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Anxiety, Depression and Quality of Life among Patients with Heart Failure

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ABSTRACT

Introduction: Heart failure as a chronic progressive disorder is a common and costly health problem throughout the world, affecting all aspects of patient quality of life. Patients with heart failure experience high level of anxiety and depression and their quality of life decrease significantly. Although it is important to study the quality of life in heart failure patients, there has been no comprehensive study in this regard in Iran. The present study aimed to assessment of the level of anxiety, depression, and quality of life among patients with heart failure.
Methodology: The research community of this descriptive-analytical study included 251 patients with heart failure who were hospitalized in three hospitals of Ahvaz Jundishapur University through a six months period. The Minnesota questionnaire, State-Trait Anxiety Inventory, and Beck Depression Inventory were used to evaluate quality of life and the levels of anxiety and depression, respectively.
Findings: Mean age of the participants was 65.8 years ± 9.8 years. Mean score for patients' physical, mental, and general quality of life were 24.10 ± 7.15, 15.6 ± 4.96, and 62.23 ± 19.44, respectively. The results indicated low quality of life of the participants. Mean score for State and trait anxiety, and depression level were 48.40 ± 9.85, 51.98 ± 8.45, and 46.54 ± 12.15, respectively. The results revealed high levels of both trait and state anxiety in patients. According to the score the 97% of patients suffers from depression. Moreover, the results of this study demonstrated that variables factors including old age, low education level, low economic status, the number of admissions (more than four times), and advanced stages of disease (class III and IV) were associated with low quality of life and high anxiety and depression level ($p<0.001$).
Conclusion: In this study, patients with heart failure had low quality of life and high levels of anxiety and depression. Therefore, the results of this study are a warning for researchers and physicians in order to provide care giving training and psychological supports to improve condition of patients with Heart failure.

Key words: Heart failure, Quality of life, Anxiety, Depression

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INTRODUCTION

Heart failure (HF), as a chronic progressive disorder, is a common and costly global problem, affecting around 23 million people throughout the world [1-3]. Its annual prevalence is continuously increasing. The disease has been recognized as a main cause of death in the United States, and has become one most important concerns of world health [4,5]. In developing countries such as Iran, 1% to 2% of total adult population are suffering from HF, and its prevalence is increasing [1,6]. The caregiving cost for HF patients is significant, and 37 billion dollars are directly or indirectly spent annually just in US in order to give care to these patients [4,7]. HF not only can affect healthcare system resources, but also may tremendously influence quality of life (QOL) of patients and their families [8,9].

HF is a complex clinical syndrome that results from any structural and functional cardiac impairment of filling and ejection of blood, causing disability to pump blood and provide tissues with oxygen and nutrients [1,6]. Cardinal symptoms of HF include fatigue and dyspnea, causing exercise intolerance and volume overload, and might cause lung density, ascites, or peripheral edema [4,6]. These symptoms influence patients' ability to perform activities of daily living, socialization, functional status and result severe decrease in their QOL. Low QOL in patients

with HF not only would negatively affect their social and familial life, recreational activities, and job, but also would increase probable admission and mortality due to this condition [2].

According to literature review, that most HF patients experience depression and anxiety symptoms, while it is also observed a considerable reduction in patients' QOL [4,10]. Depending on the method which researchers used in order to assess the level of depression, around 9%-96% of patients suffer from depression [4,7]. Regarding anxiety, the prevalence rates of anxiety in patients with HF are 4-5 times more than that in the general population. Therefore, both depression and anxiety are common among patients with HF and lead to a deterioration in patients' QOL [4,10]. In addition many sociodemographic characteristics such as education, marital status, gender, economic status, occupation, and age are among factors affecting the rate of anxiety, depression, and QOL in different researches. It has been defined that highly educated, married, and employed patients with a good economic status have lower anxiety and depression levels than illiterate, low educated, single, and unemployed patients with a weak economic status, therefore, enjoy a better QOL [4,11,12].

Helping patients with HF to reach the highest QOL, as mostly a mental multidimensional variable, is one of the most important goals of providing healthcare to them. Indeed, QOL is defined as person's perception of life, values, aims, standards, and interests, which could be an important component of improving healthcare quality by nurses. Despite recent progresses in diagnosis and management of such patients' situation, unfortunately the results have been unfavourable [1,2]. Therefore, the current study aimed to estimate the level of depression, anxiety, and QOL in patients with HF, and examine the associated factors with the presence of anxiety, depression and poor QOL such as sociodemographic characteristics and factors related to HF. The study will contribute to prevent all these factors that lead to depression, anxiety in order to improve HF patients' QOL.

MATERIALS AND METHODS

Research community and sampling method

The current descriptive analytical study was done in cardiology and CCU units of educational hospitals of Ahvaz Jundishapur University of Medical Sciences using questionnaire during a six month (2018) period. The research community included 251 patients with HF stage II to IV according to New York Heart Association (NYHA) classification that admitted to educational hospitals of Ahvaz Jundishapur University of Medical Sciences. The patients were selected based on the study inclusion criteria including documented HF in patient's profile and medical records, at least 6 months had been passed from the diagnosis, presence of typical symptoms of HF such as ankle swelling and fatigue, a cardiac ejection fraction of 40% or lower and age of more than 18 years. The subjects were selected through the convenience sampling method.

DATA COLLECTION TOOLS

Demographic questionnaire

The demographic questionnaire used in this study included items related to social-demographic characteristics and data related to patients' histories based on their medical records. The demographic variables in this questionnaire included age, gender, marital status, occupation, education, and economic status based on the specific income range (low, intermediate and high) that is determined annually by the government, and clinical variables included the duration of disease, admission times in recent year, disease class, heart surgery in recent year, and the cause of HF [4].

Minnesota living with heart failure questionnaire (MLwHFQ)

In this study, the Minnesota Living with Heart Failure Questionnaire (MLwHFQ) was used to evaluate QOL in patients with HF. It is the most widely used disease-specific instrument and has been translated into at least 34 languages, with proven reliability and validity. MLwHFQ has been translated and validated in Iran. The questionnaire was firstly developed in Minnesota University. The questionnaire consists of 21 questions asking about how much the disease and its treatment had affected the patient's life in the last month (4 weeks). Respondents are able to answer each question in a Likert type scale (scores from 0: no effect to 5: very much). The MLwHFQ includes subscales for physical (8 items) and emotional function (5 items) and 8 additional items that are part of the total MLwHFQ. The possible range of the total score is from 0 to 105; a higher score indicates poorer HRQL. The questionnaire has a high reliability, and the Cronbach's alpha was 0.97 in a study by Brokalaki et al. [13]. Reliability of the questionnaire was 0.96 in this study.

State-trait anxiety inventory (STAI)

State-Trait Anxiety Inventory (STAI) was used in this study to evaluate the anxiety level. This inventory was first developed by Spielberger [14] and its validity and correctness have been well defined [15]. The inventory consists of 40 items (20 items in the State Anxiety Inventory and 20 items in the Trait Anxiety Inventory). Items related to trait anxiety would evaluate general emotions, and those related to state anxiety would evaluate the emotion at the time of answering questions. In this inventory, the answers are scored according to the four-point Likert scale from not at all (score 1) to very (score 4). The lower score for each subscale is 20 and the higher 80. High score means high anxiety level. The scale has been translated and validated in Iran. Cronbach's alpha was 0.92 for State anxiety and 0.93 for Trait anxiety [16]. In this study the Cronbach's alpha for State anxiety and Trait anxiety subscales were 0.88 and 0.84, respectively.

Beck depression short inventory

Beck Depression Short Inventory was used in this study in order to evaluate the level of depressive symptoms. The inventory consists of 21 items, used for evaluating people more than 13 years old. The answers are scored from zero to four. The total score is, therefore, between zero and 84. Zero indicates the lowest depression and 84 shows the highest severity of depression. Scores 0-12, 13-19, 20-28, and ≥ 29 in the inventory indicate no depression, mild depression, moderate depression, and severe depression, respectively [17]. The inventory has been translated and validated in Iran. Cronbach's alpha for this inventory has been reported as 0.93 [18]. Reliability of the questionnaire was 0.90 in this study.

Ethical considerations

The study was approved by the Ethics Committee of Ahvaz Jundishapur University of Medical Sciences with ethics code IR.AJUMS.REC.1398.99. The research team elaborated the study objective and methodology to patients and answered their questions. Since participation in this study was voluntary, the data resulted from the survey was used just with their consent. The participated patients were ensured of confidentiality of their medical and demographic data. A research team expert was present in place to help and draw any ambiguity in filling questionnaires.

RESULTS

Mean, standard deviation, median, and interquartile range were used to describe quantitative variables, and absolute frequency and frequency percentage for qualitative variables. The tests used in this research were at 0.01 and 0.05 error level. Mann-Whitney nonparametric test was used to compare quantitative variables between the two groups. Kruskal-Wallis test was used to compare quantitative variables between several groups. Spearman rho correlation was used to evaluate correlation between the questionnaire variables and dimensions. The correlation coefficients of 0.1-0.3, 0.3-0.5, and ≥ 0.5 indicate low, intermediate, and high correlation, respectively [4]. Multiple linear regression analysis was used to identify the predictor of overall QOL in patients with HF (Table 1). Significance levels are flanked and statistical significance was set at 0.05. SPSS 17.0 was used for the analyses.

Table 1: Multiple linear regression models on total QOL in patients with HF

Parameters	Enter method		Backward stepwise method	
Model	**Coefficients**	**p**	**Coefficients**	**p**
Age (years)	-3.297	0.423	-	-
Cause of HF	-2.256	0.584	-	-
Economic status	2.106	0.721	-	-
Number of hospitalization during the last year	2.204	0.489	-	-
Level of education	2.145	0.529	-	-
Marital status	0.819	0.874	-	-
Severity of HF (NYHA)	-10.132	0.079	-6.213	0
Sex	3.041	0.594	-	-
(Constant)	74.439	0	74.006	0

Demographic characteristics

The present samples in this research included 251 patients with HF admitted during the study period in the educational hospitals of Ahvaz Jundishapur University of Medical Sciences. They were mostly (50.6%) more than 60 years; 54.6% of the patients were male; 45.4% had an intermediate economic status. The demographic characteristics of the study population are indicated in Table 2 in details.

The results of diagnosis course and data related to patients' history based on their medical records are presented in Table 3. The disease course is more than 107 months in 41.8% of patients. Moreover, around 82.9% of patients were admitted 1-4 times during the recent year. More details on medical history of participants are shown in Table 3.

Table 2: Socio-demographic data of the sample (N=251)

Variables		N	%
Sex	Men	137	54.6
	Women	114	45.4

Age (years)	(mean ± SD) 65.8 ± 9.8		
	≤ 40	38	15.1
	41-59	86	34.3
	≥ 60	127	50.6
Marital status	Married	181	72.1
	Unmarried/Divorced/Widower	70	27.9
Job	Occupied	80	31.9
	Unemployed	30	11.9
	Retired	75	29.9
	Householders	66	26.3
Level of education	Illiterate	94	37.5
	Primary	83	33.1
	High school	52	20.7
	University	22	8.7
Economic status	Low	81	32.3
	Medium	114	45.4
	High	56	22.3

Table 3: Characteristics concerning the state of health of patients

Variables		**N**	**%**
Duration of HF (month)	<12	42	16.8
	12-35	27	10.7
	36-71	56	22.3
	72-107	81	8.3
	>107	45	41.8
Cause of HF	Ischemic heart disease	141	56.2
	Valvular disease	71	28.3
	Dilated cardiomyopathy	39	15.5
Number of hospitalization during the last year	1-2	138	55
	3-4	70	27.9
	5-6	18	7.1
	≥ 7	25	10
Ejection fraction (%)	10-20	22	8.8
	20-30	79	31.5
	30-40	150	59.7
Severity of HF (NYHA)	NYHA II	90	35.9
	NYHA III	112	44.6
	NYHA IV	49	19.5
Cardiac surgeries during the last year	CABG	9	3.6
	PTCA	59	23.5
	Valve replacement	21	8.4
	None	162	64.5

QOL dimensions, anxiety and depression level

The results of evaluating HF effect on QOL, anxiety, and depression level are shown in Table 4. High QOL score in this research indicates poor QOL. According to the results, at least 50% of patients (median) got scores less than 64, 25, and 15 for general QOL, physical, and mental-psychological dimensions, respectively. These scores show mean effects of HF on QOL in patients participated in this study.

Table 4: Measuring impact of HF on quality of life, level of depression, state and trait anxiety

Range (Min-Max)		Minimum score	Maximum Score	Mean ± SD	Median (range)
Physical health	(0-40)	4	38	24.10 ± 7.15	25 (19-34)
Emotional health	(0-25)	2	24	15.06 ± 4.96	15 (12-21)
Total QOL	(0-105)	10	100	62.33 ± 19.44	64 (50-79)
State anxiety	(20-80)	23	72	48.40 ± 9.85	49 (48-60)
Trait anxiety	(20-80)	30	76	51.98 ± 8.45	52 (46-60)
Depression	(0-84)	4	39	46.54 ± 12.15	32 (30-40)

STAI was used in this study in order to evaluate state and trait anxiety level. Evaluating depression level using the Beck questionnaire showed around 97% of the patients suffered from depression.

Association between QOL dimensions, anxiety and depression level, and demographic characteristics

Correlation analysis between variables indicates a significant positive correlation between all studied variables. Results (Table 5) showed that high anxiety and depression level had a strong correlation with low QOL. Moreover, patients with high levels of anxiety and depression would experience poor mental-psychological health. In addition, the results of correlation between demographic characteristics and QOL are demonstrated in Table 5. The results of statistical analysis indicated that a significant association between age, gender, education, occupation, marital status, duration of disease, and disease severity (based on NYHA classification) with physical health dimension, emotional sub-dimension and total score in MLwHFQ.

Table 5: Correlation among QOL, depression and anxiety

Parameters		State anxiety	Depression	Physical health	Emotional health	Total QOL
Trait anxiety	r	0.43	0.33	0.36	0.38	0.41
	p	<0.001**	<0.001**	<0.001**	<0.001**	<0.001**
State anxiety	r	1	0.49	0.46	0.54	0.58
	p	-	<0.001**	<0.001**	<0.001**	<0.001**
Depression	r	-	1	0.61	0.64	0.74
	p	-	-	<0.001**	<0.001**	<0.001**
Physical health	r	-	-	1	0.75	0.86
	p	-	-	-	<0.001**	<0.001**
Emotional health	r	-	-	-	1	0.88
	p	-	-	-	-	<0.001**
*Significant at level 0.05						
**Significant at level 0.01						

Mean age of patients participated in the study was 65.8 years. Mean QOL, anxiety, and depression was more in women than men and increased by age. Regarding education level of patients, compared to illiterates or those with lower mean education level, those with academic education gained lower mean score indicating their better QOL.

In this study, employed patients gained lower mean scores in physical health dimension, emotional sub-dimension and overall QOL compared to unemployed, retired, and housewife patients, and the difference was statistically significant. Moreover, those with well economic status got better scores, which means they had better QOL, compared to intermediate or poor levels. In addition, patients who were admitted more than 4 times during the recent year got higher score which means they

had more inappropriate QOL. Such patients suffered from higher depression and anxiety level as well.

DISCUSSION

Evaluating QOL, anxiety, and depression level

Although very important, QOL, anxiety, and depression and their importance in improving conditions of patients with HF is neglected by physicians and researchers, therefore impacting all dimensions of patients' QOL associated with patients' health [19,20]. The results of this study indicated inappropriate status of physical, mental-psychological, and QOL dimensions of these patients. Due to changes in lungs, circulation, and skeletal muscles function, patients with HF experience symptoms such as fatigue, dyspnea, dizziness, and exercise intolerance. As the condition progresses gradually, all these factors result in patient's physical ability to decline, and affect patient's general QOL in terms of physical and mental dimensions [4,21]. According to the study results, it seems that all these symptoms induced by HF affected all dimensions of QOL associated with their health. The results were completely consistent with other results of researchers who reported low QOL in patients with HF [22-25]. Due to the nature of HF, evaluating anxiety and depression level is an effective variable in health of patients with HF [26]. Different studies have shown that anxiety and depression in patients with HF affects their QOL through different mechanisms. Physiologically, anxiety and depression cause inflammation and result into hypercholesterolemia through stimulation of sympathetic neurologic system, decrease in heart beat variability, and platelet dysfunction. In terms of behavior, anxious and depressed patients neglect their self-care and daily regimen, and avoid following their prescribed drugs [27]. High level of anxiety and depression in the patients of this research and the strong correlation between QOL, anxiety and depression dimensions might be due to their fear of death caused by the disease [28] and deteriorate the patients' health. The results of this study are consistent with other researchers' results who had suggested depression and anxiety as one reason for low QOL in patients with HF [20,29].

Factors influencing QOL of patients with HF

Age and gender

There are many studies in which age and gender has been considered as an effective factor on QOL in patients with HF. Results of most studies indicate the significant correlation between age and gender with QOL. Results of these studies indicate better QOL in men and young age compared to women and old age patients with HF. In previous studies, such correlation was evident in physical and mental dimensions of QOL [30]. In parallel with these results, our findings also indicated low QOL in women compared to men, and decrease in QOL with increase in age. Results of studies by Riedinger et al. and Reynolds et al. regarding better QOL of male patients with HF compared to females due to difference in biological and psychological characteristics could be one reason which can explain our results [21,31].

On the other side, the results of this study are in contrast with those of some other researchers who stated that there is no significant association between age and gender with QOL [32]. One reason for such contrast is cultural differences in the studied communities. In developing countries like Iran, men have more physical activity and connection with society compared to women. Therefore, low QOL in women compared to men in this study can be attributed to the lack of activity and social relations which deteriorate with increase in age. Most women in this study were housekeeper. Despite old age, chronic disease and partnership problems, such women have more responsibility in house works, children care, etc. compared to men, all of which causes lower QOL in women with HF compared to men [33-35].

Education, occupation, economic and marital status

Due to its close relation with socio-economic status, education has very high impact on QOL of individuals. Therefore, education and economic status are among the most important factors affecting patients' QOL [30]. Results of this study clearly showed that compared to patients with elementary education or illiterate ones, academically educated patients significantly enjoy of better QOL and lower levels of anxiety and depression. Likewise, compared to poor, unemployed, retired and housewives, employment and good economic status had a lower anxiety and depression level and better QOL. Housewife participants who were all women had the lowest QOL and the highest level of anxiety and depression. The results were consistent with those of Hunt who studied the relation between income, education, and occupation with admission rate, anxiety, and depression in patients with HF [36]. Considering the results of this study, it seems low financial resources of unemployed and low income people and inability to understand medical recommendations, especially in illiterate people, result in lack of follow-up and/or adherence to treatment. Due to lack of treatment follow-up and disease control, such people would have higher mean anxiety and depression, which ultimately decreases their QOL [3]. Results of this study, therefore, indicate that good economic status causes patients with HF feel secure and calm.

Living alone is one reason for depression of patients and increases the possibility of developing diseases [37]. According to results of this study which were consistent with studies by Dunbar et al., and Wang et al., marital status increased QOL in married people through family support increasing patient's self-care and their positive effect on keeping healthy behaviors [38,39].

Number of admissions and disease duration and severity

Anxiety and depression increased with a higher number of hospital admissions, and patients' QOL decreased on the contrary. The results were consistent with the results

of other researchers indicating the fact that with higher number of admissions, patients think their health and life is in danger. Fear of disease severity and death may increase anxiety and can result in depression and lower patients' QOL after several admissions [4,10].

The duration of HF is accompanied by many physical disorders resulting in significant limitation of patient's life and daily activities. Patients who do not want to accept these conditions and are aware of their disability in performing job, family, and social responsibilities, become depressed. With disease progression from NYHAII toward NYHAIII and NYHAVI in such situation, the patient's mental status becomes more critical [37]. Results of this study confirmed such facts, so that anxiety and depression increased and QoL decreased significantly with increase in disease duration, especially in NYHAIII and NYHAVI stages patients. Moreover, multiple linear regressions showed that only the severity of HF statistically significantly associated with Total QOL. Results of the present study are completely consistent with related research results reporting high prevalence of depression and anxiety in advanced stages of HF [40,41]. Moreover, aligned with the results of this study, Gottlieb et al., Rutledge et al. and Pena et al., demonstrated that patients with NYHAIV heart failure are more depressed than to those with NYHAII and NYHAIII heart failure [42-44].

LIMITATIONS

The major limitations of this study were the use of the convenience sampling technique. In this study small sample size may affect the analysis of the data, moreover, the study conducted only from 1 major city (Ahvaz), so it is restricted the generalization of the results in HF patients in the community.

CONCLUSION

QOL in patients with HF is a mental and multidimensional concept resulted from physical, mental, and social status of patients. The present descriptive-analytical research is the first comprehensive study on evaluating anxiety, depression, and QOL in patients with HF, in whom the effective and related factors to QOL were studied. The results of this study indicated that patients' QOL is very low and many of them suffer from anxiety and depression symptoms. Moreover, the results of this study demonstrated that patients' QOL is affected by different factors including age, gender, education, occupation, economic status, number of admissions, marital status, disease duration, and disease severity. This study indicated that the mental and physical dimensions of QOL are highly affected by HF. These results showed that beside patients' physical dimension, nurses should also pay attention to their psychological dimensions. Some of the participants in the study stated that "we are alive but not living," and were ready to take the risk of substance abuse in order to improve their QOL. The results of this study are, therefore, an alarm to researchers and physicians in order to provide care training and psychological support to improve HF patients' condition.

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CONFLICT OF INTEREST

The authors declare that there is no conflict of interest regarding the publication of this manuscript.

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