

Research Paper: Sleep Quality, Anxiety, and Depression in Patients With Heart Failure



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ABSTRACT

Objectives: Heart Failure (HF) is a chronic condition with great impact on the lifestyle of the patients. As many as 80% of HF patients report experiencing sleep difficulties. Thus, we try to detect clinical predictors of sleep quality and define probable relationship between anxiety, depression, and sleep quality in HF patients.

Materials & Methods: One hundred patients (male: 50 persons, female: 50 persons) with ejection fraction less than 45% who were hospitalized in CCU and post-CCU ward, were included in this study. Hospital Anxiety and Depression Scale (HADS) and Pittsburg Sleep Quality Index (PSQI) questionnaire were used to collect the related data.

Results: The patients' mean (SD) total PSQI score was 9.07(4.43). The most problem was seen in sleep onset latency (1.85[1.15]) sub-score of PSQI and the sleep quality of 78% of patients was abnormal. This score was higher in patients with history of abnormal blood pressure (P=0.001). PSQI score have significant correlation with anxiety (r=0.216, P=0.035) as well as depression (r=0.351, P=0.000).

Conclusion: Many HF patients suffer from sleep difficulties and PSQI score seems to have significant correlation with anxiety and depression.

1. Introduction

Heat failure is a chronic condition that have great impact on the lifestyle of the patients [1]. The prevalence of Chronic Heart Failure (CHF) has been estimated to be 33% in Iran [2]. Sleep-related problems and poor sleep quality are significant public health issues with high prevalence worldwide that

can adversely impact quality of life [3, 4]. About 80% of HF patients also report experiencing sleep disturbances [5], including difficulties in falling asleep, insomnia, interrupted sleep (e.g. nocturia), restless sleep, and breathing difficulty during sleep [6-11]. Also poor sleep quality in HF is associated with decreased quality of life, depression, impaired self-care and increased risk for myocardial infarction [12-14]. Furthermore several studies have shown that insom-

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nia is related to anxiety and depression [15] and anxiety and major depressive disorder are associated with HF occurrence [16].

Recent controlled trials suggest that sleep disorders can increase mortality and risk for malignant arrhythmias in CHF patients [17-19]. Furthermore drugs used to treat CHF and cardiac resynchronization therapy are partially effective in the treatment of Central Sleep Apnea (CSA) or Cheyne Stokes Respiration (CSR) [20, 21]. Obstructive Sleep Apnea (OSA) is an established risk factor for hypertension [22] so increasing patient's cardiovascular risk profile. Moreover, OSA affects the heart directly by repetitive increase in Left Ventricular (LV) wall stress and decrease in LV performance [23, 24]. These findings suggest that OSA contributes to the pathogenesis of HF and might worsen HF symptoms.

Identification and treatment of SDB (sleep-disordered breathing) is imperative because an untreated sleep disorder intensifies the strain on the heart with increased respiratory effort, hypoxia, and sympathetic stimulation [25]. However, SDB still remains undiagnosed in numerous patients, much attention to ameliorate SDB may improve Ejection Fraction (EF) and outcomes for patients with systolic HF and decrease pulmonary artery pressure for those with preserved ejection fraction [26, 27]. Despite these findings, the factors that influence sleep quality in HF patients is contradictory [6, 8, 28], suggesting that poor sleep quality in HF patients may be more complicated than already believed. Thus, assessment of sleep quality is important for a wide range of clinical and behavioral research fields and for practitioners of medicine and psychology [29]. Thus, this study aimed to detect clinical predictors of sleep quality and define probable relationships between anxiety, depression, and sleep quality in HF patients.

2. Material and Methods

This cross-sectional study was conducted at Vali-asr Hospital, an educational treatment base hospital in Fasa City, south of Iran from September 2012 to September 2013. Participants were hospitalized patients suffering from heart failure disease either in Coronary Care Unit (CCU) or post-CCU ward. This study included 100 patients (male: 50 persons, female: 50 persons) with ejection fraction less than 45% and all recruited patients filled the informed consent form. Also we took Ethics Committee approval.

Information of anxiety and depression, sleep quality, demographic and illness profile were gathered by an educated nurse via individual interviews. Demographic data in-

cluded questions about age, gender, marital status and educational level. The information of illness profile included heart diseases risk factors, blood pressures and EF. Before asking questions, the patients' blood pressure were measured by sphygmomanometer in supine position. To screen anxiety and depression, we used the Hospital Anxiety and Depression Scale (HADS) [30] developed by Zigmond and Snaith in 1983 to identify cases of anxiety and depression among patients in nonpsychiatric hospital clinics.

HADS contains 14 items with two subscales: anxiety and depression. Each item has 4-point scale, giving maximum scores of 21 for anxiety and depression that high score indicate more anxiety and depression. Scores ≥ 11 on either subscale are considered to be a significant 'case' of psychological morbidity, while scores of 8-10 represents 'borderline' and 0-7 'normal' [31]. Generally, the Iranian version of the HADS was found to be acceptable to almost all patients (99%). Its Cronbach α reliability coefficient has been found to be 0.78 for the HADS anxiety sub-scale and 0.86 for the HADS depression sub-scale.

Sleep quality was assessed by Pittsburg Sleep Quality Index (PSQI). PSQI is a standardized self-administered questionnaire, introduced in 1989 and has gained widespread acceptance as a useful instrument for the assessment of sleep disorders that may be associated with anxiety and depression [32]. PSQI consists of seven clinically derived components that assesses the sleep difficulty, and the sum of these seven component scores yields a global score of subjective sleep quality (range: 0-21). PSQI Cronbach α coefficient was 0.77 for all subjects, 0.52 for the patient group, and 0.78 for the control group. Cronbach α value of 0.77 indicates acceptable reliability [33]. The validity assessment results suggest that the Persian version of the PSQI is an acceptable instrument.

Quantitative variables are presented as mean (SD) values and qualitative variables as frequency (percentage). PSQI scores were compared between groups with ANOVA. The Pearson correlation coefficient was used to analyze the relationship between PSQI sub-scores with anxiety, depression, and blood pressures. A multiple linear regression model was used to detect influential factors on sleep quality. Therefore in this model, all variables were included in the analysis. Entry and removal criteria for variables were set at P values less than 0.05. Finally variables that remains in the model, unstandardized regression coefficients with its standard errors were reported. Statistical analysis was done by using IBM (International Business Machines Corporation) SPSS (IBM-SPSS Inc, Chicago, Illinois) version 19. P value less than 0.05 was considered as significant level.

3. Results

Patient's characteristics

In this study, we enrolled 100 HF patients (50 male and 50 female) with the mean (SD) age of was 66.80(13.07) year. About 48% of patients had history of blood pressure, 35% of them had positive history of MI (myocardial infarction), 22% were smoker and 71% were uneducated. Their mean (SD) anxiety and depression scores were 8.77(4.11) and 10.55(3.56), respectively.

Sleep quality

The patients' mean (SD) total PSQI score was 9.07(4.43). Also as referred in Table 2, the most problem in sub-scores of PSQI was observed in sleep onset latency (1.85[1.15]) and the least problem was observed in using sleeping medication (0.86[1.12]). Sleep quality of 22% of these patients was normal (PSQI score <5) and 78% abnormal. As showed in Table 1, the mean (SD) PSQI score in male patients was 8.25(4.65) that was significantly lower than female scores, i.e. 10.22(3.88) (P=0.031). This score was higher in patients with his-

tory of abnormal blood pressure (P=0.001). Also PSQI total score is lowest in employed patients (P=0.028). Total score of sleep quality index was not different in patients with MI history (P=0.157), with regard to smoking (P=0.079), age (P=0.687), and education (P=0.602). EF did not have significant correlation with PSQI score (r=-0.026, P=0.805), systolic BP (r=0.142, P=0.171) and diastolic BP (r=0.069, P=0.510) .

Sleep quality and HADS

PSQI score has significant correlation with anxiety (r=0.216, P=0.035) and with depression (r=0.351, P=0.000). As showed in Figure 1 in people with depression difficulties, the mean PSQI score was higher significantly from who was healthy (P=0.036) also in patients with anxiety (P=0.029).

Multivariate analysis

Stepwise multiple regression analysis showed that three factors affect sleep quality (Table 3): 1. Age, patient with higher age had better quality of sleep (P=0.049), 2. History of blood pressure, patients with this history had the worst quality of sleep (P=0.005), and 3) higher depression

Table 1. Mean of PSQI in patients with HF

Characteristics	n	PSQI Total Score (0-21)			
		Mean	SD	P	
Sex	Male	50	8.25	4.65	0.031
	Female	50	10.22	3.88	
Blood pressure dx	Normal	52	7.62	4.5	0.001
	Abnormal	48	10.65	3.81	
Myocardial infarction	No	65	8.59	4.35	0.157
	Yes	35	9.94	4.53	
Smoking	No	78	9.34	4.46	0.104
	Yes	22	7.57	3.93	
Age, y	39-49	10	7.85	3.67	0.745
	50-59	27	9.61	3.54	
	60-69	18	8.35	4.14	
	≥70	45	8.87	4.71	
Educational level	Illiterate	71	9.12	4.17	0.602
	Educated	29	8.59	5.00	
Job	Employed	46	7.55	4.42	0.028
	Unemployed	15	8.91	4.87	
	Housekeeper	39	10.17	3.92	

Table 2. PSQI sub scores in HF patients

Variable	Mean	SD
Sleep quality (0-3)	1.37	0.93
Sleep onset latency	1.85	1.15
Sleep duration	1.36	1.23
Sleep efficacy	0.53	0.92
Sleep disturbance	1.61	0.60
Using sleeping medication	0.86	1.12
Daytime dysfunction	1.46	0.96
Total PSQI (0-21)	9.07	4.43

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Table 3. Stepwise multiple regression analysis for sleep quality (PSQI total score) in CAD patients

Variable	Regression Coefficient	Standard Error of Regression Coefficient	t	P
Model Constant	8.064	2.464	3.273	0.002
Blood Pressure dx	2.583	0.890	2.903	0.005
Depression Score	0.354	0.123	2.882	0.005
Age (y)	-0.067	0.035	-1.915	0.049

Adjusted R²=0.210.

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score that caused the worst sleep quality (P=0.005). Other variables were not included in the regression model.

4. Discussion

This study was conducted to identify some variables that affect sleep quality in patients with heart failure and we found that many patients with HF suf-

fer from sleep disorders. Lee et al. reported that approximately 33% of individuals over 18 years had insomnia symptoms related to hypertension, stroke, stress, arthralgia, depression and urological disorder [34], also about 50% of stroke patients have sleep disorder [35]. Herrscher et al. found that 52% of patients with HF had moderate to severe sleep-disordered breathing [36].

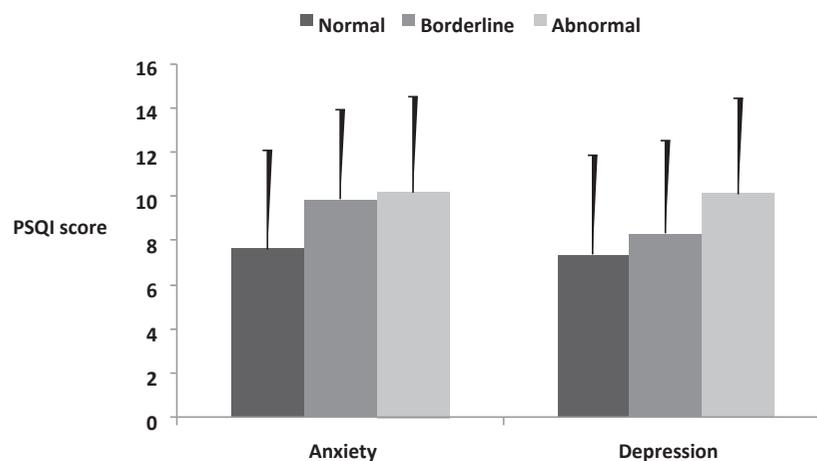


Figure 1. Sleep quality (PSQI total score) in CAD patients with anxiety and depression

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In our study we found that PSQI score has significant correlation with anxiety and depression in HF patients. But there is no association between PSQI score, and MI history or smoking. Also we realized that age, BP and depression play a significant role in worsening sleep quality. Herrscher et al. observed no association between sleep-disordered breathing and age or male gender [36] as we find too that older patients had better sleep quality but sleep quality had no association with gender. However, in some studies, the results demonstrate that sleep difficulties are prevalent in older adults with HF. A previous study has showed that demographic (such as older age) and medical factors (such as HF severity) are correlated with poor sleep quality in patients with HF [6].

Fritschi et al. observed that patients with HF are at considerable risk for sleep disturbances [32]. Herrscher et al. found that hypertension was a strong predictor of OSA (obstructive sleep apnea) among HF patients. Also they found that patients with CSA (central sleep apnea) have generally lower EF, lower cardiac output and at higher risk of developing lower blood pressure [36]. A critical review of the literature that was done between 1994-2009 reported that the prevalence of depression and anxiety in patients with chronic HF is 10%–60% and 11%–45%, respectively [37]. Among the PSQI subscales, daytime dysfunction appeared to have the strongest relationship with anxiety disorders comorbid with poor quality sleep than poor mental health-related quality of life with anxiety disorders alone [38].

The exact underlying mechanism of depression in augmentation of HF is not clear, but it is possible that depression may reflect greater sleep disorders and so increase HF severity. According to finding of Haworth JE et al. study in 2005, depression and anxiety in patients with CHF was related to previous psychiatric history and a higher NYHA (New York Heart Association) class. Additionally, anxiety in CHF patients was related to comorbid physical illness (diabetes and angina). Furthermore, some studies suggest that the physical, psychological and social effects of depression negatively impact CHF whose symptoms may lead to depression, especially in lower social class, worse NYHA class, and those with a previous history of mental illness [39].

Another study commented that patients with CHF often have cerebrovascular diseases which affect small vessel functions and so vascular depression may occur that leads to apathy, poor executive cognitive function, and psychomotor impairment [40]. In clarification of the mechanism of depression and anxiety in patients with CHF, Yohannes, et al. reported that coronary artery dis-

ease and high blood pressure can lead to CHF and CHF in individuals with low social class or in solitary young people can result in depression. Then depression in turn increases heart rate and arrhythmia and also decreases sleep time [37].

Future work that employs more objective assessments of sleep quality is needed to elucidate and confirm the current findings. Similar case controlled studies with larger samples that directly measure comorbid conditions and use precise instruments to study sleep disorders such as polysomnography or design cohort studies are much needed to better understand the independent effects of sleep quality in HF.

According to findings of our study, medical specialists, especially cardiologists in addition to control disease sign and symptoms, must attend to other factors such as sleep status and depression in HF patients, too. We recommend that physicians consult with psychiatrists in this situation specifically after patients' discharge, to increase their health condition and improve their sleep status.

5. Conclusion

The most HF patients have low sleep quality and PSQI score seems to have associated with anxiety and depression.

Ethical Considerations

Compliance with ethical guidelines

The study have been approved by the Research Ethics Committee. Informed consent was obtained from all individual participants included in the study.

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Conflict of interest

The authors declared that there is no conflicts of interest regarding the publication of this article.

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