

## ■ Original article

## A survey of the quality of life in patients undergoing hemodialysis and its association with depression, anxiety and stress

Vida Shafipour<sup>1</sup>, Fatemeh Alhani<sup>2,\*</sup>, Anoshirvan Kazemnejad<sup>3</sup>

(Received: 28 Feb 2015; Accepted: 30 Jun 2015)

### Abstract

**Background and Purpose:** Hemodialysis patients face several physical and mental tension factors including depression, anxiety and stress, which could decrease their quality of life. This study aimed to identify the relationship between quality of life (QOL), depression, anxiety and stress in patients undergoing hemodialysis.

**Methods:** This descriptive, analytical study was conducted on 160 hemodialysis patients (80 male and 80 female) using convenience sampling at three hemodialysis centers in Sari, Mazandaran, Iran. Data collection was performed during three months using three questionnaires of demographic characteristics, DASS-21 and quality of life (SF-36). Collected data were analyzed using descriptive and inferential statistics.

**Results:** In this study, the mean age of patients was 50.8±12.81 years, and 88.8%, 92.5% and 85.6% of the subjects had severe depression, anxiety and stress, respectively. Spearman's correlation coefficient showed a significant inverse correlation between the physical and mental domains of SF-36 questionnaire with depression ( $r=-0.38$ ,  $r=-0.29$ ), anxiety ( $r=-0.48$ ,  $r=-0.45$ ) and stress ( $r=-0.5$ ,  $r=-0.57$ ), respectively ( $P<0.001$ ).

**Conclusion:** According to the results of this study, increased depression, anxiety and stress could reduce QOL in hemodialysis patients. Therefore, nurses and health care staff play a pivotal role in the identification and alleviation of these factors by using coping and support strategies to improve QOL in these patients.

**Keywords:** Anxiety, Depression, Hemodialysis, Quality of life, Stress

### Introduction

Chronic and progressed renal failure remarkably affects the physical and mental health of an individual (1, 2). End-stage renal disease (ESRD) is a life-threatening condition that influences the daily life of many patients and their families forcing them into unstable health conditions and lifestyles (3).

The prevalence rate of chronic renal failure has been estimated at 242 cases per one million across the world, which increases by 8% every year (4). In Iran, the prevalence of renal diseases is on a

rising trend, and there are 253 dialysis cases per each population of one million patients. Annually, 38,000 patients undergo hemodialysis, and this rate has been predicted to double by 2020 (5).

Hemodialysis is a common therapy for ESRD and a replacement for other renal treatments performed to prolong patient life (6). Dialysis has numerous effects on the overall health and various aspects of daily life, as well as the quality of life (7). Quality of life is an important parameter measured in patients

<sup>1</sup> Department of Medical-Surgical Nursing, Nasibeh School of Nursing and Midwifery, Mazandaran University of Medical Science, Sari, Iran <sup>2,\*</sup> Corresponding author: Nursing Department, Faculty of Medical Sciences, Tarbiat Modares University, Tehran, Iran. Email: [alhani\\_f@modares.ac.ir](mailto:alhani_f@modares.ac.ir)

<sup>3</sup> Department of Biostatistics, Faculty of Medical Sciences, Tarbiat Modares University, Tehran, Iran

with chronic diseases (8), as well as a key component of the assessment of dialysis patients (6).

Quality of life determines the effectiveness and outcome of different treatment methods. According to the World Health Organization (WHO), quality of life is defined as the general perception of individuals towards different aspects of their life, including the dominant culture, value system, goals and achievements, expectations, standards and priorities. Therefore, healthcare providers need to consider this parameter in the process of treatment in order to prevent the possible side effects of a disease (9), such as physical, economic, social and emotional complications, which are likely to cause mental discomfort in the patient and reduce their quality of life (10).

Patients who undergo hemodialysis are likely to tolerate a broad spectrum of changes caused by their treatment; in this process, the patient remains connected to the machine twice or three times a week for an average of four hours each time (11, 12). Hemodialysis aims to help patients lead a normal life; however, the limitations and subsequent tensions could reduce the quality of life involuntarily (12). Dialysis patients experience different complications, which might have adverse effects on their life quality (10).

According to the literature, hemodialysis patients are more prone to mental complications such as anxiety, depression and social deficits compared to healthy individuals (1, 10). These mental problems are normally the result of the physical conditions caused by hemodialysis (13). Several studies have suggested that despite the high prevalence of depression among hemodialysis patients but due to the proximity with the symptoms of increased urea, this disorder often remains undiagnosed. Consequently, most of the patients might not be evaluated in terms of mental health problems, and their quality of life is usually endangered by the unidentified depression (14, 15).

Mental disorders, such as anxiety, could substantially decrease quality of life, and appropriate strategies are required in order to diagnose and improve these complications (16, 17). Renal failure is a chronic condition (10), and if it leads to ESRD, it

may have destructive effects on the overall health and quality of life (QOL) of the patient (13). Furthermore, the therapies used for ESRD could impose heavy costs on the health care system of a country.

Since stress risk factors could deteriorate the overall health and QOL of hemodialysis patients, accurate diagnosis and regular evaluations of these factors could prevent the health consequences of therapy (10). Impaired mental health affects QOL resulting in unemployment, family and relationship problems, disruption of interpersonal affairs and failure of the individual to fulfill familial and social responsibilities.

Regarding the chronic and impairing nature of ESRD and the persistent need for hemodialysis in these patients, as well as the long-term effects of the therapy on the normal life of the patients, improving QOL has been a major concern among researchers. The present study aimed to determine the relationship between QOL and mental disorders such as depression, anxiety and stress in hemodialysis patients.

## Materials and Methods

This descriptive, analytical study was conducted on 160 male and female patients undergoing hemodialysis for at least 6 months, who were not diagnosed with mental disorders and had no history of kidney transplant.

Primarily, the researchers attempted to assess the QOL of the subjects in two aspects of physical and mental conditions. Following that, the prevalence of depression, anxiety and stress and their association with the therapy were measured.

The patients were selected during different work shifts on weekdays from three hemodialysis centers at a teaching hospital in Sari, located in Mazandaran, Iran. Samples were collected from the patients referring to the dialysis wards using convenience sampling. The objectives of the study were explained to the patients, and written consent was provided from all the subjects.

In addition, the subjects consented to convey information about themselves. In addition, the patients were free to withdraw from the study at any given time and were granted terms of confidentiality. Data collection was performed

using three questionnaires including demographic characteristics, quality of life (SF-36) and Depression, Anxiety and Stress Scales (DASS-21) during three months. All the questionnaires were completed after dialysis treatment.

In this study, patient information forms consisted of demographic characteristics and hemodialysis features (e.g. treatment duration and time, history and frequency of hemodialysis in a week).

### Applied Measures

#### *Short-form Health Survey 36 (SF-36)*

Short-form health survey 36 (SF-36) is a multi-dimensional questionnaire with 36 items, which are divided into two main categories (physical and mental) and eight subscales including physical functioning scale (PFS), role-physical (RP), bodily pain (BP), general health (GH), vitality (VT), social functioning (SF), role-emotional (RE) and mental health (MH).

The questions were scored between 0-5 (zero: severe condition, five: normal condition). Score of each item was calculated independently, and the total score in each domain ranged between 0-100 with higher scores representing better QOL.

In this study, the level of QOL was evaluated based on the responses given by the subjects. Moreover, the reliability of SF-36 scale was determined using Cronbach's alpha in the first 20 questionnaires. According to Montazeri (2005), the reliability of SF-36 has been calculated at 0.65 in Iran (18).

#### *Depression Anxiety Stress Scales (DASS-21)*

This general, self-reporting questionnaire was developed by Loviband and Loviband (1995) (19) and focuses on the assessment of depression, anxiety and stress.

There are 21 questions in DASS-21, which are divided into the following categories:

1) **Depression** (7 questions) with the score range of 10-13 (mild), 14-20 (moderate), 21-27 (severe) and above 28 (very severe).

2) **Anxiety** (7 questions) with the score range of 8-9 (mild), 10-14 (moderate), 15-19 (severe) and above 20 (very severe).

3) **Stress** (7 questions) with the score range of 15-18 (mild), 19-25 (moderate), 26-33 (severe) and

above 24 (very severe) (20).

In this study, reliability of the correlation coefficient was calculated at 0.9 for 20 samples.

### Data Analysis

Data analysis was performed in SPSS V.16 using descriptive and inferential statistics. For demographic variables, frequency was used, and the relationship between demographic variables and depression, anxiety, stress and QOL was determined using the Spearman's correlation coefficient due to the abnormal distribution of the data.

### Results

The investigated sample size consisted of 160 patients (80 male and 80 female) within the age range of 25-79 years (mean age: 50.84±12.81 years). Socio-demographic characteristics of the subjects are shown in Table 1. In this study, 100

**Table 1.** Socio-demographic Characteristics of the Studied Patients

Variable	N (%)
Age	25-79
Mean ± SD	50.84 ± 12.81
Gender	
Male	80
Female	80
Marital status	
Married	122 (76%)
Single	12 (7.5%)
Divorced	7 (4.4%)
Educational Status	
Academic educations	13 (8%)
Reading and writing	59 (37%)
Illiterate	39 (24.4%)
Employment	
Part-time	39 (24.4%)
Full-time	19 (11.9%)
Unemployed	102 (63.8%)
Economic Status	
Good	25 (15.6%)
Average	60 (37.5%)
Weak	75 (46.9%)
Length of Hemodialysis (yr)	
Less than one	22 (13.8)
1-2	53 (33.3%)
3-5	49 (30.6%)
More than 10	9 (5.6%)
Shift	
Morning	100 (35.6%)
Afternoon	53 (33%)
Evening	23 (14.4%)
Rotation	27 (16.9%)

**Table 2.** Severity of Depression, Anxiety and Stress in Patient undergoing Hemodialysis

Variables		Mild	Moderate	Severe
Depression	N (%)	0 (0)	18 (11.2)	142 (88.8)
Anxiety	N (%)	0 (0)	12 (7.5)	148 (92.5)
Stress	N (%)	7 (4.4)	15 (9.4)	137 (85.6)

patients (62.5%) were hemodialyzed three times and 60 cases (37.5%) received treatment twice a week.

Regarding the comorbidities, 56 patients (35%) had cardiac diseases, 43 patients (22.6%) had diabetes, 19 patients (11.9%) had hepatitis B, 18 patients (11.2%) had pulmonary diseases and 9 patients (5.6%) had no history of diseases. According to the results of this study, 142 patients (88.8%) had severe depression and 18 subjects (11.2%) had moderate depression.

As for anxiety, 148 patients (92.5%) were diagnosed with severe anxiety, while 12 cases had moderate anxiety. Moreover, the evaluation of stress indicated that 137 patients (85.6%) had severe stress, 15 patients (9.4%) had moderate stress, 7 cases had mild stress and only one patient had a normal stress level (Table 2).

According to the results of Spearman's correlation coefficient, there was a significant negative correlation between the level of QOL and depression, anxiety and stress ( $P < 0.001$ ). Furthermore, a significant negative correlation was observed between the physical aspect of QOL and depression ( $r = -0.38$ ), anxiety ( $r = -0.48$ ) and stress ( $r = -0.57$ ) ( $P < 0.001$ ). The same relationship was observed between the mental aspect of QOL and depression ( $r = -0.29$ ), anxiety ( $r = -0.43$ ) and stress

( $r = -0.5$ ) ( $P < 0.001$ ); in other words, high levels of depression, anxiety and stress were found to decrease QOL.

The results of Spearman's correlation coefficient were also indicative of a significant negative correlation between PFS, limited RP, BP, GH, vitality and MH with depression, anxiety and stress. However, the correlation between SF and emotional aspect of QOL with depression, anxiety and stress was not considered to be significant (Table 3).

Moreover, a significant correlation was found between depression, anxiety and stress, which was indicative of the fact that increased level of depression could lead to increased anxiety and stress ( $P < 0.001$ ). On the other hand, no significant correlation was observed between the time of dialysis and depression, anxiety and stress. However, there was a significant correlation between the history of dialysis, depression ( $P = 0.001$ ,  $r = 0.25$ ), physical component summary (PCS) ( $P = 0.000$ ,  $r = -0.3$ ) and mental component summary (MSC) ( $P = 0.05$ ,  $r = -0.15$ ); nevertheless, these parameters had a negative correlation with QOL.

## Discussion

Hemodialysis is considered as the main treatment option for ESRD patients (1). However, this method could cause several physical and mental complications that may not be manageable even with the use of new and advanced techniques (21). These physical, mental and social problems could decrease the level of QOL in patients undergoing hemodialysis. Emotional and mental disorders, such as depression, anxiety and stress, are common

**Table 3.** Spearman's Correlation Coefficient Results of Depression, Anxiety and Stress Scores with (Sf-36) QOL Scores in Hemodialysis Patients

Correlation coefficients	Physical Functioning	Role Physical	Bodily Pain	General Health	Vitality	Social Functioning	Role Emotional	Mental Health
Depression	R=-0.25 P=0.002	R=-0.21 P=0.006	R=-0.34 P=0.000	R=-0.28 P=0.000	R=0.34 P=0.000	R=0.2 P=0.01	R=0.08 P=0.31	R=-0.5 P=0.000
Anxiety	R=-0.32 P=0.000	R=-0.31 P=0.000	R=-0.39 P=0.000	R=-0.33 P=0.000	R=-0.39 P=0.000	R=-0.02 P=0.73	R=-0.06 P=0.4	R=-0.5 P=0.000
Stress	R=-0.41 P=0.000	R=-0.29 P=0.000	R=-0.42 P=0.000	R=-0.44 P=0.000	R=-0.51 P=0.000	R=-0.51 P=0.000	R=-0.04 P=0.6	R=-0.6 P=0.000

complications among hemodialysis patients leading to reduced QOL.

According to the results of this study, there was a significant negative correlation between the level of QOL and variables of depression, anxiety and stress; in other words, increased levels of these variables could reduce QOL in hemodialysis patients (10, 17, 22).

In one study, Sayin et al. (2007) claimed that depression and anxiety had significant adverse effects on the QOL in hemodialysis patients as they had lower QOL scores compared to the patients undergoing peritoneal dialysis and kidney transplant (24). In another study, Odden et al. (2006) reported that patients with ESRD were more likely to experience poor overall health and QOL compared to healthy individuals (2).

The results of the current study were indicative of a significant correlation between depression and different aspects of QOL; in other words, high levels of depression in the patients undergoing hemodialysis led to lower QOL scores. According to the findings of Cukor et al. (2007), depression and anxiety could reduce QOL and increase mortality.

On the other hand, several researchers have stated that depression and anxiety are independent variables with an inverse correlation to QOL (25). For instance, Son et al. (2009) observed the prevalence and symptoms of depression to be higher among hemodialysis patients, which led to reduced QOL (26).

In the current study, a significant correlation was found between anxiety and different aspects of QOL, and increased anxiety was observed to decrease QOL. This is consistent with the findings of previous studies confirming that as a common complication among ESRD patients, anxiety could adversely affect the quality of life (17). It is also noteworthy that mental complications, such as depression and anxiety, are often accompanied by physical conditions and disabilities (27).

In the present study, a significant correlation was observed between different aspects of QOL and stress in hemodialysis patients; accordingly, patients with high stress levels experienced lower QOL, while this correlation was not significant in the variables of SF and RE. According to the literature,

hemodialysis affects the physical and psychosocial health of an individual due to the stress caused by the treatment procedure (28).

According to the other findings of this study, women were observed to suffer from severe stress more than men. In one study, Tagay et al. (2007) reported that stress complications were highly prevalent among the patients undergoing long-term dialysis, and there was a significant correlation between depression, anxiety and health-related QOL; accordingly, intensified stress symptoms in hemodialysis patients could trigger depression and anxiety and reduce QOL in these patients.

Furthermore, they claimed that female dialysis patients experienced more mental discomfort in the form of disappointment, phobia and insecurity compared to male patients (17). The findings of the current study were indicative of a significant correlation between stress, depression and anxiety; accordingly, increased depression was found to deteriorate the level of severe stress and anxiety.

In another study, Dogan et al. (2005) evaluated several hemodialysis patients and realized that the subjects suffering from severe depression had higher levels of anxiety and reduced QOL (22). In the current study, the majority of the subjects experienced severe stress during their treatment. Similarly, Tagay et al. (2007) reported that most of their patients experienced at least one serious stressor, while half of them expressed feelings of insecurity, disappointment and fear towards dialysis treatment (17).

The causes of stress were not determined in the present study due to the applied method. However, the effects of stress symptoms and significance of different variables of mental health in SF-36 were evaluated closely. Generally, stress leads to the failure of the individual to perform their familial and social roles, and such changes in the lifestyle will naturally give rise to mental complications in ESRD patients (2).

In this study, the majority of the subjects suffered from severe depression, and only a few experienced moderate stresses. Moreover, depression was found to be the most prevalent mental complication among ESRD patients (22). Severe anxiety was

another frequent disorder among our subjects, and hemodialysis was observed to affect the emotional and social function of the subjects significantly.

In another study, Aghanwa and Morakinyo (1997) reported the prevalence of psychiatric complications, such as depression and anxiety, to be noticeably higher among dialysis patients compared to healthy individuals (30). In addition, they claimed that ESRD alone could not determine QOL in hemodialysis patients, and other factors including age, gender and educational and social status had a remarkable effect on the level of QOL as well (9).

In the present study, the majority of the subjects were married and unemployed with low education levels. In the study conducted by Tagay et al. (2007), the majority of the patients were married (17) and had a history of cardiovascular diseases (2). According to the findings of these two studies, married patients had a higher QOL compared to single subjects since they tended to enjoy the support of their spouses and children (9).

In conclusion, the most substantial challenge to be faced by ESRD patients is to cope with dialysis treatment and the subsequent complications. In this regard, health care staff and nurses play a key role in the assessment and improvement of QOL in these patients by attempting to enhance the patients' adaptation and mental condition and providing support (23). Therefore, regular evaluation of the mental condition needs to become an essential component of healthcare plans for hemodialysis patients (22).

### Conflicts of interest

There were no conflicts of interest in this study.

### Author's contributions

FA designed the study, provided the important suggestions for the improvement of the first draft and supervisor. VSH collected the data, analyzed the data, and wrote the paper. AK analyzed the data, and contributed to the study design. FA and VSH contributed to the translation procedure. All authors read and approved the manuscript.

### Acknowledgements

Hereby, we extend our gratitude to the participants and staff of the hemodialysis wards for assisting us in this research project.

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