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THE EFFECT OF ACTIVITIES OF DAILY LIVING AND DEPRESSION SYMPTOM LEVEL ON SLEEP QUALITY IN THE ELDERLY WITH HEART FAILURE

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Contribution
AA conceived the idea and designed the study. Data collection and manuscript writing was done by AA, and MG. All the authors contributed equally to the submitted manuscript.

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ABSTRACT

Objective: To determine the effect of activities of daily living and depression symptom level on sleep quality in the elderly with heart failure.

Methodology: In this descriptive study the sample consisted of 95 patients presented to the cardiology outpatient clinic of a university hospital due to heart failure and who met the inclusion criteria of the study. The research data wss collected using the Personal Information Form, the Pittsburgh Sleep Quality Index, the Katz Index-Activities of Daily Living and the Geriatric Depression Scale-Short Form.

Results: It was found that the sleep quality of all patients who participated in the study was low (9.98 ± 2.74). The mean depression symptom level score of the patients was high (7.58 ± 3.58), and that sleep quality decreased as the depression symptom level score increased ($p<0.05$). There was no relationship between the total activities of daily living score and the total sleep quality score, and that the sleep quality of the dependent patients in the washing and transfer dimensions, which are the sub-dimensions of activities of daily living, were lower than that of the independent ones. Also, it was found that as the level of dependence increased in the daily living activities increased, the level of depression symptoms increased too.

Conclusions: The study revealed that elderly patients with heart failure experienced significant sleep problems and that their sleep quality decreased as the depression symptom levels increased.

Keywords: Activities of daily living, depression, elderly, heart failure, sleep quality

INTRODUCTION

Heart failure (HF) is a rapidly growing major public health problem that has high mortality and morbidity rates. HF is more common especially in individuals aged 65 and over and the rate of rehospitalization is quite high.[1] It is estimated that there are over 37.7 million individuals diagnosed with HF worldwide.[2] There are no new data in Turkey; however, it is reported that the incidence of HF is 9.6% and this rate is much higher in the elderly population.[3]

Heart failure is a chronic and progressive disease accompanied by many physical and psychological symptoms and characterized by a low quality of life and its prevalence increases with advancing age.[2] Symptoms such as dyspnea, weakness and fatigue are experienced at frequent intervals in elderly individuals with heart failure and limit various aspects of their lives. Functional insufficiencies (self-care, dressing, bathing, shopping, decrease in physical condition, etc.) can be seen in performing the activities of daily living due to advancing age.[4-6] The disease-related symptoms, increased age and increased level of dependence in the activities of daily living lead patients to become dependent on their caregivers, lose their social roles in daily life, and thus experience develop mental problems.[6-8] Various emotional problems, such as anxiety, stress, depression are common in HF patients, can negatively affect the prognosis of the disease and disrupt the sleeping pattern.[7,9,10] The physical and mental problems experienced by HF patients can also significantly affect sleep quality, which is an essential component of activities of daily living. In the study conducted by Moradi et al, it was determined that patients with HF experienced sleep problems at a significant level and that the level of experiencing sleep problems increases with age.[11] Furthermore, some studies in the literature reported that the prevalence of depression in HF patients is high and this is associated with low physical activity.[5,8,9] Symptoms such as low functional capacity and depression seen in heart failure cases cause disorder in sleep quality, thus reduces the quality of life.[5,6,9]

Nurses have important roles in identifying the factors causing sleep problems in individuals with HF and maintaining/improving the regular sleeping pattern. No study in the literature has examined the effect of activity level and depression on sleep quality together in individuals with HF aged over 65 years. Therefore, the data obtained from the study will guide the development of targeted care and education approaches. For this reason, this study was conducted to determine the effect of activities of daily living and depression symptom level on sleep quality in the elderly with heart failure.

METHODOLOGY

The study had a descriptive design. The sample of the study consisted of patients who applied to the cardiology outpatient clinics of a university hospital due to HF between 9 February 2016 and 31 April 2016. A power analysis was conducted to determine the sample size. Considering at least a 30% correlation between continuous measurements, the sample size was determined as 85 to determine the statistical significance with a maximum 5% type I error margin and a minimum 80% power.[12] 107 patients were reached between the specified dates. During the data collection, seven patients were excluded from the study since they did not agree to participate in the study and five patients were excluded due to incomplete data. Therefore, the study sample consisted of 95 patients. Patients who were aged 65 years and over, who were diagnosed with HF at least three months ago, who were classified as New York Heart Association Functional Classification (NYHA) Class II and III, who were physically and cognitively suitable for answering forms to be applied in the research, who did not have any communication and mental problems, and who were not diagnosed with a sleep problem and did not use medication for sleep problems were included in the research.

The research data were collected using the Personal Information Form, which was developed for HF patients using the literature information, the Pittsburg Sleep Quality Index, the Katz Index-Activities of Daily Living and the Geriatric Depression Scale-Short Form. Besides, information regarding ejection fraction (EF) and NYHA class level was obtained from the patient file.

The personal information form, was developed in line with the literature. It includes questions regarding some socio-demographic characteristics

(age, sex, marital status, etc.), clinical characteristics (duration of disease, number of hospitalizations, medications used, etc.), health behaviors (smoking and alcohol use) and sleep hygiene, which are considered to affect sleep quality in individuals with HF.[1,4,7,13-15]

The Pittsburg Sleep Quality Index (PSQI), was developed by Buysse et al. in 1989 and its Turkish validity and reliability study was conducted by Ağargün et al.[16,17] In both the original study of the scale and the validity and reliability study conducted by Ağargün, the Cronbach alpha was found as 0.80. In our study, the Cronbach alpha was found to be 0.72. The PSQI scale evaluates the sleep quality in the last one month and consists of 24 questions and 7 items. Nineteen questions are answered by the individual and five are answered by the spouse or roommates. The score was calculated based on 18 items and 7 components. Each item is scored between 0-3 points and the sum of the scores from 7 components gives the total PSQI score. The total score ranges between 0-21 points. A total PSQI score of ≤5 indicates a “good sleep quality” and a score of >5 indicates a “poor sleep quality”.

The Katz Index-Activities of Daily Living (ADL), was developed by Katz et al. in 1963[18] The ADL index determines the activities to provide the basic needs required for the maintenance of life. The ADL index consists of six subscales: bathing, dressing, toileting, transferring, continence, and feeding. In the ADL index, a score between 0-6 points indicates a “dependent” patient, a score between 7-12 points indicates a “semi-dependent” patient, a score of 13-18 points indicates an “independent” patient.

The Geriatric Depression Scale-Short Form (GDS-SF), consists of 15 questions, in total. Five questions (1, 5, 7, 11 and 13) are expressed positively and others are expressed negatively. In the evaluation of the scale, the answer “no” given to positive questions and “yes” to negative questions are scored 1 point. A total of 6 points or over from the scale is considered significant for the diagnosis of depression. It was developed by Yesevage et al. in 1983[19] Due to the easy use of the short form consisting of 15 questions, its validity and reliability were proved.[20] The Turkish validity and reliability study of the scale was conducted by Durmaz et al.[21] The Cronbach alpha value was found as 0.92 in the validity and reliability study and 0.80 in our study.

Both the Ethical Committee and the Office of the Chief Physician of the hospital where the study was conducted approved this study (Decision No:2016/13). The patients who participated in the study were informed about the purpose of the study and confidentiality of the information and their oral consent was taken. This study was conducted according to the Declaration of Helsinki.

In the evaluation of the data, mean and standard deviation, minimum and maximum were used in continuous variables; frequency and percentage were used to identify the categorical variables. Student's t-test was used to compare the means of two groups and the One-Way ANOVA was used to compare the means of more than two groups. In case of a difference found via ANOVA, the Tukey was used as a Post Hoc test. The Cronbach alpha was determined to evaluate reliability. The Pearson Correlation coefficient was used to examine the correlations between the scales and subscales. The statistical significance level was taken as $p<0.05$.

RESULTS

It was determined that 52.6% of the patients who participated in the study were male; 46.3% were primary school graduates; 60% were married; 76.8% were overweight and over. The mean age of the patients was 75.44±6.36. The mean total PSQI score of the patients included in the study was determined as 9.98±2.75. Also, it was determined that the mean Katz index-activities of daily living score of the patients was 12.22±4.67 and that the mean GDS-SF score was 7.58±3.58 (Table 1).

Table 1: The Effect of Socio-Demographic and Clinical Characteristics, Health Habits and Sleep Activities on Sleep Quality in Patients with Heart Failure

Variables	Summary
Age (year)	75.44 (±6.36)
EF percentage	36.53 (±9.79)
Time after HF diagnosis	5.74 (±4.74)
Number of hospitalizations after HF diagnosis	5.88 (±4.02)
Number of continuous medications	4.82 (±1.22)
Sex	
Female	45 (47.4)
Male	50 (52.6)

Educational level	
Illiterate	25 (26.3)
Literate	19 (20.0)
Primary school	44 (46.3)
Secondary school and over	7 (7.4)
BMI	
18.5-24.9	22 (23.2)
25-29.9	54 (56.8)
30.0 and over	19 (20.0)
Marital status	
Married	57 (60.0)
Single	38 (40.0)
Presence of a chronic disease other than HF	
Yes	93 (97.9)
No	2 (2.1)
NYHA classification	
Class II	50 (52.6)
Class III	45 (47.4)
Alcohol consumption	
I drink	5 (5.3)
I quit	10 (10.5)
I have never drunk	80 (84.2)
Smoking	
I smoke	14 (14.7)
I quit	26 (27.4)
I have never smoked	55 (57.9)
Tea consumption	
Yes	89 (93.7)
No	6 (6.3)
Coffee consumption	
Yes	50 (52.6)
No	45 (47.4)
Number of pillows	
1	41 (43.1)
2	49 (51.6)
3	5 (5.3)
Daytime sleepiness	
Yes	89 (93.7)
No	6 (6.3)
Continuous variables	
Pittsburgh Sleep Quality Index	9.98±2.74
Activities of Daily Living (Total)	12.22±4.67
Geriatric Depression Scale Short Form	7.58±3.58

SD: standard deviation, BMI: Body Mass Index, HF: Heart Failure, EF: Ejection Fraction, NYHA: New York Heart Association

It was determined that the most frequent sleep problems in the patients with HF were inability to fall asleep after going to bed, waking up at midnight or early in the morning, going to the toilet during sleep, and inability to breathe comfortably (70.5%, 66.3%, 77.9%, and 68.4%, respectively) (Table 2).

When the patients included in our study were examined in general, it was determined that the patients with HF who were dependent in Bathing and Transferring subscales had a poorer sleep quality compared to those who were independent and that the difference was statistically significant (p=0.04; p=0.02, respectively). Besides, the sleep quality was found to be poorer in those who had a GDS-SF score of 6 points or over, which is the cut-off score in the scale, than those who had a GDS-SF less than 6 points and the statistical difference between them was significant (p<0.01) (Table 3).

A negative correlation was found between the depression symptom level and the ADL scores of patients with heart failure. Moreover, a positive correlation was found between the depression symptom level and the total PSQI score (p <0.05). It was found that as the level of dependence in the daily living activities increased, the level of depression symptoms increased. It was also found that as the level of depression symptoms increased, the sleep quality decreased (Table 4).

Table 2: Distribution of Sleep Problem Rates in Patients with Heart Failure (n=95)

Characteristics	Zero Times a Week	Less than Once a Week	1-2 Times a Week	More than 3 Times a Week
Inability to fall asleep 30 minutes after going to bed	7 (7,4)	21 (22,1)	36 (37,9)	31 (32,6)
Waking up at midnight or early in the morning	5 (5,3)	27 (28,4)	35 (36,8)	28 (29,5)
Going to the toilet	3 (3,2)	18 (18,9)	40 (42,1)	34 (35,8)
Inability to breath comfortably	6 (6,3)	24 (25,3)	37 (38,9)	28 (29,5)
Excessive chill	21 (22,1)	33 (34,7)	21 (22,1)	20 (21,1)
Excessive hot flashes	25 (26,3)	42 (44,2)	14 (14,7)	14 (14,7)
Bad dreams	44 (46,3)	30 (31,6)	17 (17,9)	4 (4,2)
Pain	23 (24,2)	35 (36,8)	29 (30,5)	8 (8,4)
Other reasons	29 (30,5)	50 (52,6)	12 (12,6)	4 (4,2)
Coughing and loud snoring	23 (24,2)	28 (29,5)	30 (31,6)	14 (14,7)

Table 3: Effect of Activities of Daily Living and Depression Symptom Level on Sleep Quality in Patients with Heart Failure (n=95)

Characteristics	PSQI mean (SD)	P value
Bathing		
Dependent	10.72 (±2.81)	0.04
Semi-dependent	9.42 (±2.30)	
Independent	9.13 (±2.80)	
Dressing		
Dependent	10.29 (±2.74)	0.18
Semi-dependent	10.28 (±2.81)	
Independent	9.08 (±2.59)	
Toileting		
Dependent	9.84 (±2.53)	0.11
Semi-dependent	10.8 (±3.09)	
Independent	9.36 (±2.51)	
Transferring		
Dependent	11 (±2.99*)	0.02
Semi-dependent	9.26(±2.29*)	
Independent	10.11 (±2.96)	
Continence		
Dependent	9.85 (±2.43)	0.95
Semi-dependent	9.95 (±2.64)	
Independent	10.09 (±3.12)	
Feeding		
Dependent	9.86 (±2.71)	0.97
Semi-dependent	9.96 (±2.41)	
Independent	10.04 (±2.99)	

Activities of Daily Living		
Dependent	10.25 (±2.70)	0.85
Semi-dependent	10.07 (±2.86)	
Independent	9.79 (±2.68)	
GDS-SF ↓ 6	8.87 (±2.40)	0.01
GDS-SF ↑ 6 and over	10.52 (±2.76)	

SD: standard deviation, PSQI: Pittsburg Sleep Quality Index, GDS-SF: Geriatric Depression Scale-Short Form

Table 4: Correlation of Age, Clinical Features, Depression, Daily Life Activity and Sleep Quality of Patients with Heart Failure with Each Other

Characteristic	1	2	3	4	5	6	7	8	9
1-Age	-								
2-Duration of illness	r=0.10 p=0.31								
3-BMI	r=-0.13 p=0.23	r=0.03 p=0.8							
4-Number of hospitalizations	r=-0.09 p=0.4	r=0.64 **p=0.001**	r=0.07 p=0.51						
5-EF	r=0.23 **p=0.03**	r=-0.17 p=0.09	r=0.01 p=0.9	r=-0.36 **p=0.001**					
6-Number of the drugs used	r=-0.06 p=0.58	r=0.18 p=0.08	r=-0.04 p=0.7	r=0.06 p=0.57	r=-0.28 **p=0.01**				
7-PSQI	r=-0.12 p=0.25	r=0.03 p=0.8	r=0.03 p=0.76	r=0.11 p=0.29	r=-0.12 p=0.23	r=0.12 p=0.27			
8-ADL	r=-0.13 p=0.22	r=0.25 **p=0.02**	r=0.23 **p=0.04**	r=-0.001 p=0.99	r=0.1 p=0.32	r=0.09 p=0.34	r=-0.16 p=0.12		
9-Depression	r=0.008 p=0.94	r=0.03 p=0.76	r=-0.24 **p=0.02**	r=-0.06 p=0.55	r=-0.02 p=0.86	r=0.11 p=0.28	r=0.29 **p=0.004**	r=-0.33 **p=0.001**	-

BMI: Body Mass Index, EF: Ejection Fraction, PSQI: Pittsburg Sleep Quality Index, ADL: Activities of Daily Living

DISCUSSION

The findings obtained in our study showed that the sleep quality of all patients was low (PSQI>5), that the mean PSQI score was high (9.98±2.74), and that sleep disorders constituted an important problem in patients with HF. This finding is consistent with other studies in which the PSQI scores were high in patients with HF. Likewise, in a study conducted in Taiwan, the mean PSQI score of the patients with HF was found to be 10.78±4.87.[22] In a study conducted in Turkey including HF patients, the mean PSQI score was determined as 9.20±2.10.[15] Another finding obtained in our study was that the sleep quality of all patients was low. Javadi et al. reported that 91.2% of the patients with HF had poor sleep quality, on the other hand, Santos et al. determined that 68.5% of the patients had poor sleep quality.[13,14]

In our study, it was seen that poor sleep quality was more common than that in both national and international studies. This difference may be due to the age range differing between the study groups.

The mean age of the patients included in the study was determined to be high (75.44±6.36). In elderly individuals, the HF incidence increases due to prolonged life span, accompanying diseases with aging and changes in cardiovascular structures and functions with physiological aging. Our study findings are consistent with the literature results.[13,14,22] In this study, it was determined that individuals aged 65 years and over had poor sleep quality considering their conditions; however, the difference was not statistically significant. In the literature, it is seen that the correlation between sleep quality and age in patients with HF is complicated. Javadi et al. determined that sleep

quality decreased with increased age in hospitalized patients with HF.[13] On the other hand, in the study conducted by Wang et al. in which the factors affecting sleep quality were examined, it was concluded that age did not affect sleep quality.[22] Gau et al. compared the sleep quality of 126 elderly HF patients and 67 young HF patients and reported that the sleep disorders seen in patients with HF were specific to the disease rather than age. In the same study, it was determined that the prevalence of sleep disorders in young HF patients was higher than that in healthy elderly individuals.[23] In our study, it was determined that age did not affect sleep quality. The reason for poor sleep quality in all of the patients included in the sample is thought to be frequently experienced symptoms such as shortness of breath, weakness, and fatigue. It is also thought that this frequency may lead patients to experience sleep problems independently of their age.

In our study, it was concluded that the sleep quality of NYHA class III HF patients was lower than that of NYHA class II HF patients. This finding was expected and is consistent with the previous studies. Previous studies, reported that sleep quality decreases as the NYHA class increases.[11,14,22,23] According to the NYHA classification, as the class level increases, HF progresses and the symptoms get worse. It is thought that this negative effect may reduce the sleep quality of patients.

It was determined that the majority of the patients included in our study experienced sleep problems such as going to the toilet during sleep and inability to breathe comfortably (77.9% and 68.4%, respectively). In the literature, many studies are reporting that nocturia negatively affects the sleep quality in patients with HF.[11,13,14,22] 67.1% of the HF patients in the study conducted by Javadi et al. 72.2% of the patients in the study by Santos et al. and 89% of the patients in the study by Moradi et al. stated that they had sleep problems due to urination at night.[11,13,14] Wang et al. on the other hand, determined that HF patients using diuretics had poor sleep quality.[22] This can be explained by the improvement in nighttime urination as a result of increased kidney perfusion due to decreased workload in the heart during sleep at night. Besides, the vast majority of the patients in our study stated that they had sleep problems due to dyspnea. Similarly, Santos et al. determined that more than half of the patients experienced sleep problems due to shortness of breath.[14] Moradi et al. investigated the factors related to sleep quality in patients with HF and it was found that shortness of breath experienced by patients caused sleep interruption and impaired sleeping patterns.[11] It is thought that shortness of breath frequently experienced in HF patients makes it difficult for patients to fall and stay asleep and impairs patients' sleeping patterns.

It was determined that the activities of daily living of the patients participating in the study were at the semi-dependent level. Dunlay et al. found that 59.4% of patients with HF had difficulty in one or more activities of daily living, that 24.1% had moderate difficulty and that 12.9% had difficulty at a high level.[4] In our research, it was seen that sleep quality decreased as dependency levels increased in activities of daily living. Furthermore, it was determined that those who were dependent on bathing and transferring subscales of the Katz Index-Activities of Daily Living had a lower sleep quality compared to those who were independent. Awotidebe et al. evaluated the functional capacity and sleep quality of HF patients and found that patients with HF had a lower functional capacity and sleep quality than healthy individuals. In the same study, it was found that HF patients with low functional capacity had lower sleep quality.[6] In the study investigating the clinical and echocardiographic parameters related to physical activity habits and sleep quality in patients with HF, sleep quality was affected by daily activity habits in addition to disease-related causes.[24] In our study, patients experienced limitations on bathing and transferring at most. Therefore, those who were dependent on these issues had poor sleep quality.

Depression is commonly seen in individuals with heart failure and it is stated in the literature that it is an important problem affecting sleep quality.[7,10,22] In our research, most of the patients were determined to have mild depression. Hussain et al. contucted a study to determine the frequency of depression in patients with congestive heart failure and to evaluate the correlation between depression and clinical parameters and found that 60% of the patients had depression. In the same study, it was determined that patients who had higher NYHA class levels had more severe depression.[25] In our study group, patients with higher depression scores were found to have lower sleep quality. Nasir et al. evaluated sleep quality and depression in hospitalized congestive HF patients and determined that almost all of the patients had poor sleep quality and high depression symptom level (moderate depression in 45% and severe depression in 37.5%) and that there was a significant correlation between sleep quality and depression.[7] Riegel et al. found that the depression level was higher in HF patients who had poor sleep quality compared to the patients with good sleep quality.[10] Symptoms such as shortness of breath, weakness and fatigue experienced in HF reduce functional capacity and ground a basis for the development of mental problems in patients. It is

suggested that mental problems such as anxiety and depression negatively affect sleep quality in patients.

Limitations

The sleep disturbance was assessed using the PSQI, which is a subjective measurement tool, in our patients. Polysomnographic measurements that are used to determine sleep disturbance could not be benefitted due to the insufficient technical facilities. The study may not represent the overall HF population since only NYHA class II to III outpatient were included.

CONCLUSION

In our research, it was found that all HF patients had poor sleep quality, that their mean depression symptom level was high, and that their sleep quality decreased as depression symptom level score increased. Also, it was determined that the activities of daily living were at a semi-dependent level and that there was no statistically significant correlation between the mean Activities of Daily Living index score and the mean Pittsburgh Sleep Quality Index score. Following these results, nurses who give care to HF patients are recommended to evaluate the sleep quality and depression level of patients using valid and reliable scales. It is also recommended to support nurses to reflect these evaluations on nursing practices.

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