

Original Paper

# The Relationship Between Sleep Quality and General Health in Patients With Heart Failure



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## ABSTRACT

**Introduction:** Sleeping is one of the most important human innate needs, and its disruption due to a variety of illnesses, can cause anxiety, distress, and adverse mental health conditions in the individual.

**Objective:** This study aimed to examine the relationship of sleep quality with general health in patients with heart failure.

**Materials and Methods:** This is a cross-sectional analytical study conducted on 150 patients with heart failure hospitalized in the cardiology department of one of the hospitals in Sari City, Iran in 2014. The data collection tools were the Pittsburgh Sleep Quality Index (PSQI) inventory and General Health Questionnaire-28 (GHQ-28). For analyzing the collected data, the Independent t test, Pearson correlation and Chi-squared test were used.

**Results:** About 26.2% of the patients had good quality of sleep, while 73.8% had poor quality. The patients' mean score of general health was reported as  $29.14 \pm 13.75$ . According to Chi-squared test results, except sleep duration and habitual sleep efficiency, other dimensions of sleep quality had significant relationship with general health. Based on the Independent t test results, age and marital status of the patients had a significant relationship with some dimensions of sleep quality ( $P < 0.05$ ). According to Pearson correlation test results, somatic symptoms and anxiety as two dimensions of general health, had significant association with ejection fraction of patients' hearts ( $P = 0.008$ ,  $r = 0.6$ ). Also, there was significant relationship between depression and gender of the patients ( $P = 0.003$ ) based on the Independent t test.

**Conclusion:** According to the results, sleep quality and general health in patients with heart failure are at low level and they are directly related to each other. Therefore, providing specific general health-care services can be useful for these patients and improve their sleep quality.

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## Introduction

**H** eart Failure (HF) is one of the most common cardiovascular disorders and considered as a chronic, progressive and debilitating disorder [1]. Patients with HF suffer from many physical and mental disorders which affects their satisfaction and quality of life and some of the important biological needs such as sleep quality [2]. The World Health Organization has estimated the annual incidence of heart failure as 660000 cases per year, that is predicted to be doubled in the next 30 years [3].

In Iran, according to the latest statistics by the Ministry of Health and Medical Education, cardiovascular diseases are the leading cause of death, and 378 deaths occur every day due to this disease [4]. Therefore, everybody should pay attention to important parameters that are directly related to patient's quality of life and subsequently patient's health [5]. One of the most important parameters in these patients that is affected for some factors such as breathing problems during sleep and hospital care, is sleep quality and pattern [6].

Sleep as one of the important factors in the physical and mental health [7] plays a significant role in circadian rhythms and complex biological patterns whose desirable quality is essential for health and promotion of the quality of life [8, 9]. Thus, in patients with HF, because of the nature of the disease and disorders that occur in their breathing rhythms especially during sleep and rest, studying the quality of sleep is of particular importance [10]. In patients with HF, the prevalence of sleep-related respiratory disorders has been reported as 10–60% [11]. This respiratory disorder is associated with limited diagnostic symptoms, and its mortality is high due to the failure in compensatory mechanisms and restrictions in cardiac function [12]. The sudden death which is the main cause of death in patients with heart failure, occurs in 30% of Japanese patients during sleep [13]. Therefore, these patients must undergo medical care in hospitals for a long time which ends in their dissatisfaction with the quantity and quality of their sleep [14].

Aslani [15] reported the prevalence of sleep disorders in these patients as 51%. This undesirable sleep quality, in addition to negative physical, mental, and psychological effects, can lead to restlessness, aggression, and prolongation of hospitalization and treatment [16]. In light of these issues, prevention and care in these patients and reducing these disorders are major goals in the field of psychiatric nursing, because nurses are the first

medical group that have interaction with patients in the hospital [5]. On the other hand, hospitalization can create various physical and psychological stressors such as pain, lack of health, job loss, sensory deprivation, feeling of impending death, as well as varying degrees of psychological responses such as frustration, fatigue, and panic. These problems can cause a feeling of worthlessness and low self-esteem in these patients, and affect their physical and mental health [17]. Taghadosi [18] in a study reported that 62% of patients with HF suffered from some mental problems which indicates the necessity of serious attention to this group of patients. Thus, with regard to disorders in the sleep pattern of these patients, study of the relationship of sleep quality with HF becomes more evident.

In the literature, the concept of sleep quality and general health, especially its mental dimension, in patients with HF have been addressed separately. Thus, the relationship between sleep quality and general health in patients with HF is unclear. By recognizing the impact of these two variables on each other, we can support these patients and provide proper interventional programs. In this regard, this study attempted to study the relationship between sleep quality and general health in patients with HF.

## Materials and Methods

This is a cross-sectional analytical study conducted for three months in 2014. Study population consisted of all patients with HF hospitalized in the cardiology department of one of the hospitals in Sari, Iran. The samples were collected by convenience sampling method. The sample size was calculated as 150 with 95% confidence and 90% test power and considering the similar study results (stating low sleep quality in patients with HF as 79%) [19]. The inclusion criteria were as follows: Having heart failure documented in medical records; having passed at least six months after the diagnosis of HF; having Ejection Fraction (EF) of less than 40% based on echocardiographic reports; lacking thyroid disorders or psychological and mental illnesses based on medical records, being over 18 years old, willing to participate in study, lacking common cold or allergic rhinitis which could somehow affect the patient's sleep quality, and occurring any sudden psychological incident such as the death of close relatives during the past two months.

For collecting data, three instruments were used; a demographic form (checking age, gender, level of education, marital status, income, previous hospitalization history, disease duration, and EF value), the Pittsburgh

Sleep Quality Index (PSQI), and General Health Questionnaire-28 (GHQ-28). PSQI was designed by Buysse PSQI [20]. It has 18 items measuring the quality and pattern of sleep in seven areas: subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency (i.e., the percentage of time in bed that one is asleep), sleep disturbances, use of sleeping medications, and daytime dysfunction over the last month. It is scored based on Likert-type scale each of which has a range of 0-3 points. The scores of seven components are then summed up which has a range of 0-21 points. The points 0-5 indicate good quality and points 5 and above indicate poor quality of sleep in patients. This questionnaire has an acceptable reliability and validity [21]. Its Cronbach  $\alpha$  coefficient ranges from 0.78 to 0.82.

Goldberg designed GHQ-28 [22] which has 28 items in four dimensions of depression, somatic symptoms, anxiety/insomnia, and social dysfunction. Each dimension has 7 questions: somatic symptoms, questions 1-7; anxiety/insomnia, questions 8-14; social dysfunction, questions 15-21; and severe depression, questions 22-28. It is scored based on Likert-type scale each response has a range of 0-3 points. The score for each dimension ranges from 0 to 21 and the total score from 0 to 84. Higher scores means lower general health condition and a total score higher than 23 shows the presence of distress. This is a standard tool and reliability and validity of its Persian version have been already confirmed [23].

The total possible score ranges from 0 to 84. The collected data were analyzed in SPSS (V. 18) by using descriptive statistics and performing Independent t test for comparing sleep quality and general health in both sexes, as well as using Pearson correlation coefficient for examining the relationship between general health, HF duration and EF. The Chi-squared test is used to assess the relationship between general health and HF. Also, to test the normality of data distribution, Kolmogorov-Smirnov test was employed.

### Results

The participants were 24 to 77 years old with a mean age of 52.14±9.4 years. Most of them were female (62%) and married (74.4%). Table 1 presents the demographic characteristics of study participants.

The results showed that 26.2% of patients had good quality of sleep, while 73.8% had poor quality. The total mean score of sleep quality was 14.27±3.32. Among seven components of sleep quality, the highest score (poorest quality) belonged to sleep disturbances 2.53±0.48 and lowest score (best quality) belonged to subjective sleep quality 1.56±0.36. According to the Independent t-test results, in male patients, subjective sleep quality (P=0.004) and habitual sleep efficiency (P=0.008) were significantly lower than those in female patients; however, sleep latency and sleep disturbances of male patients were significantly higher (P=0.02). Age

Table 1. Demographic characteristics of study subjects

Variable	Group	N (%)
Educational level	Lower than high school	139(92.6)
	High school and above	11(7.4)
History of previous hospitalization	Yes	73(48.7)
	No	77(51.3)
Income level (\$)	<299	129(86)
	>300	21(14)
Duration of disease (y)	<1	43(28.7)
	>1	107(71.3)
EF (%)	10-20	31(20.7)
	21-30	58(38.7)
	31-40	61(40.6)

**Table 2.** Sleep quality and general health in patients with heart failure

	Variables	Mean±SD
Sleep quality	Subjective sleep quality	1.56±0.36
	Sleep latency	2.15±0.54
	Sleep duration	2.25±0.42
	Habitual sleep efficiency	2.2±0.42
	Sleep disturbances	2.53±0.48
	Use of sleeping medications	1.62±0.38
	Daytime dysfunction	1.96±0.72
General health	Somatic symptoms	7.42±4.16
	Anxiety	7.22±4.36
	Social dysfunction	7.92±3.21
	Depression	6.56±4.55

and marital status of patients had a significant relationship with total score of sleep quality ( $P=0.003$ ) (Table 2).

The total mean score of general health was reported as  $29.14\pm 13.75$ , where the score of social dysfunction was higher (Mean=7.94) (Table 2). According to the Chi-squared test results, except sleep duration and habitual sleep efficiency, other components of sleep quality had significant relationship with the total score of general health (Table 3). According to Pearson correlation test results, somatic symptoms and anxiety as two components of general health, had significant association with EF ( $P=0.008$ ,  $r=0.6$ ). Based on the Independent t-test

results, there was significant relationship between depression and gender of patients ( $P=0.003$ ) (Table 4).

## Discussion

According to our study results, sleep quality of patients with HF is at poor condition. This finding was consistent with the results of some studies [16, 24, 25]. Doğan also reported that most patients with cardiovascular diseases complain of their poor sleep quality [26]. This may be because of psychological and physical problems caused by the disease limitations and disabilities. Heart failure has the most negative effect on general health of the patients, especially on their social function. This finding

**Table 3.** Correlation between general health and sleep quality components

Sleep Quality Components	Sig.*
Subjective sleep quality	0.0001
Sleep latency	0.003
Sleep duration	0.26
Habitual sleep efficiency	0.6
Sleep disturbances	0.001
Use of sleeping medications	0.034
Daytime dysfunction	0.004
Total	0.001

\*The Chi-squared test

**Table 4.** General health dimensions with respect to duration of disease and ejection fraction

General Health Dimensions	Duration of Disease			EF		
	Age Range	Mean±SD	Sig.*	Score (%)	Mean±SD	Sig.*
Somatic symptoms (y)	<1	6.65±3.57	0.34	10-20	9.38±5.03	0.008
	>1	7.71±4.25		>21	6.92±3.75	
Anxiety (y)	<1	6.13±3.33	0.35	10-20	9.32±4.17	0.008
	>1	7.65±4.7		≥21	6.68±4.26	
Social dysfunction (y)	<1	7.51±2.73	0.19	10-20	8.74±3.22	0.153
	>1	8.07±3.31		≥21	7.72±3.18	
Depression (y)	<1	5.79±3.63	0.26	10-20	8.06±6.11	0.116
	>1	6.85±4.69		≥21	6.16±4	

\* Independent t-test

was consistent with the results of many studies that reported the rate of mental disorders, especially depression and anxiety, for these patients as 50–65% [5, 18, 27, 28]. However, results of Schleifer and Macari-Hinson [29] and Silverstone [30] showed that the prevalence rates of these disorders were lower. The reason for this inconsistency can be due to the cultural differences as well as using different study tools.

Heart failure compared with other chronic diseases, due to its debilitating complications and many limitations in life (both mental and physical), destroys the functional roles of the patients in social, family, marital relations, and reduces their professional performance. In the present study, there was a direct correlation between sleep quality and general health; patients with poor quality of sleep had a lower general health level. This is in agreement with the findings of Shamshiri [7], Theofilou [31], and Saksvik [32]. The researcher believed that these two factors did not have direct interaction with each other, because both the sleep patterns and the health status of the individual are also affected by many other factors such as worrying about the future, economic condition due to sequential follow-up of the disease, and the cost of treatment. These factors can reduce the quality and quantity of sleep and general health but they were not examined in this study.

Baglioni reported that insomnia would cause many complications in the physical and mental state of the individual and could have adverse effects on his or her quality of life [33]. Given the fact that any disease affects everyone’s health on one hand and sleep disturbance affects a person’s comfort and relaxation on the other hand, heart failure can be a serious threat to the patient’s life and can make this disorder even worse [5].

The patient’s hospitalization and the change in his location, manner and time of rest and sleep along with the change in his general health at the time of the examination create a direct association between sleep quality and general health.

In the current study, two dimensions of subjective sleep quality and habitual sleep efficiency had a significant relationship with gender, and they were at lower level among male patients. These results were consistent with the findings of Baglioni [33] and Abbasi [34], but inconsistent with the results of Akbarzadeh [24] where reported poorer sleep quality of women. This could be because of the difference in the study age groups. Female patients in our study were almost at menopause age, while in the study of Akbarzadeh women were younger. Women’s sleep quality was lower than that of men in the study of Akbarzadeh probably due to hormonal changes associated with menstrual cycle.

Results of our study also showed that somatic symptoms and anxiety had significant association with heart ejection fraction. This finding is consistent with the results of Cline [35] and Gangwisch [36]. Since EF is indicative of the disease condition and its reduction shows disease severity, it can be said that being aware of EF can cause anxiety and lower self-esteem in taking care of patients’ physical health. The results also indicated that depression had significant relationship with gender where depression was more common in male patients. Findings of Shamshiri [7], Doğan [26], and Abbasi [34] were in agreement with this result. The researcher believes that in the present study, because male patients had graver somatic symptoms and social dysfunction compared to women, these factors could have a significant effect on depression.

According to the findings of this research, providing specific care for improving the quality of sleep and general health, can be helpful in treating the physical and mental problems of patients with HF. It is suggested that the medical staff and especially nurses, while taking care of these patients, consider other aspects of health such as quality of life, quality of sleep, and general health. Therefore in addition to therapeutic and physiological aspects, they could have a better and more effective role in improving the general health of these patients and consequently their sleep quality by providing appropriate intervention programs and psychological support.

One of the limitations of this study was the use of convenience sampling method which can affect the generalizability of the findings. Another limitation is related to the cross-sectional design of the study which, considering the effect of time and seasonal factors on the quality of sleep, it may affect the outcome of the study. Thus, it is recommended that other study designs such as longitudinal design be used to overcome this problem.

## Ethical Considerations

### Compliance with ethical guidelines

After obtaining permission from the Vice Chancellor for Research (Code: 216/93) and Ethics Committee of the university (code: IR.MAZUMS.REC.93.S197), the researcher referred to the cardiology department at a certain hour of the day (6 PM) to collect the study information after obtaining written consent from the patients.

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### Conflict of interest

No conflict of interest has been declared by the authors.

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