

Factors affecting quality of life and fatigue in patients with leukemia under chemotherapy

Amir Musarezaie, Firuz Khaledi¹, Homayoon Najji Esfahani², Tahere Momeni Ghaleghasemi

Behavioral Sciences Research Center, Department of Adult Health Nursing, ¹Department of Psychiatric Nursing, School of Nursing and Midwifery, ²Department of Operating Room, School of Nursing and Midwifery, Isfahan University of Medical Sciences, Isfahan, Iran

ABSTRACT

Background: The goal of treating chronic diseases, including hematologic malignancies, is to increase patients' life span and to improve their capabilities as much as possible; so that patients could maintain an appropriate level of quality of life (QoL) and continue their lives. Most studies performed to evaluate the treatment of various diseases were mostly focused on the increase of life expectancy regardless of the QoL and treatment issues. Furthermore, fatigue is one of the most common and distressing side effects of cancer and treatments related to it, which can affect a patient's QoL, and be followed by many problems. This study was designed and implemented with the aim to determine the factors affecting the QoL and fatigue in patients with leukemia undergoing chemotherapy. **Materials and Methods:** This was a cross-sectional correlation descriptive-analytical study. One hundred and fifteen patients with leukemia referred to Sayyed-Al-Shohada Hospital were enrolled in the study through convenient sampling method. To collect data, a three-part questionnaire was used: The first part was related to demographic characteristics and disease-related data and the second part was the fatigue check list and the third part was the Short-Form 36 Health Survey (SF-36) related to QoL. The data were analyzed after collection and coding through Software SPSS version 18 and descriptive and analytical statistics (analysis of variance test, independent *t* test, Pearson's and Spearman's correlation coefficient) with 95% confidence interval. **Results:** The results showed that there was a significant correlation between QoL in Physical Component Summary with gender ($P = 0.03$), educational level ($P = 0.09$), and marital status ($P = 0.004$). Also there was a significant correlation between QoL in Mental Component Summary with educational level ($P = 0.01$) and economic status ($P = 0.02$). Findings showed that there was a significant correlation between fatigue and marital status ($P = 0.005$). But statistically there was no significant correlation between demographic variables such as age, educational level, and employment status with patients' fatigue. Spearman correlation coefficient showed that there was a significant correlation between fatigues with pain ($P = 0.005$). Also findings revealed the statistically significant correlation between fatigues with economic status ($P = 0.003$). **Conclusion:** According to the present

results, it seems that some demographic factors affect QoL and significant relationship exists between them. Fatigue in patients with leukemia dramatically affects their QoL. Therefore, it is important for medical staff to pay attention to demographics and fatigue in leukemic patients in order to improve their QoL and help them to organize their activities to promote health and QoL.

Key words: Chemotherapy, fatigue, leukemia, quality of life

Address for correspondence: Mrs. Tahere Momeni Ghaleghasemi, Department of Adult Health Nursing, School of Nursing and Midwifery, Isfahan University of Medical Sciences, Isfahan, Iran. E-mail: t_momeni@nm.mui.ac.ir

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INTRODUCTION

Neoplastic diseases are the second cause of death in most developed countries of the world and are the most dreadful diseases today.^[1] Leukemia is a neoplastic disease of the hematopoietic and immune system, which manifests in various clinical and pathological forms.^[2] It has had a growing trend in all countries of the world, including Iran (in the ninth place with regard to cancer prevalence in 1996 and the fourth in 2001.^[3] According to Hadi *et al.*, the incidence of leukemia in Iranian women 15-49 years of age, was 13.89% in 100,000 and the incidence of blood cancer in them was 4.02% out of all the cancers. Also, the incidence of leukemia in men 15-49 years of age in Iran was 18.31% in 100,000 that allocated 4.89% of all the cancers in Iranian men.^[4] In 2003, the American Cancer Society estimated about 30,600 new cases of leukemia diagnosed and 21,900 deaths from leukemia occurred.^[5]

The aim of treatment of hematologic malignancies is to increase survival and improve patients' abilities as much as possible in order to continue their lives by maintaining an appropriate level of quality of life (QoL).^[6] Because the treatment of hematologic malignancies is generally not possible and the aim of treatment is to relieve symptoms and improve survival, in recent years, the QoL is considered as the basic criterion for assessing response to treatment.^[7] Patients with leukemia receive aggressive treatments such as chemotherapy and this considerably affects their QoL.^[8] Chemotherapy is the most important factor that affects the QoL of patients with acute leukemia.^[9] In hematologic malignancies, patients with leukemia had lower QoL scores and higher anxiety levels.^[10]

It is over a decade that reviewing QoL as an important issue in health care, especially for chronic disease, is discussed^[11] and is considered as part of the evaluation criteria for cancer treatment.^[12] In recent years, interest in assessing and improving the QoL of patients with chronic diseases, including cancer, has increased significantly and improving daily functioning and QoL for these patients has become important.^[13]

Fatigue is one of the most complex and the most common problems associated with leukemia that can affect many aspects of patients' lives and lead to major problems.^[14] Approximately 72%-99% of patients with cancer suffer from fatigue. In these patients, fatigue may be caused by the effect of the disease and its treatment, which is referred to cancer-related fatigue.^[15] During cancer treatment, chemotherapy causes fatigue more than other treatments. For example, compared with 60%-93% of the patients who undergo radiation therapy that may experience fatigue, 80%-96% of the patients who are undergoing chemotherapy suffer from fatigue.^[16]

Fatigue is the most common and most bothersome symptom in patients with cancer undergoing chemotherapy. They

feel fatigue more severe and more constant compared with healthy people and this condition does not improve with adequate rest and sleep. Fatigue is a common and important side effect of chemotherapy and is equivalent to a prevalence of 80%-99%. Damage to the bone marrow and side effects of treatment, such as nausea, vomiting, diarrhea, and loss of appetite during chemotherapy, are the intensifying causes of fatigue.^[17]

Fatigue during cancer treatment can adversely affect patients' QoL.^[18] Patients expressed the feeling of fatigue as weakness, lack of energy, and exhaustion. There are numerous physical and psychological causes of cancer-related fatigue. Physical factors include anemia, various metabolic disorders, insufficient food, anorexia, nausea, vomiting, and gastrointestinal obstruction. Psychological factors that may be involved in fatigue include depression, anxiety, and sleep deprivation.^[19] Curt *et al.* showed that cancer-related fatigue was more among patients receiving chemotherapy and also in patients who received prolonged chemotherapy. Approximately 76% of patients undergoing chemotherapy experienced fatigue.^[20]

The yield loss due to fatigue reduces QoL.^[17] In Dehghan *et al.*'s study, patients who were more tired had lower QoL.^[21] Aaronson *et al.*^[22] and Hurny *et al.*^[23] mentioned the substantial negative impacts of fatigue on QoL in their studies. Visser and Smets also noted that fatigue is an important predictor of QoL and is associated with the QoL of patients with cancer.^[24] Byar *et al.* showed that high levels of fatigue are associated with low QoL for patients with cancer.^[25]

Individual's QoL is associated with all factors of cancer referred to as cancer features. These features include fatigue, emotional and mental problems, illness denial, and impaired mental picture due to changes in body function and duration of disease. Other features of cancer include type of cancer, stage of cancer, early diagnosis, cancer pain, variables and demographic indicators of the patient, and caregiver behaviors that may affect the QoL of patients with cancer.^[26] In a study conducted on factors affecting QoL in patients with lymphoid neoplasia (leukemia and lymphoma), higher scores of QoL based on physics was associated with noninvasive nature of the patient, being male, and being less educated; higher scores of QoL based on psychology were associated with noninvasive nature of the patient, being male, and having higher income.^[27]

Regarding the relationship between demographic variables and QoL in these patients, there were some controversies, which the present study attempted to clear. Due to the high rate of impact of the disease on all aspects of people's lives, patients with medical advances have an average increase in survival. Various symptoms of this disease including fatigue as one of the most complex and common side effect related to leukemia, can affect many aspects of their lives, including QoL. Understanding these factors will help the society's health workers in their efforts to improve the health and organize

the QoL of these patients. We designed and implemented a study to investigate the factors affecting the QoL and fatigue in patients with leukemia undergoing chemotherapy. The present study tried to answer questions about existence or absence of relationship between demographic variables and QoL and fatigue in these patients. It should be noted that the present study as a beginning for more comprehensive and complete studies.

MATERIALS AND METHODS

This was a cross-sectional correlation descriptive-analytical study. One hundred and fifteen patients with leukemia from Sayyed-Al-Shohada Hospital affiliated to Isfahan University of Medical Sciences were enrolled in the study during 5 months through convenient sampling method (2013). According to statistical consultant and statistical formula, the sample size was estimated to be 96. In this statistical formula mark “Z” indicated for 95% confidence Interval was considered 1.96 and mark “σ” indicated for standard deviation, according to the leukemic QoL standard deviation in the study by Hadi *et al.*^[4] where it was considered as 27.08. “d” Value according to statistical consultant was considered one-fifth of a standard deviation. Due to the potential loss of samples, 15%-20% of this amount was added to the sample, thus the 115 patients in the 5-month sampling period (with Convenience Sampling), were enrolled.

$$n = \frac{(Z_{1-\alpha/2})^2 \times \sigma^2}{d^2}$$

The inclusion criteria were over 18 years of age, definitive confirmation of the leukemia diagnosis by a hematologist, were undergoing chemotherapy, no known mental problems, or being treated with psychotropic drugs and Persian speaker. The subjects were excluded in case of unwillingness to continue the study, any troubles that prevented the person from participating, or transfer of the patient to another hospital.

Before initializing the study, approvals were obtained from hospital authorities. The selected subjects were then assured about data confidentiality and their access to final results and asked to sign informed consent forms. To collect data, a three-part questionnaire was used; the first part was related to demographic characteristics and disease-related data (age, gender, marital status, employment status, educational level, social support level, economic status, experienced pain from disease, time passed from diagnosis and type of leukemia). The second part was the fatigue check list (1: Do you need to relax? 2: Do you have trouble sleeping? 3: Do you feel weak? 4: Do you get tired?), which was used to evaluate the fatigue, and the third part was the Short-Form 36 Health Survey (SF-36) related to the QoL.

SF-36 questionnaire consisted of 8 scale or concept, which includes physical functioning (PF), role-emotional (RE), role-physical (RP), bodily pain (BP), social functioning (SF),

mental health (MH), vitality (VT), and understanding general health (GH).^[28] SF-36 questionnaire has been used to evaluate by professors and students of Mashhad University and its reliability and validity reported as 75%.^[29] Reliability and validity of this questionnaire evaluated in other research,^[30] for example, in the study of Montazeri *et al.* it was used and confirmed.^[31] Also reliability of this questionnaire has been done in the Musarezaie *et al.*'s study in patients with breast cancer and its Pearson's correlation coefficient obtained was 75% through test and re-test method with a 2-week interval.^[32]

The responding method for the QoL questionnaire varied from dual mode (Yes/No) to 6-degree Likert Scale. In this tool, increased score indicates higher level of QoL.^[33] Average time for filling this questionnaire is approximately 5-10 min.^[32]

According to standard procedures SF-36 subscale scores, this questionnaire can be used in two domains: Physical health (Physical Component Summary) and mental health (Mental Component Summary).^[34] To facilitate analysis, these two general areas have been evaluated in the present study.

Considering the ethical considerations and obtaining consent of the patients, the researchers began to complete the questionnaires. Literate patients completed the questionnaires by themselves and for the rest it was completed through interviewing method. The data were analyzed after collection and coding through Software SPSS version 18 and descriptive (frequency distribution, mean, standard deviation) and analytical statistics (analysis of variance test, independent *t* test, Pearson's and Spearman's correlation coefficient) with 95% confidence interval.

RESULTS

According to the results of the present study, mean age of the study subjects was 31.3 ± 3.6 years. Most of the subjects were male (53.04%), single (50.43%), employed (45.21%), and 45.21% were under high school graduates. Most of the subjects obtain a medium social support (60.86%) and had a medium economic support (52.16%). A 91.30% of the subjects had pain caused by leukemia that 86.95% of them had a moderate pain level. Average duration of the disease was 36 (3.2) months. 60.86% of the leukemia was Acute Myeloblastic Leukemia (AML), 21.73% was Acute Lymphoblastic Leukemia, 8.69% was Chronic Lymphoblastic Leukemia, and 8.72% was Chronic Myeloblastic Leukemia.

Other information about correlation between QoL (Physical and Mental Component Summary) with gender, educational level, economic status, and marital status is illustrated in table 1.

According to the results of the present study, 91.30% of the study subjects experienced a different level of fatigue.

Table 1: Demographic variables associated with QOL scores

Marital status	Economic status	Educational level	Gender	Variable aspect of QoL
ANOVA test	Spearman correlation coefficient	Spearman correlation coefficient	Student <i>t</i> test	Physical Component Summary
<i>P</i> =0.004	<i>P</i> =0.4	<i>P</i> =0.09	<i>P</i> =0.03	
<i>F</i> =0.43	<i>r</i> =0.24	<i>r</i> =0.53	<i>t</i> =0.23	
ANOVA test	Spearman correlation coefficient	Spearman correlation coefficient	Student's <i>t</i> test	Mental Component Summary
<i>P</i> =0.97	<i>P</i> =0.02	<i>P</i> =0.01	<i>P</i> =0.12	
<i>F</i> =0.14	<i>r</i> =0.67	<i>r</i> =0.51	<i>t</i> =0.83	

QOL = Quality of life, ANOVA = Analysis of variance

In terms of correlation of demographic variables with fatigue of study subjects, the results showed that there was a significant correlation between marital status with findings, as the mean scores of fatigue in singles were more than married ones ($P = 0.005$). But statistically there was no significant correlation between demographic variables such as age, educational level, and employment status with patients' fatigue. Spearman correlation coefficient showed that there was a significant correlation between fatigues with pain, as more pain led to more fatigue in patients ($P = 0.005$, $r = 0.55$). Also findings revealed the statistically significant correlation between fatigues with economic status ($P = 0.003$, $r = -0.65$).

DISCUSSION

Based on the findings, incidence of leukemia was higher in men and acute Myeloblastic leukemia (AML) was the most common type of leukemia. Zand *et al.* study confirms these results.^[35]

There was a significant relationship between QoL in physical health domains and gender, educational level, and marital status of the patients as well as a relationship between the QoL in mental health domains and educational level and income. There was no relationship between QoL in physical health domain and patient's income, and also between QoL in mental health domain and gender and marital status. The findings of Khiltash *et al.*^[27] on 94 patients with lymphoid neoplasia (leukemia and lymphoma) were also in line with the results of the present study.

According to the study, 91.30% of the patients expressed the signs and symptoms of the illness in varying degrees. Vogelzang *et al.*'s study showed that 91% of patients with cancer suffer from fatigue^[36] that was consistent with the present study.

Based on our findings, among the demographic variables only marital status showed a significant relationship with fatigue in patients. The mean fatigue score was higher in singles than married. However, other variables such as age, educational level, and employment status were not associated with fatigue. These results were consistent with Safaee *et al.*'s study since they also found a relationship between marital status and fatigue.^[11]

We found a statistically significant relationship between patient's fatigue and pain. Relationship between fatigue and pain has been confirmed in several studies.^[37,38] Pain in causing fatigue may be explained by several mechanisms; one of them is the experience of pain in most of the cancer patients, which may lead to complex physical and psychological symptoms resulting in fatigue in patients.^[11]

Results showed a relationship between financial status of the patients and fatigue. Having cancer and its treatment costs imposes a heavy burden to the family's financial state. This matter has a lot of psychological consequences and following this psychological trauma, physical problems such as fatigue may appear. Therefore, awareness of the social and economic status of patients seems to be necessary for medical staff. The results obtained from this study are consistent with other studies.^[11,39,40]

Unlike most of the studies that concentrate on the general QoL of patients with cancer (regardless of the particular type of cancer), this study has considered a certain type and the most common among the young population (the majority of patients with AML, the most common type of leukemia were younger than 30 years).^[41] According to the young Iranian population and the importance of this class of the population in the productive power resource of Iran, the importance of this study has doubled. Almost all the studies that have examined the QoL in a particular type of cancer, have studied breast cancer, and with this regard (type of cancer) this study is among its first studies. Another strength point of this study was considering fatigue as one of the most common complications of leukemia patients. Given that fatigue is a common side effect of treatment protocol (repeated chemotherapy), it decreases the QoL for these patients.

CONCLUSION

According to the present results, it seems that some demographic factors affect QoL have a tangible relationship among them as well. Fatigue in patients with leukemia is the most common and serious problem that can dramatically affect their QoL. Therefore, it is important for the medical staff to consider the demographic information and fatigue in these patients to improve their QoL. It helps them in organizing their activities to promote health and QoL of the patients. Based on the study findings in chemotherapy centers,

health care providers, especially nurses, are key members of the care team and they should pay special attention to the phenomenon of fatigue in patients undergoing chemotherapy with leukemia, and have strategies to eliminate or alleviate it.

It is recommended, as an aid in assessing the patient's recovery and also in the assessment of different treatment outcomes, the QoL in all patients with leukemia to be assessed; so, based on our findings, the best treatment method for the patients can be chosen. It is also suggested for further studies to investigate the QoL, fatigue, and its association with the demographic characteristics of the patients with other types of cancer.

The findings of a study should be considered together with its limitations. The main limitation of this study was the low number of people with leukemia who had the inclusion criteria for the intervention. Among these patients, their unique physical and mental conditions were also another limitation for the researchers. Anxiety, irritability, worries, depression, and aggression were also sometimes a barrier to communicate with the patients and for them to complete the questionnaire. It should be noted that the approximate time to enter the study for this number of subjects ($n = 115$) was 5 months. Another limitation was the limited environment of the study; due to this limitation, studying patients with leukemia admitted in other hospitals at the same time was not possible. The research environment was the only research center affiliated with Isfahan University of Medical Sciences (Isfahan, Iran), which besides Isfahan also covers other surrounding cities.

Based on the limitations of this study, including the small number of subjects, applying the study only in one hospital, and in only one section, and the problems of generalizability, it is recommended for further similar studies to be conducted in other hospitals with larger sample size. Also, to improve the quality of data analysis, it is suggested that in future, researches with similar methodology using multivariate tests also must be considered.

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