history of cancer were factors that were associated with cancer-related fatigue. Therefore, in addition to providing physical care and nursing interventions, giving due attention to the demographic and clinical components of cancer patients can play an effective role in treating fatigue in these patients.

Introduction

Cancer is a non-communicable disease that has a much wider prevalence than other non-communicable diseases (1). The disease is caused by abnormal gene expression and improper cell differentiation (2), and it is one of the leading causes of death in developed and developing countries and is the second leading cause of death in the world (1). Despite significant advances in medicine, cancer is still one of the most important diseases of the present century. As a serious disease in society, a person suffers greatly from psychological disorders and loss of quality of life after being diagnosed with cancer (3). Given the increase in the elderly population in the country, the increased life expectancy and increased environmental pollutants, the incidence of cancer is expected to double in the next two decades. According to the World Health Organization, the incidence of cancer in Iran in 2020 reached reach 85,653 people and the number of cancer deaths was 62,897 (4).

Knowing that you suffer from cancer is a surprising and disturbing experience for everyone. Diagnosis of this disease is considered a crisis for patients (5). One of the most common and debilitating cancer-related problems experienced by patients at any stage of the disease is fatigue, and about 72 to 99% of cancer patients suffer from such fatigue. In these patients, fatigue may be caused by a disease or related treatment that is called cancer-related fatigue (6). In fact, fatigue is an unusual, persistent, and mental feeling of boredom that is related to either the cancer or its treatment (7). Cancer-related fatigue is more severe, persistent, and debilitating than normal fatigue caused by lack of sleep or exercise; cancer-related fatigue does not improve with sleep and rest (8). Cancer-related fatigue is a multidimensional concept that can be investigated from physical, psychological and social aspects (9). Fatigue can spontaneously endanger the quality of life of cancer patients (10). The issue of fatigue is a controversial global issue among cancer patients and has been considered as a diagnostic review in the international classification of diseases (11). A wide range of possible and influential physical, emotional, cognitive, and psycho-social causes, that are not easily distinguishable from one other, play roles in creating cancer-related fatigue (12). It depends on various factors such as the anatomical location of the tumor, the stage of treatment, the type of treatment received and other factors. Recognition of these effective factors can have a significant effect on prevention, control and measures adopted to improve symptoms and thus the improvement of cancer patients' quality of life (13). In the study conducted by Haghighat et al (2008), fatigue was associated with factors such as depression, pain, recent tamoxifen use, mastectomy, and anxiety (14). In the study conducted by Bahrami Barsari et al (2020), the severity of fatigue had a significant inverse relationship with the level of education and family income. Moreover, a direct and significant relationship was observed between the presence of metastasis and the severity of fatigue (15). Given the increasing number of cancer patients and the importance of cancer-related fatigue on patients' quality of life and lack of knowledge in this field, the present study was conducted to investigate the relationship between demographic and clinical factors and cancer-related fatigue.

Method

This study was a descriptive-correlational one that was conducted on 160 cancer patients referring to selected oncology clinics of Shahid Beheshti University of Medical Sciences. After obtaining the required permit of the ethics committee with the code IR.SBMU.PHNM.1396.966 from Shahid Beheshti School of Nursing and Midwifery and obtaining other necessary permits, data collection started. Inclusion criteria include being 20 to 80 years old, definitive diagnosis of having one type of cancer, and passing at least 6 months of diagnosis, being able to read and write, having full consciousness and the ability to answer questions, being familiar with Farsi, having informed consent to participate in the study, and the lack of cognitive or mental disorders. Patients who were not willing to participate in the study or whose disease was so severe that they were unable to participate in the study or had other chronic diseases were excluded from the study.

The sample size was determined using the formula and taking into account $\alpha = 0.05$, $\beta = 0.01$ and $r = -0.34$, and considering almost 10% of attrition, the sample size was determined to be 160. Correlation coefficient

was obtained from a similar study conducted by Iwase et al (2015) (16). α , β are respectively the first and second types of errors.

$$c = 0.5 \times \ln \left(\frac{1+r}{1-r} \right)$$

$$n = \left[\frac{Z_{\alpha} + Z_{\beta}}{c} \right]^2 + 10 = 160$$

Sampling was performed in several stages. First, the hospitals affiliated to Shahid Beheshti University of Medical Sciences that had oncology clinics were listed, and then the hospitals with the highest number of cancer patients referring to oncology clinics were selected. The samples were selected by using convenience sampling method and according to the inclusion criteria based on the ratio of patients to the centers. The questionnaires were then filled out by patients.

Data collection tools in this study include demographic information questionnaire and Multidimensional Fatigue Inventory Short Form.

The standard fatigue questionnaire was designed by Smets et al in 1995. This questionnaire has 5 general domains. General fatigue has four items, physical fatigue has four items, mental fatigue has four items, reduced activity has four items, and reduced motivation has four items. The answer range for each question was on five-point Likert scale ranging from "Yes Absolutely True" to "No Absolutely False". For each item, a score of 1 to 5 was calculated and in some items, reverse scoring was performed; a higher score indicates greater fatigue (17). In the study conducted by Roy et al (2012), the internal consistency of the tool was measured, with Cronbach's alpha reported between 0.70 and 0.95 (18). Its reliability was confirmed by test-retest method on 29 nurses with two weeks interval in the study conducted by Javali et al (r : 0.8) (19). The objectives of the research were announced to all participants. Informed consent was obtained. The questionnaires were distributed among the patients by the researcher and after collecting all the questionnaires, the data analysis process was conducted. Data were analyzed using SPSS-22. A p value less than 0.05 was considered to be significant.

Results

In this study, as many as 160 cancer patients were included in a statistical analysis. The mean age of the patients in this study was 55.51 ± 14.27 , and the mean age of being diagnosed with cancer was 53.69 ± 14.01 .

In terms of gender distribution, as many as 61.3% of patients were male (98 patients) and 38.8% (62) were female. In terms of marital status, 85.6% of the patients were married (137), 6.9% (11) were single, 3.8% (6) were widowed and 3.8% (6) were divorced. In terms of employment status, 23.8% (38 people) are self-employed, 12.5% (20 people) are retired, 18.8% (30 people) are employees, 2.5% (4 people) are students,

8.1% (13 people) are workers, 28.1% (45 people) were housewives and 6.3% (10 people) were unemployed. In terms of educational level, 14.4% (23 people) are illiterate, 30.6% (49 people) had primary school degree, 13.8% (22 people) had middle school degree, 21.9% (35 people) had high school degrees, and 19.4% (31 people) had academic degrees. Also, in terms of drug use history, as many as 23.8% (38 people) had a history of drug use and 76.2% (122 people) did not report such a history. In terms of family history of cancer, 35% (56 people) answered yes and 65% (104 people) answered no (Table 1).

Table 1
Descriptive information of cancer patients referring to selected clinics affiliated
with Shahid Beheshti University of Medical Sciences in Tehran in 2018

Variable		Frequency	Percentage
Gender	Male	98	61.3
	Female	62	38.7
Marital status	Married	137	85.6
	Single	11	6.9
	Widowed	6	3.8
	Divorced	6	3.8
Employment status	Self-employed	38	23.8
	Retired	20	12.5
	Employee	30	18.8
	Student	4	2.5
	Worker	13	8.1
	Housewife	45	28.1
	Unemployed	10	6.3
Educational level	Illiterate	23	14.4
	Primary school	49	30.6
	Middle school	22	13.8
	High school	35	21.9
	Academic degrees	31	19.4
Family history of drug use	Yes	38	23.8
	No	122	76.2
Family history of cancer	Yes	56	35
	No	104	65

As for the stage of cancer, 46.9% of patients (75 people) were in the first stage, 36.3% (58 people) were in the second stage, 12.5% (20 people) were in the third stage and 4.4% (7 people) were in the fourth stage. Regarding the type of cancer, 18.1% (n = 29) of the cases were related to colon cancer, which accounted for the largest percentage, and pancreatic and uterine cancers, with 0.6 (n = 1) percent, accounted for the lowest frequency (Figure 1).

According to Table 2, 48.1% (77 people) underwent chemotherapy, being the most common method of treatment. In contrast, surgery and pain relief with 1% frequency were the least used treatment methods. Other items are in Table 2.

Table 2

Frequency of cancer treatment methods in cancer patients referring to selected clinics affiliated with Shahid Beheshti University of Medical Sciences in Tehran in 2018

Variable		Frequency	Percentage
Treatment method	Chemotherapy	77	48.1
	Surgery	1	0.6
	Radiotherapy	9	5.6
	Relief	1	0.6
	Chemotherapy and surgery	49	30.6
	Chemotherapy, surgery, radiotherapy, and relief	13	8.1
	Chemotherapy and radiotherapy	9	5.6
	Chemotherapy and relief	1	0.6

Determining The Relationship Between Fatigue And Demographic Factors

Table 3 shows the beta coefficient values in regression analysis along with the level of significance, among which the family history of cancer ($P = 0.043$) and history of drug use ($P = 0.095$) indicate a significant relationship. Moreover, marital status showed a significant relationship with fatigue score, so as the level of marriage increases, the fatigue score increases as well ($P = 0.038$)

Table 3

Results of linear regression of independent variables for fatigue in cancer patients referring to selected clinics affiliated with Shahid Beheshti University of Medical Sciences in Tehran in 2018

Variable	Standard deviation	Standardized beta	Significance level	t statistic
Constant	8.860	-	0.517	0.650
Age	0.339	0.552	0.173	1.370
Age of being infected	0.401	-0.448	0.262	-1.127
Stages of the disease	1.382	0.097	0.239	1.181
Gender	2.719	-0.144	0.129	-1.181
marital status	1.391	0.173	0.38	2.091
Employment	0.607	0.115	0.209	1.263
Family history of cancer	2.320	0.160	0.043	2.039
History of drug use	2.745	0.139	0.095	1.678
Education	0.886	-0.134	0.122	-1.555
Type of treatment	0.516	-0.112	0.169	-1.381
Type of cancer	0.243	0.053	0.493	0.687

Given the normality of the data, the results of independent t-test to compare the mean of the total fatigue score in patients with a family history of cancer and patients without a history showed a significant difference ($P = 0.016$, $t = 2.429$). Moreover, given the normality of the data obtained from the histogram, the results of independent t-test to compare the mean of the total fatigue score in patients with a history of drug use and patients without such a history did not show a significant difference ($P = 0.314$, $t = -1.010$). The results of one-way analysis of variance (ANOVA) showed that there is no significant difference between marital status and total fatigue score ($P = 0.122$, $F = 1.961$) (Table 4).

Table 4

Comparison of mean and standard deviation of total fatigue score in terms of family history of cancer, history of drug use in cancer patients referring to selected clinics affiliated with Shahid Beheshti University of Medical Sciences in Tehran in 2018

Variable		Frequency	Mean	Standard deviation	Significance level	t statistic	Confidence interval	
Family history of cancer	Yes	56	19.80	14.39	0.016	2.429	Higher bound	Lower bound
	No	104	14.20	13.65			-1.045	-10.157
Drug use history	Yes	122	18.18	12.44	0.314	-1.010	Higher bound	Lower bound
	No	38	15.53	14.60			-7.735	2.532
Marital status	Married	137	15.38	13.93	0.122	1.961	Higher bound	Lower bound
							13.03	17.74
	Single	11	25.16	8.68			16.05	34.27
	Widowed	6	26.00	14.05			11.24	40.75
	divorced	6	15.54	16.74			4.29	26.79

Determining The Relationship Between Fatigue And Clinical Factors

The results of one-way analysis of variance (ANOVA) showed that there was no significant difference between the stages of cancer and the total score of fatigue ($P = 0.144$, $F = 1.828$). The results of one-way analysis of variance (ANOVA) have also indicated that there is a significant difference between the type of treatment and the total score of fatigue ($P = 0.007$, $F = 2.918$) (Table 5).

Table 5

Comparison of mean and standard deviation of total fatigue score in terms of cancer stage in cancer patients referring to selected clinics affiliated with Shahid Beheshti University of Medical Sciences in Tehran in 2018

Variable		Frequency	Mean	Standard deviation	Significance level	t statistic	Confidence interval	
Cancer stage	First	75	13.78	14.07	0.144	1.828	Higher bound	Lower bound
							10.54	17.02
	Second	58	18.37	12.58			15.06	21.68
	Third	20	16.10	15.90			8.65	23.54
	Fourth	7	23.42	18.96			5.89	40.96

Table 6

Comparison of mean and standard deviation of total fatigue score in terms of type of treatment in cancer patients referring to selected clinics affiliated with Shahid Beheshti University of Medical Sciences in Tehran in 2018

Variable		Frequency	Mean	Standard deviation	P value	Confidence interval	
						Higher bound	Lower bound
Type of treatment	Chemotherapy	77	17.02	12.65	0.007	14.15	19.89
	Surgery	1	53.00	-		-	-
	Radiotherapy	59	7.44	20.33		-8.18	23.07
	Relief	1	48.00	-		-	-
	Chemotherapy and surgery	49	14.65	13.40		10.80	18.50
	Chemotherapy and surgery and radiotherapy and relief	13	19.30	11.27		12.49	26.11
	Chemotherapy and radiotherapy	9	15.77	17.12		2.61	28.93
	Chemotherapy and relief	1	-4.00	-		-	-

Discussion

In the present study, the mean and standard deviation of the overall fatigue score was 16.16 ± 14.12 ; general fatigue 8 ± 3.83 , physical fatigue was 7.48 ± 4.15 , emotional fatigue was 6.62 ± 4.09 , and mental fatigue was 4.61 ± 3.55 , and fatigue related to energy was 10.57 ± 4.58 ; the energy dimension had the

highest score among the dimensions of fatigue in cancer patients. The increased mean score of fatigue in cancer patients can be attributed to many factors, such as changes in economic, social, cultural and generally changes in the lifestyle of individuals in society. In the study conducted by Safaei et al, there was no significant relationship between age and occupation with fatigue score (13). Also, in the study conducted by Chehregosha et al, there was no significant relationship between gender and employment status with fatigue score (20). In the present study, there was no significant relationship between age, gender and employment status with the rate of fatigue; it is in line with the aforementioned studies.

In some studies, the degree of fatigue is related to the type of treatment; patients who received chemotherapy experienced higher degrees of fatigue (21). In the study conducted by Karthikeyan et al, the rate of fatigue was higher in patients receiving chemotherapy followed by patients receiving chemotherapy-radiotherapy, and finally radiotherapy (22). However, in the study conducted by Huang et al, no significant relationship was found between the type of treatment and fatigue (23). Radiotherapy and chemotherapy seem to have more destructive effects on patients' physical and mental conditions, and surgery has far fewer effects on patients' physical condition and fatigue, and patients were reported to have better condition. In the present study, in terms of fatigue, there was a significant difference between treatment methods in cancer patients.

In the study conducted by Safaei et al, only the type of treatment was mentioned as a factor affecting the individual's fatigue, and tumor metastasis, degree of differentiation and other symptoms of the disease, including the duration of the disease, had no significant relationship with fatigue in the participants (13). However, in the present study, the patients' status was not investigated.

In fact, cancer-related fatigue affects the patient's ability and performance in daily activities and delays the patient's treatment; even in some cases it leads to a decreased rate of survival (6). In fact, fatigue is a common and unpleasant complaint in cancer patients that is observed in 24-74% of cases (24).

In a study conducted by Chehregosha et al (2013), the mean patient fatigue score was 54.65, which was higher than that of the present study (20). In the present study, the majority of the subjects complained of mild to severe fatigue. As for the general and energy, the fatigue score was higher than other subscales. In the study conducted by Aston et al, 2% of the participants reported mild to severe fatigue, with an average score of fatigue in the physical dimension being higher than that of other dimensions (25). In the study of Van Vert et al, the highest score was related to physical fatigue and the lowest score was mentioned for emotional fatigue (26). But in the present study, the least fatigue was seen in the psychological dimension; this is not in line with the results of the study conducted by Van Vert et al.

In the study conducted by Huang et al, no significant relationship was observed between marital status and fatigue score (23); this is in line with the results of our research. However, in the study by Safaei et al, there was a significant relationship between marital status and fatigue and the rate of fatigue was higher in single people than that of married people (13). Numerous studies have reported various findings, perhaps it can be interpreted that part of the stress caused by fatigue is reduced with the psychological support

provided by spouses and with increasing marriage time, the degree of dependence between couples increases and their emotional support deepens as well.

The present study was a descriptive-correlational one that was conducted on cancer patients referring to selected oncology clinics of Shahid Beheshti University of Medical Sciences hospitals. Therefore, the generalizability of the results to other population groups decreases. Also, many clinical factors such as anemia, depression and the type of drugs used can affect cancer-related fatigue, and the consideration of these variables for the researcher was not possible; this was one of the main limitations of the present study. Considering the fact that the existence of different dimensions of fatigue in cancer patients has been considered inevitable. Also, in Iran there is a lack of studies on the variable of fatigue. Thus, it is suggested to conduct further studies to increase strategies of reducing cancer-related fatigue.

Conclusion

In the present study, the type of treatment and family history of cancer were factors that were associated with cancer-related fatigue. Due to the existence of fatigue in cancer patients and its relationship with demographic and clinical factors, the results of this study can be used to properly plan the perspective of nursing care needed for cancer patients to reduce cancer-related fatigue.

Declarations

- Funding: 'Not applicable'
- Conflicts of interest/Competing interests: 'Not applicable'
- Availability of data and material: we are make sure that all data and materials as well as software application or custom code support their published claims and comply with field standards.
- Code availability: 'Not applicable'
- Authors' contributions: *"All authors contributed to the study conception and design. Material preparation, data collection and analysis were performed by [Payam Emami], [Farhad Azadmehr] and [kosar membari]. The first draft of the manuscript was written by [Farzad Zareie] and all authors commented on previous versions of the manuscript. All authors read and approved the final manuscript."*
- Ethics approval: 'Not applicable'
- Consent to participate: "Informed consent was obtained from all individual participants included in the study.
- Consent for publication: "The authors affirm that human research participants provided informed consent for publication of the images in Figure(s) 1a, 1b and 1c."

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Figures

پستان	Breast	پروستات	Prostate	ریه	Lung	کولون	Colon	معدہ	Stomach
سارکوم	Sarcoma	لنفوم	Lymphoma	خون	Blood	حنجره	Larynx	کبد	Liver
رحم	Uterus	مری	esophagus	سایر	Other	تخمندان	ovary	کلیه	Kidney
		مغز	Brain	مئانه	Bladder	پانکراس	pancreas	زبان	Tongue

Figure 1

Frequency distribution of cancers in cancer patients referring to selected clinics affiliated with Shahid Beheshti University of Medical Sciences in Tehran in 2018