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Original Article

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

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Abstract

Introduction: Despite significant advances in medicine, cancer remains one of the most important diseases of the present century. One of the most common and debilitating cancer-related problems experienced by patients at any stage of the disease is fatigue, which may be due to a disease or related treatment that is called cancer-related fatigue. The present study aimed at determining the relationship between demographic and clinical factors and cancer-related fatigue in patients referring to oncology clinics.

Methods: A total of 160 cancer patients entered the present descriptive-correlational study. The participants were selected based on convenience sampling. Data collection tools included demographic information and a multidimensional fatigue symptom inventory-short form. Finally, the obtained data were analyzed using SPSS 22.

Results: The results of the independent *t* test demonstrated a significant difference in the mean total score of fatigue in patients with and without a family history of cancer ($P=0.016$, $t=2.429$). However, no significant difference was observed between the mean total score of fatigue in patients with and without a history of drug use ($P=0.314$, $t=-1.010$). The results of a one-way analysis of variance revealed that there was no significant difference between marital status and general level of fatigue ($P=0.122$, $F=1.961$).

Conclusion: Based on the findings, the type of treatment and family history of cancer were linked to cancer-related fatigue. This suggests that, in addition to offering physical care and nursing interventions, considering the demographic and clinical aspects of cancer patients can be crucial in effectively addressing fatigue in these individuals.

Keywords: Cancer, Demographic, Clinical, Fatigue

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Introduction

Cancer is a non-communicable disease that has a much wider prevalence than other non-communicable diseases (1). This disease is caused by abnormal gene expression and improper cell differentiation (2). It is one of the leading causes of death in developed and developing countries and 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 85 653 people, and the number of cancer deaths was 62 897 (4).

One of the most common and debilitating cancer-related problems experienced by patients at any stage of the disease is fatigue. About 60%-96% of individuals with cancer receiving treatment encounter fatigue, with rates ranging from 60% to 93% for those undergoing radiotherapy and 80%-96% for those receiving chemotherapy (5). 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 cancer or its treatment (7). Cancer-related fatigue is more severe, persistent, and debilitating than normal fatigue caused by a 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 a diagnostic review in the international classification of diseases (11). A wide range of possible and influential physical, emotional, cognitive, and psychosocial causes that are not easily distinguishable from one another, play a role in creating cancer-related fatigue (12). This type of fatigue 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 cancer patients' quality of life (13). In the study conducted by Haghighat et al, fatigue was associated with factors such as depression, pain, recent tamoxifen use, mastectomy, and anxiety (14). In another study by Bahrami Baresari et al, 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, the importance of cancer-related fatigue on patients' quality of life, and the lack of knowledge in this field, the present study was performed to investigate the relationship between demographic and clinical factors and cancer-related fatigue.

Objectives

This study aimed at determining the relationship between demographic and clinical factors and cancer-related fatigue in patients referring to oncology clinics.

Methods

Study Design

This descriptive-correlational study was conducted on 160 cancer patients referring to selected oncology clinics. The inclusion criteria included being 20–80 years old, suffering from one type of cancer based on a definitive diagnosis, 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 having no cognitive or mental disorders. On the other hand, patients who were not willing to participate in the study, those whose disease was so severe that they were unable to participate in the study, or participants who 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 $r = -0.34$. Considering almost 10% of attrition, the sample size was determined to be 160. The correlation coefficient was obtained from a similar study conducted by Smets et al (16). α and β are the first and second types of errors, respectively.

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

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

A multi-stage sampling approach was employed. First, hospitals with oncology clinics were listed, and those with the highest influx of cancer patients were selected. The samples were then chosen using a convenient sampling method, in line with the inclusion criteria and based on the patient referral ratio to the centers. Subsequently, patients completed the questionnaires as part of the data collection process.

Instruments

In this study, data were collected using a demographic information questionnaire and the Multidimensional Fatigue Inventory.

The standard fatigue inventory was developed by Smets et al (16). This questionnaire consists of 20 questions that include five areas, namely, general fatigue, physical fatigue, mental fatigue, decreased activity, and decreased motivation, with each area including four items. Each question is answered based on a three-point Likert-type scale in the range of "yes, it is absolutely correct" to "no, it is completely wrong". A score of 1 to 3 is devoted to each item, and reverse scoring is considered for some items. Therefore, the total score of each domain will be 4–20, and the total score of the scale is obtained from the sum of all domains' scores, which can be between 20 and 100. This questionnaire has been translated into Persian, with a reliability of more than 0.7 and a validity of 0.85 (17).

The demographic questionnaire included demographic data and medical information. The demographic variables were age, gender, marital status, education level, and employment status. Medical history data included the type of cancer, stage of cancer, treatment, time since diagnosis, family history of drug use, and family history of cancer.

Data Analysis

The objectives of the research were announced to all participants, and informed consent was obtained from them. The questionnaires were distributed among the patients by the researcher, and the data analysis process was conducted after collecting all the questionnaires. The obtained data were analyzed using SPSS-22, and a *P* value less than 0.05 was considered to be significant.

Results

Patient Characteristics

The demographic characteristics and medical information for the 160 patients are summarized in Table 1.

Most participants were men, married, had a primary school degree, and were self-employed. The mean age of patients in this study was 55.51 ± 14.27, and the mean age at diagnosis was 53.69 ± 14.01. The most common form of cancer was colorectal cancer. A majority of participants had been diagnosed for three months, mostly at stage I. Overall, 128 patients (77.1%) were receiving chemotherapy,

Table 1. Descriptive Information of Cancer Patients Referring to Selected Clinics

Characteristics		Mean	SD
Age (y)		55.51	14.27
Age at diagnosis (y)		53.69	14.01
		n	%
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	İlliterate	23	14.4
	Primary school	49	30.6
	Middle school	22	13.8
	High school	35	21.9
	Academic degrees	31	19.4
Time since diagnosis (months)	3 or less	114	68.67
	4-6	52	31.32
Cancer stage	I	75	46.9
	II	58	36.3
	III	20	12.5
	IV	7	4.4
Type of cancer	Breast	21	13.1
	Colon	29	18.1
	Leukemia	19	11.9
	Stomach	19	11.9
	Lung	24	15
	Other	48	30
Family history of drug use	Yes	38	23.8
	No	122	76.2
Family history of cancer	Yes	56	35
	No	104	65

Note. SD: Standard deviation.

which was the most common treatment method.

In terms of family history of cancer, 35% (56 people) answered yes and 65% (104 people) answered no (Table 1).

As for the stage of cancer, 46.9% of patients (75 people) were in the first stage. Regarding the type of cancer, 18.1% (n = 29) of the cases were related to colon cancer, which accounted for the largest percentage.

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

Table 2. Sample Characteristics

Variables		Frequency	Percent
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 provides 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 ($P = 0.038$).

Given the normality of the data, the results of the 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 the 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 revealed no significant difference ($P = 0.314$, $t = -1.010$). Based on the results of the one-way analysis of variance (ANOVA), there was no significant difference between marital status and total fatigue score ($P = 0.122$, $F = 1.961$, Table 4).

Determining the Relationship Between Fatigue and Clinical Factors

The results of the ANOVA represented that there was no significant difference between the stages of cancer and the total score of fatigue ($P = 0.144$, $F = 1.828$, Table 5). The results of the ANOVA have also confirmed a significant difference between the type of treatment and the total score of fatigue ($P = 0.007$, $F = 2.918$, Table 6).

Discussion

In the present study, the means (standard deviations) of the overall fatigue score, general fatigue, physical fatigue, emotional fatigue, mental fatigue, and fatigue related to energy were 16.16 (± 14.12), 8 (± 3.83), 7.48 (± 4.15), 6.62 (± 4.09), 4.61 (± 3.55), and 10.57 (± 4.58), respectively. 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 economic, social, and cultural

Table 3. Results of Linear Regression of Independent Variables for Fatigue in Cancer Patients Referring to Selected Clinics

Variables	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 at diagnosis (y)	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

Table 4. Comparison of Mean and Standard Deviation of the Total Fatigue Score in Terms of Family History of Cancer and History of Drug Use in Cancer Patients Referring to Selected Clinics

Variables		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

Table 5. Comparison of Mean and Standard Deviation of the Total Fatigue Score in Terms of Cancer Stage in Cancer Patients Referring to Selected Clinics

Variables		Frequency	Mean	Standard Deviation	Significance Level	t Statistic	Confidence Interval	
							Higher Bound	Lower Bound
Cancer stage	I	75	13.78	14.07	0.144	1.828	10.54	17.02
	II	58	18.37	12.58			15.06	21.68
	III	20	16.10	15.90			8.65	23.54
	IV	7	23.42	18.96			5.89	40.96

Table 6. Comparison of Mean and Standard Deviation of the Total Fatigue Score in Terms of Type of Treatment in Cancer Patients Referring to Selected Clinics

Variables		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	S9	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	-		-	-

changes and general changes in the lifestyle of individuals in society. In the study conducted by Safaee et al, there was no significant relationship between age and occupation with fatigue score (13). In addition, in the study performed by Chehrehgosha et al, no significant relationship was found between gender and employment status with fatigue score (18). In the present study, there was no significant relationship between age, gender, and employment status

with the rate of fatigue, which is in line with the findings of 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 (19). 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 radiotherapy (20). However, in the study conducted by Huang et al, no significant relationship was found between the type of treatment and fatigue (21). 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. Further, patients were reported to have better conditions. In the present study, in terms of fatigue, there was a significant difference between treatment methods for cancer patients.

In the study performed by Safaee et al, only the type of treatment was mentioned as a factor affecting the individual's fatigue, 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, the patient's status was not investigated in the present study.

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 (22).

In a study conducted by Chehrehgosha et al, the mean patient fatigue score was 54.65, which was higher than that of the present study (18). In the current study, the majority of the subjects complained of mild to severe fatigue. As for general and energy, the fatigue score was higher than other subscales. In the study performed by Stone 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 (23). In the study of van Weerte et al, the highest score was related to physical fatigue, while the lowest score belonged to emotional fatigue (24). However, in the present study, the least fatigue was found in the psychological dimension, which is not in line with the results of the above-mentioned study.

In the study conducted by Huang et al, no significant relationship was observed between marital status and fatigue score (21), which conforms to the results of our research. Conversely, in the study by Safaee et al, there was a significant relationship between marital status and fatigue, and the rate of fatigue was higher in single people compared to 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.

Limitations

The present descriptive-correlational study was performed on cancer patients referring to selected oncology clinics. Therefore, the results cannot be generalized to other population groups. Moreover, many clinical factors, such as anemia, depression, and the type of applied drugs, could affect cancer-related fatigue, and the consideration of these variables for the researcher was impossible; this was one of the main limitations of the present study. Considering that the existence of different dimensions of fatigue in cancer patients has been considered inevitable. Additionally, in Iran, there is a lack of studies on the variable of fatigue. Thus, it is suggested that further studies be conducted to increase strategies for reducing cancer-related fatigue.

Conclusion

In the present study, 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.

Authors' Contribution

Data curation: Farhad azadmehr and Payam Emami.
Formal analysis: Farzad Zareie.
Investigation: Kosar Membari.
Methodology: Farhad azadmehr and Farzad Zareie.
Project administration: Payam Emami.
Resources: Kosar Membari.
Software: Farhad azadmehr.
Supervision: Payam Emami.
Validation: Kosar Membari and Farzad Zareie.
Visualization: Farhad azadmehr and Kosar Membari.
Writing–original draft: Farhad azadmehr.
Writing–review & editing: Payam Emami.

Competing Interests

No conflict of interests has been declared by the authors.

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