Original Article

Examination of factors affecting the sleep quality of psychiatry patients using structural equation model

 Özlem Örsal, Hülya Kök Eren, Pınar Duru

Department of Nursing, Eskişehir Osmangazi University Faculty of Health Sciences, Eskişehir, Turkey

Abstract

Objectives: Mental illness can cause disruption of sleep quality. This study aimed to evaluate the sleep quality of patients who were hospitalized, and to identify the factors that affect their sleep quality.

Methods: A cross-sectional design was used to conduct the research, which included the participation of 90 patients who were hospitalized in the psychiatry service of a medicine faculty hospital in the central Anatolia region between September 2011 and February 2012. The sleep quality of the patients was assessed using the Pittsburgh Sleep Quality Index (PSQI). Data were analyzed using the IBM SPSS (version 20.0) Statistical Package Program, with which Mann-Whitney U test and Kruskal-Wallis analyses were conducted, as well as structural equation modeling (SEM).

Results: The patients' total mean score on the Pittsburgh Sleep Quality Index was 8.1±4.6 (min: 1.0; max: 18.0), and 67.8% (n=61) of the patients had poor sleep quality. The SEM indicated that 43% of the total variance in the sleep quality of the psychiatry patients was explained by previous presence of sleep problems, 22% was explained by being female, and 31% was explained by having a diagnosis related to anxiety. This diagnosis was related to bipolar diseases in 19%, to schizophrenia in 18%, to depression in 17%, and to personality disorders in 16% of the patients.

Conclusion: While being diagnosed with anxiety had the greatest aggravating impact on sleep quality, sleep quality most affected the frequency of sleep medication use. It is suggested that order to treat the sleep problems related to each different psychiatric diagnosis, further detailed research is needed.

Keywords: Psychiatry patients; sleep disorder; sleep quality.

What is known about this issue?

The frequent sleep disorders experienced by patients with psychiatric disorders not only increase the recurrence process of the disease but also affect the treatment process of patients.

What does this article add to the known facts?

• In the present study, it was found that seven of every ten psychiatric patients had poor sleep quality, and that sleep quality varied according to psychiatric diagnoses.

What is its contribution to the practice?

• These findings, as well as others from the study, point to the need of developing unique approaches / interventions that are specific to psychiatric diagnoses in order to improve the poor sleep quality of psychiatric patients.

Sleep is a physiological process that involves a period of unconsciousness that transitions into a return to consciousness by internal and external stimuli. Sleep consists of two main periods, one being the active sleep period, called REM (Rapid Eye Movement) sleep, during which the body gets relaxed and rapid eye movements and rapid brain waves are observed. When a person first falls asleep, they start out with REM sleep. During the nonREM period, slow eye movements are observed. By completing the full cycle of the REM and NONREM process of sleep, a person awakes in a vigorous and energetic state, whereby they are able to maintain mental activities (e.g., learning) at the optimum level. The sleep – vigilance cycle in adults is 7–8 hours on average.[1–3]

Sleep quality is explained as the efficiency of sleep, and it consists of the components of subjective sleep quality, sleep delay, sleep duration, habitual sleep activity, sleep disorders, usage of opiates and daytime dysfunction.[4] Individuals for whom mental activities such as learning and memory are important should especially have good quality sleep.[5] Bad sleep quality affects the physical condition[2,6] working performance[7,8] life quality[9,10] and emotional structure[10,11] of patients in a negative way.[1,3,12]

One of the factors that negatively affects sleep quality is the existence of a psychiatric illness, such as anxiety or depression.[13] Patients that suffer from sleeplessness are likely to experience a recurrence of psychiatric disorders.[14] Studies have shown that individuals who sleep less than seven hours a day and have poor sleep quality have an increased level of depressive symptoms.[15] Furthermore, in studies investigating the effects of anxiety and depression on sleep quality, it has been reported that anxiety and depression alter sleep stages, which can result in prolongation of sleep time, decrease in REM latency,[16,17] frequent waking from sleep because of nightmares during the REM period due to anxiety and depression, and difficulty in falling back to sleep.[18] Thus, anxiety, depression and personality disorders have been observed to affect all subcomponents related to sleep quality, including sleep delay, sleep duration, sleep depth, and habitual sleep activity.[3,16] It has been reported that 60% of individuals suffering from anxiety and depression have sleeplessness problems,[3,19] and that anxiety and depression cause "daytime sleep", a type of sleep disorder.[20] According to the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV) and the International Classification of Sleep Disorders Guidelines (ICSD), sleep problems are considered as one of the six indicators of anxiety, depression, and personality disorders. In particular, it has been shown that sleep quality and anxiety, depression, and personality disorders are often interrelated, and that bad sleep could be a predictive indicator of depression and personality disorders, being either observed simultaneously with anxiety, depression and personality disorders, or developing after anxiety, depression or personality disorders.[3,17,19]

Psychiatry patients that have a varying sleep quality are known to experience many emotional, behavioral, sexual, economical, academic and social problems depending on social and physical changes. Patients may experience changes in sleep patterns and deterioration in sleep quality due to a new life style they are not used to and new rules they face. Patients hospitalized at psychiatry service were stated to have worse sleep quality compared to the patients at other services.[21] Sleep quality of psychiatry patients is important since it directly affects the adaptation of the patients to the illness and their participation to the treatment process. The provision and maintenance of a therapeutic environment is one of the fundamental roles of the psychiatric nurse. Psychiatric nurse, this role, provides the structured environment for the provision of sleep patterns, that is, not allowing patient to be in their sleep clothes during daytime, not allowing them sleep during, sleeping at a certain time after dinner and getting up at a certain time, not taking vitals at night except for the acute phase (substance abuse, etc.), and monitoring the patients out of the door or on the camera since the doors of the rooms are made of glass or there are cameras in the rooms unless it is necessary to go next to them; these procedures and applications help enable both physical and psychological sleep patterns.[22–24]

This study aimed to find out frequency of bad sleep quality of patients being hospitalized at a psychiatry clinic at Central Anatolia Region, identify the relationship between the contributing factors and sleep quality, and to evaluate the effect of bad sleep quality on psychiatric diagnoses.

Materials and Method

Research Design and Participants

A cross-sectional design was used for the research, which was conducted with patients who were hospitalized at the psychiatry service of a medicine faculty hospital in the central Anatolia region between September 2011 and February 2012. The study group of the research included 90 (85.7%) of the 105 patients who were hospitalized in this service between the stated dates. The study did not select a sample from out of the population, but rather, the sample included all the patients who had a psychiatric diagnosis, had been staying at the hospital for at least one week, and were able to answer the questions on the data collection form. The patients who had been at the hospital for less than one week and/or had difficulty communicating due to being catatonic or suffering from some other like condition were not included in the study.

Data Collection Tools

Data were collected using a patient information form and the Pittsburgh Sleep Quality Index (PSQI).

Patient Information Form

The patient information form was developed by the researchers in the light of related literature.[3,5,10,21,25] The form consists of questions related to specific sociodemographic characteristics of the patients (gender, age, education level, marital status, profession, income, number of children (if any), and their habits/medical characteristics (existence of another chronic diseases, medicines used, blood pressure, body-mass index (BMI)), period of hospitalization, reason for being hospitalized, previous sleep problems (if any), presence or absence of sleep problems after being hospitalized, identification of the sleep problem, factors affecting sleep patterns (conversations between other patients, conversations between the employees of the institution, and the habits of people in the same room), psychiatric symptoms of the patient (hallucination, obsession, anxiety etc.), tests and interventions for diagnosis and treatment etc.), distress during sleep, problems (sleep apnea, difficulty falling asleep, fear / shouting, etc.) detected by the spouse during sleep, and methods use to cope

with sleep problems (warm shower, hot drink, listening to music, watching TV). The patients' own responses to the items of 'the income does not meet my expenses' – 'the income meets my expenses' – 'the income is well above my expenses' were used to identify their income levels.

Pittsburgh Sleep Quality Index (PSQI)

The Pittsburgh Sleep Quality Index (PSQI), which is a self-report scale, was used for assessing sleep quality in this study. The scale was developed by Buysse et al.[4] in 1989, and its validity and reliability study for Turkey was conducted by Ağargün et al.[26] in 1996. The Cronbach's alpha value of the Turkish version of the scale was reported as 0.80, while for this study it was calculated to be 0.84. The PSQI consists of the following 7 components: subjective sleep quality, sleep latency, sleep duration, habitual sleep activity, sleep disorder, sleep medication use and daytime dysfunction. Although PSQI consists of 24 items, its calculation is made on 19 items. The index consists of both open-ended questions (such as, "when did you regularly go to bed at night last month?") and multiple-choice questions (such as, "How was your sleep quality over the last month? – very good ……… very bad). Participants respond to each multiple-choice question with a number ranging from 0 to 3. The total PSQI score, obtained by adding the points on the items related to the seven components, varies between 0 and 21, with scores of above 5 indicating "bad sleep quality", and scores of below 5 indicating "good sleep quality".

Data Collection

Prior to the study, administrative permission was obtained from the relevant hospital and approval (approval no: 2011/153) was obtained from the ESOGÜ Faculty of Medicine Ethics Committee. After informing the patients about the subject and purpose of the study, the researcher and each patient filled out the questionnaire together. Each interview lasted approximately 15-20 minutes.

Statistical Analysis

Mann Whitney U and Kruskal Wallis tests and the structural equation model were used for statistical analysis of the data. Structural equation modeling (SEM), which is used to detect the structural relations (direct and indirect effects) between observable and latent variables, is a strong statistical method that involves the combination of various statistical techniques including factor analysis (in terms of defining latent variables on the basis of observed variables), canonical correlation (involving many dependent and independent variables), and regression (variables); furthermore, the model includes the assessment errors and considers the assessments that have correlations between them.[27,28] In this study, the SEM was used to determine the sleep quality of psychiatric patients and to identify the effects that the variables determined to have sig-

nificant relations between them according to binary analyses had on patients' sleep quality. Statistical significance was set at p<0.05.

Results

The mean age of the patients who participated in the study was 38.4±14.4 (min: 15.0; max: 71.0) years, and 52.2% (n=47) were female. The total mean score on the PSQI was 8.1±4.6 (min: 1.0; max: 18.0), 67.8% (n=61) were found to have poor sleep quality, 62.2% (n=56) had a daily sleep duration of more than 7 hours, 14.4% (n=13) had a sleep duration of less than 5 hours a day, 23.3% (n=21) stated that they had been using opiates three or more times a week, and finally, 41.1% (n=37) were found to experience sleep disorders one or more times a week. The distribution of the patients' median scores on the PSQI according to sociodemographic characteristics is presented in Table 1.

It was found that 31.1% (n=28) of the participants were diagnosed with schizophrenia, 18.9% (n=12) with bipolar, 27.8% (n=25) with depression, 8.9% (n=8) with anxiety, 7.8% (n=7) with personality disorder, and 5.6% (n=5) with disorders related to substance abuse. The patients who had another chronic disease had significantly poor sleep quality (p=0.020). Table 2 presents the distribution of the patients' median scores on the PSQI according to their medical characteristics.

Significantly poor sleep quality was observed in the patients who had sleep problems before (p=0.000), who had sleep problem after being hospitalized (p=0.010), who informed the medical staff about his/her sleep problem (p=0.000), who had psychiatric symptoms that deteriorated sleep pattern (p=0.001), who wakes up with distress during sleep (p=0.002), who was informed by his/her spouse or a close person about being restless during sleep (p=0.002), who had difficulties falling asleep (p=0.004), and who was informed by his/her spouse or a close person about being frightened/shouting during sleep (p=0.015). Table 3 presents the distribution of the median scores of the patients according to variables related to sleep.

SEM was used to identify the predictive relationships between sleep quality and the variables that had significant relationships with sleep quality according to binary analysis (Figure 1). According to the SEM created in the study, each one of the variables of being female, existence of sleep problem beforehand, and being diagnosed with schizophrenia, bipolar, depression, anxiety, and personality disorders had a significant influence on the psychiatric patients' sleep quality (p<0.05 for each) (see Fig. 1 and Table 4).

Standardized coefficients were used to compare the effects that were found to have significant differences between them. According to the SEM, 43% of the variance in the poor sleep quality of the psychiatric patients was affected by the presence of previous sleep problems and 22% by being female, while 31% was affected by having a diagnosis related to anxi-

Table 1. The distribution of the psychiatric patients' mean PSQI scores by their sociodemographic characteristics

Sociodemographic variables	n	Pittsburgh Sleep Quality Index	Statistical analysis
		Med. (Min.–Max.)	z / KW; p
Gender			
Female	47	8.00 (1.00–18.00)	690.500; 0.010
Male	43	6.00 (1.00–17.00)	
Age group			
15 to 24	12	8.50 (1.00–17.00)	3.950; 0.413
25 to 34	29	8.00 (1.00–17.00)	
35 to 44	17	6.00 (1.00–15.00)	
45 to 54	14	5.50 (1.00–18.00)	
Older than 55	18	9.00 (2.00–18.00)	
Education level			
Primary school or less education	39	7.00 (2.00–18.00)	968.000; 0.829
Middle school or more education	51	8.00 (1.00–17.00)	
Marital status			
Married	52	8.00 (1.00–18.00)	859.000; 0.291
Single	38	6.50 (1.00–17.00)	
Profession			
Civil servant	15	8.00 (1.00–15.00)	
Laborer	13	5.00 (1.00–17.00)	
Self-employed	32	7.50 (1.00–17.00)	
Housewife	30	8.50 (1.00–18.00)	3.189; 0.363
Income			
Income does not meet expenses	34	8.00 (1.00–17.00)	886.500; 0.585
Income meets expenses	56	7.00 (1.00–18.00)	
Children			
Yes	54	7.00 (1.00–18.00)	1.010; 0.754
No	36	8.00 (1.00–17.00)	
Number of children			
0	36	8.00 (1.00–17.00)	3.697; 0.296
1	14	5.50 (1.00–15.00)	
2	27	8.00 (1.00–18.00)	
3 or more	13	10.00 (2.00–18.00)	
Total	90	7.50 (1.00–18.00)	

PSQI: Pittsburgh Sleep Quality Index; Med.: Median; Min.: Minimum; Max.: Maximum.

ety, 19% to bipolar, 18% to schizophrenia, 17% to depression and 16% to personality disorders. Sleep quality explained 47% of the variance in the frequency of using opiates, 44% of the variance in the presence of sleep problems after hospitalization, 42% of the variance in expressing the sleep problem, 38% of the variance in the psychiatric symptoms that deteriorate the sleep pattern of the patient, 36% of the variance in waking up in distress during sleep, 25% of the variance in the presence of another chronic disease, 23% of the variance in obesity, and 21% of the variance in the difficulty of falling asleep. While having the diagnosis of anxiety (0.31) had the greatest worsening impact on sleep quality, sleep quality had the greatest effect on the frequency of sleeping medication use (0.47) (Fig. 1 and Table 4).

Discussion

Several studies have reported that the incidence of poor sleep quality in patients hospitalized in the psychiatric ward varies in the range of 49.1% to 93.2% according to patient evaluations. [14,26,29–33] In another study, 78% of psychiatric patients were determined by their psychiatrists to have sleep problems, and 36% of these patients had moderate sleep problems, while 13% were severe. [34] In this study, the sleep quality of 67.8% of the study group was found to be poor, and the total PSQI mean score was 8.1, which indicated that the patients had poor sleep quality. A number of other studies found the PSQI mean score to be in the range of 7.1–9.1, which is consistent with the present study. [29–31,35] The diversity seen in the results

Table 2. The distribution of the psychiatric patients' mean PSQI scores by their medical characteristics

Medical characteristics	n	Pittsburgh Sleep Quality Index	Statistical analysis
		Med. (Min.–Max.)	z / KW; p
Psychiatric diagnosis			
Schizophrenia	28	6.50 (1.00–18.00)	5.726; 0.334
Bipolar disorder	17	6.00 (1.00–16.00)	
Depression	25	8.00 (1.00–15.00)	
Anxiety	8	11.50 (3.00–18.00)	
Personality disorder	7	11.00 (6.00–17.00)	
Substance-related disorders	5	5.00 (3.00–12.00)	
Another chronic disease			
No	40	6.00 (1.00–18.00)	1.295; 0.016
Yes	50	8.00 (2.00–18.00)	
Use of more than one medication			
No	31	6.00 (2.00–18.00)	955.500; 0.727
Yes	59	8.00 (1.00–18.00)	
Use of sleep medication			
Never (0)	52	5.00 (1.00–16.00)	18.353; 0.000
Less than once a week (1)	7	6.00 (4.00–18.00)	
Once or twice a week (2)	10	8.00 (6.00–13.00)	
Three times a week or more (3)	21	12.00 (6.00–18.00)	
Intergroup comparison		(0–3) p=0.000	
Systolic blood pressure			
≥130 mm/hg	10	8.50 (1.00–12.00)	0.878; 0.645
110–129 mm/hg	66	8.00 (1.00–18.00)	
≤109 mm/hg	14	5.50 (1.00–15.00)	
Diastolic blood pressure			
≥85 mm/hg	6	7.00 (1.00–11.00)	1.302; 0.521
75–84 mm/hg	21	7.00 (1.00–18.00)	
≤74 mm/hg	63	8.00 (1.00–18.00)	
Body mass index group			
Underweight (0)	3	5.00 (2.00–6.00)	7.893; 0.048
Normal weight (1)	41	7.00 (1.00–17.00)	
Overweight (2)	28	6.50 (1.00–18.00)	
Obese (3)	18	9.00 (1.00–18.00)	
Intergroup comparison		(0-3) p=0.036; (2–3) p=0.017	
Duration of hospitalization			
Less than 7 days	35	7.00 (1.00–18.00)	0.475; 0.788
2 weeks	22	7.00 (1.00–14.00)	
3 weeks or more	33	8.00 (1.00–17.00)	
Previous hospitalizations			
Yes	69	8.00 (1.00–18.00)	664.000; 0.563
No	21	6.00 (1.00–18.00)	
Total	90	7.50 (1.00–18.00)	

PSQI: Pittsburgh Sleep Quality Index; Med.: Median; Min.: Minimum; Max.: Maximum.

of these studies could stem from the use of different diagnostic methods, the various populations and countries involved in the studies, and the use of different research techniques.

Although women can maintain the nonREM phase of sleep up to later ages more effectively, for men, the duration of this phase rapidly decreases after 40 years of age, and thus men are expected to have higher frequencies of poor sleep quality. [36] The present study found that women's sleep quality was significantly worse than that of men's, and according to the SEM, being a woman was a variable that affected poor sleep qual-

Table 3. The distribution of the psychiatric patients' mean PSQI scores by sleep-related variables

Variables	n	Pittsburgh Sleep Quality Index	Statistical analysis
		Med. (Min.–Max.)	z / KW; p
Prior sleep problems			
Yes	57	10.00 (1.00–18.00)	436.500; 0.000
No	33	5.00 (1.00–14.00)	
Sleep problems after hospitalization			
Yes	38	11.00 (3.00–18.00)	528.500; 0.000
No	52	6.00 (1.00–17.00)	
Expressing the sleep problem			
Yes	46	10.50 (2.00–18.00)	575.000; 0.000
No	44	6.00 (1.00–14.00)	
Factors that affect sleep patterns			
- Conversations between other patients			
Yes	14	8.00 (1.00–18.00)	494.500; 0.675
No	76	7.00 (1.00–18.00)	
- Habits of people in the same room			
Yes	13	8.00 (4.00–18.00)	439.000; 0.479
No	77	7.00 (1.00–18.00)	
- Psychiatric symptoms			
Yes	20	12.00 (3.00–18.00)	1.031; 0.001
No	70	6.00 (1.00–18.00)	
- Waking up in distress during sleep			
Yes	41	12.00 (2.00–18.00)	1.574; 0.000
No	49	6.00 (1.00–15.00)	
- Spouse's or relatives' stating that patient was distressed during sleep			
Yes	33	12.00 (2.00–18.00)	1.310; 0.002
No	57	6.00 (1.00–17.00)	
- Difficulty falling asleep			
Yes	20	12.00 (2.00–18.00)	992.000; 0.004
No	70	6.00 (1.00–18.00)	
- Spouse's or relatives' stating that patient was afraid / shouting during sleep			
Yes	12	13.50 (3.00–18.00)	671.500; 0.015
No	78	7.00 (1.00–17.00)	
Coping methods			
- Hot drink			
Yes	16	9.50 (3.00–17.00)	533.000; 0.532
No	74	7.00 (1.00–18.00)	
- Music			
Yes	19	8.00 (2.00–17.00)	533.500; 0.162
No	71	7.00 (1.00–18.00)	
- TV			
Yes	19	11.00 (1.00–18.00)	588.500; 0.394
No	71	7.00 (1.00–17.00)	
Total	90	7.50 (1.00–18.00)	

PSQI: Pittsburgh Sleep Quality Index; Med.: Median; Min.: Minimum; Max.: Maximum.

ity. Similar results have been reported in various other studies.[21,30,34] However, there are studies indicating that men had worse sleep qualities,[25,37] and others indicating that there was no difference between men and women in terms of sleep quality.[3,31]
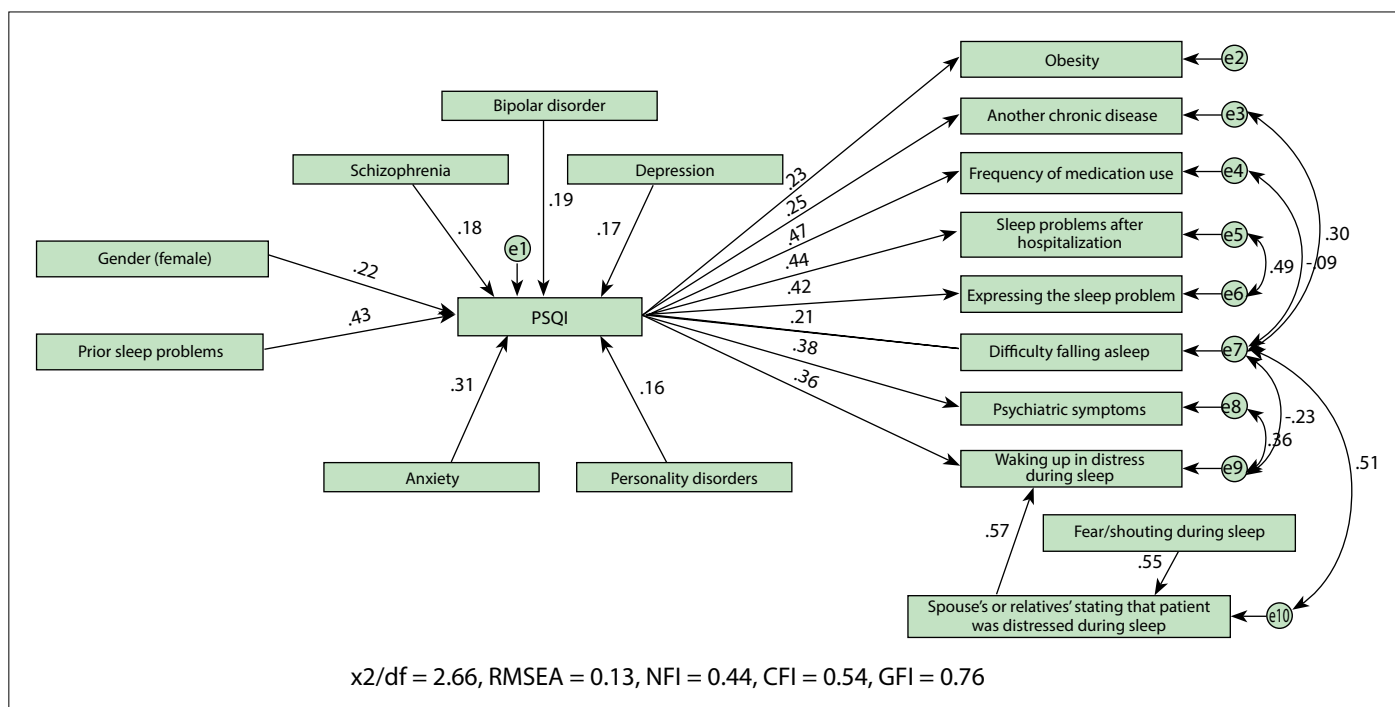
x2/df = 2.66, RMSEA = 0.13, NFI = 0.44, CFI = 0.54, GFI = 0.76

Figure 1. Structural equation model defining the psychiatric patients' sleep quality indicators.

As age increases, awake time at night and the risk of developing chronic diseases increase, and the deterioration of sleep quality in individuals as they age is an expected situation.[38,39] However, no significant relationship was found between age and sleep quality in the present study. While there are studies reporting similar results,[21,31] there are also those reporting that individuals who were 18 years old and above had worse quality sleep.[34,38] It is likely that this study did not find a relationship between age and sleep quality because the participants had a psychiatric diagnosis and were being treated with psychiatric drugs.

It is expected that the sleep quality of patients with a chronic disease will be impaired, which in turn will impair sleep quality and negatively affect their lives. According to the results of

Table 4. Results of the measurement model defining the variables that affect the psychiatric patients' sleep quality

Structural Equation Model (SEM)			Standardized β	S.H	t	p
Gender (female)	--->	Sleep quality	0.222	0.805	2.848	0.004
Depression	--->	Sleep quality	0.175	0.898	2.240	0.025
Schizophrenia	--->	Sleep quality	0.183	0.868	2.343	0.019
Fear/shouting during sleep	--->	Spouse's or relatives' stating that patient was distressed during sleep	0.548	0.108	7.380	<0.001
Bipolar disorder	--->	Sleep quality	0.192	1.027	2.459	0.014
Personality disorders	--->	Sleep quality	0.159	1,501	2.039	0.041
Anxiety	--->	Sleep quality	0.313	1,413	4.011	<0.001
Prior sleep problems	--->	Sleep quality	0.431	0.834	5.525	<0.001
Spouse's or relatives' stating that patient was distressed during sleep	--->	Waking up in distress during sleep	0.566	0.071	7.795	<0.001
Sleep quality	--->	Obesity	0.234	0.008	2.269	0.023
Sleep quality	--->	Another chronic disease	0.246	0.010	2.398	0.016
Sleep quality	--->	Frequency of medication use	0.469	0.024	5.006	<0.001
Sleep quality	--->	Sleep problems after hospitalization	0.441	0.009	4.629	<0.001
Sleep quality	--->	Expressing the sleep problem	0.421	0.009	4.373	<0.001
Sleep quality	--->	Difficulty falling asleep	0.209	0.007	2.346	0.019
Sleep quality	--->	Psychiatric symptoms	0.377	0.008	3.846	<0.001
Sleep quality	--->	Waking up in distress during sleep	0.359	0.007	4.569	<0.001

SEM in the present study, the presence of a chronic disease was a contributing factor to poor sleep quality. Deteriorating sleep quality can result from many medical conditions, such as diabetes-induced nocturia due to high glucose,[40] frequent awakenings due to cardiac dyspnea,[41] and sleep interruptions due to edema formation from throat infections or allergic reactions and airway obstruction due to continuous nasal drip,[42] sleep problems, such as decrease in pressure in respiratory passage obstructions, like adenoid, tonsil vegetation, and collapsed pharynx, and snoring,[9,43] and finally, cancer-related pains and the nightmares caused by medicines.[5,44] All of these are included under the "Sleep Disorders Caused by Medical Disorders" according to the DSM-5.[45] Similarly, the present study found that the patients with medically diagnosed chronic diseases had poor sleep quality at higher frequencies.

In one study it was reported that the total sleep duration of the participating psychiatry patients varied from 2.5 hours to 12 hours.[32] Similarly, 62.2% (n=56) of the participants in the present study had a daily sleeping duration of more than 7 hours whereas 14.4% (n=13) had a sleeping duration of less than 5 hours a day. The average sleep time in a normal adult is 7–8 hours.[1] The fact that the mean duration of sleep of the psychiatric patients in the present study was below the mean duration of sleep of normal adults could have contributed to their poor sleep quality.

In this study, 42.2% of the patients used one or more sleep medications per week, and the SEM also showed that the frequency of sleep medication use was a contributing factor to poor sleep quality. Similarly, the study conducted by Niet et al.[30] revealed that the 48.8% of the psychiatric patients used opiates one or more times a week. Hence, it is not surprising that patients using opiates would obtain lower scores on all the subscales of the PSQI, namely, subjective sleep quality, sleep latency, sleep duration, habitual sleep activity, sleep disorder, and daytime function disorder.[30]

Impulsivity, aggression, frightening dreams, increased movement, hallucinations and other psychiatric symptoms may have an impact on the sleep quality of psychiatric patients before, during or after hospitalization.[35,46,47] Results from the present study showed that the sleep quality of the patients who previously had sleep problems, had such problems after hospitalization, reported to health personnel that they had sleep problems, were cognitively impaired, awoke in a state of distress during sleep, and whose spouses/relatives reported them to be in distress during sleep were significantly worse. Individuals whose minds are constantly working due to delusions, uneasiness, anxiety, and depression have been reported to have trouble falling asleep.[25] In this study, the sleep quality of the patients who had difficulty falling asleep was significantly worse. At the same time, according to the SEM, poor sleep quality had an effect on the difficulty of falling asleep.

In the present study, results of the binary analyses showed that having a bipolar diagnosis did not affect the sleep quality of the patients. Similarly, Özkan et al.[29] also found no asso-ciation between bipolar disorder and PSQI scores. According to the results of the SEM in the present study, having bipolar diagnosis was a contributing variable to poor sleep quality. In bipolar patients, impairment in sleep structure and sleep continuity, insufficiency in falling asleep, low total sleep time, and lack of deep and resting sleep lead to poor sleep quality.[47,48]

Sleep quality along with anxiety and depression are states that mutually affect each other. Having a high level of anxiety might cause a decrease in sleep quality, and vice versa, low sleep quality might cause an increase in anxiety.[3,10,11,18,49] In the present study, it was observed that having a diagnosis of depression contributed to poor sleep quality. However, in the study conducted by Özkan et al.[29] no relationship was found between depression and sleep quality. The study done by Kaufmann et al.[34] showed that hospitalized patients and patients experiencing mood disorders and substance dependence disorders had more sleep problems. Several studies have reported that there was no association between panic disorder and sleep quality.[3,31] Results from binary analyses conducted in the present study also showed that having an anxiety diagnosis did not affect the sleep quality of the patients, yet the results of the SEM indicated that having anxiety was a contributing factor in poor sleep quality.

According to Kaufmann et al.,[34] schizophrenia patients experience less sleep problems compared to patients with other psychiatric diagnoses. In the binary analyses of the present study, it was found that having a diagnosis of schizophrenia did not affect the sleep quality of the patients. Similarly, the study conducted by Özkan et al.[31] also did not report any relationship between schizophrenia and sleep quality. The results of the SEM obtained in the present study also showed that having a diagnosis of schizophrenia contributed to poor sleep quality. Other studies have reported that lack of pattern in sleep times, disruption in the order of sleep and vigilance, and an extension in sleep latency impair sleep quality.[46,50]

Individuals with antisocial personality disorders have been reported to have difficulties in falling asleep, have short sleep durations, low sleep activity, and impaired sleep in general.[51] In the present study, results from the binary analyses revealed that having a diagnosis of personality disorder had no effect on the sleep quality of the patients, yet the results of the SEM showed that having a diagnosis related to personality disorders did in fact contribute to poor sleep quality. In a study by Kamphuis et al.,[29] antisocial personality disorder was reported to contribute to poor sleep quality, affecting in 10 times more than other disorders.

Conclusion

In addressing sleep problems of psychiatric patients, it is necessary to first identify the risk factors that affect their sleep quality, such as being female, having sleep problems prior to and after being hospitalized, being in distress during sleep, and having difficulty in falling asleep, before institutions plan

and offer their service. Secondly, it is important to realize that sleep quality is affected at different levels depending on the psychiatric diagnosis. More detailed studies, such as case-control, cohort and experimental research, are needed to better understand and address the disturbance of sleep structure related to each psychiatric diagnosis. Furthermore, it is important that services be aimed at improving the sleep quality of psychiatric patients (working in cooperation with sleep clinics, monitoring the sleep quality of patients outside the hospital, in institutions like community mental health centers, giving sleep hygiene-related trainings to patients, etc.) and that health personnel are well aware of these issues and given the proper direction.

Conflict of interest: There are no relevant conflicts of interest to disclose.

Peer-review: Externally peer-reviewed.

Authorship contributions: Concept – Ö.Ö., H.K.E., P.D.; Design – Ö.Ö., H.K.E., P.D.; Supervision – Ö.Ö.; Fundings - Ö.Ö., H.K.E., P.D.; Materials – Ö.Ö., H.K.E., P.D.; Data collection &/or processing – Ö.Ö.; Analysis and/or interpretation – Ö.Ö.; Literature search – H.K.E.; Writing – Ö.Ö., H.K.E., P.D.; Critical review – Ö.Ö., H.K.E., P.D.;

References

1. Carskadon MA, Dement WC. Normal human sleep: an overview. In: Kryger MH, Roth T, Dement WC, editors. Principles and Practice of Sleep Medicine. 4th ed. Philadelphia: Elsevier Saunders; 2005. p. 13–23.

2. Kaynak H, Ardıç S. Uyku fizyolojisi ve hastalıkları. İstanbul: Nobel Tıp Kitabevi; 2011.

3. Atalay H. Comorbidity of insomnia detected by the Pittsburgh sleep quality index with anxiety, depression and personality disorders. Isr J Psychiatry Relat Sci 2011;48:54–9.

4. Buysse D, Reynolds CF 3rd, Monk T, Berman S, et al. The Pittsburgh Sleep Quality Index: a new instrument for psychiatric practice and research. 1989;28:193–213.

5. Preišegolavičiūtė E, Leskauskas D, Adomaitienė V. Associations of quality of sleep with lifestyle factors and of studies among Lithuanian students. Medicina (Kaunas) 2010;46:482–9.

6. Lee A, Lin W. Association between sleep quality and physical fitness in female young adults. J Sports Med Phys Fitness 2007;47:462–7.

7. Sarıcaoğlu F, Akıncı S, Gözaçan A, Güner B, et al. The Effect of Day and Night Shift Working on the Attention and Anxiety Levels of Anesthesia Residents. Türk Psikiyatri Dergisi 2005;16:106–12.

8. Ardıç S. Sleep Disorders and Traffic-Work Accidents. Turkish Thoracic Journal 2001;2:91–8.

9. Fidan T, Fidan V, Akmansu M, Sütbeyaz Y. Neuropsychiatric symptoms, quality of sleep and quality of life in patients diagnosed with nasal septal deviation. Kulak Burun Bogaz Ihtis Derg 2011;21:312–7.

10. Ramsawh HJ, Stein MB, Belik SL, Jacobi F, et al. Relationship of anxiety disorders, sleep quality, and functional impairment in a community sample. J Psychiatr Res 2009;43:926–33.

11. Hidalgo MP, Caumo W. Sleep disturbances associated with minor psychiatric disorders in medical students. Neurol Sci 2002;23:35–9.

12. Andruškienė J, Varoneckas G, Martinkėnas A, Grabauskas V. Factors associated with poor sleep and health-related quality of life. Medicina (Kaunas) 2008;44:240–6.

13. Gregory A, Buysse D, Willis T, Rijsdijk FV, et al. Associations between sleep quality and anxiety and depression symptoms in a sample of young adult twins and siblings. J Psychosom Res 2011;71:250–5.

14. Costa e Silva JA. Sleep Disorder in Psychiatry. Metabolism 2006;55:40–4.

15. Chang J, Salas J, Habicht K, Pien G, et al. The Association of Sleep Duration and Depressive Symptoms in Rural Communities of Missouri, Tennessee, and Arkansas. J Rural Health 2012;28:268–76.

16. Harvey A, Stinson K, Whitaker K, Moskovitz D, et al. The Subjective Meaning of Sleep Quality: A Comparison of Individuals with and without Insomnia. Sleep 2008;31:383–93.

17. Jansson-Frojmark M, Lindblom K. A bidirectional relationship between anxiety and depression, and insomnia? A prospective study in the general population. J Psychosom Res 2008;64:443–9.

18. Paradimitriou GN, Linkowski P. Sleep disturbance in anxiety disorders. Int Rev Psychiatry 2005;17:229–36.

19. Ohayon MM, Roth T. Place of chronic insomnia in the course of depressive and anxiety disorders. J Psychiatric Res 2003;37:9–15.

20. Kung PY, Chou KR, Lin KC, Hsu HW, et al. Sleep Disturbances in Patients With Major Depressive Disorder: Incongruence Between Sleep Log and Actigraphy. Arch Psychiatr Nurs 2014;29:39–42.

21. Doğan O, Ertekin S, Doğan S. Sleep quality in hospitalized patients. J Clin Nurs 2005;14:107–13.

22. Oflaz F. Therapeutic milieu in a psychiatric ward and the responsibilities of nurses. Anadolu Psikiyatri Dergisi 2006;7:55-61.

23. Redeker N, McEnany GF. Sleep Disordes and Sleep Promotion in Nursing Practice. New York: Spinger Publishing Company; 2011.

24. Laguna-Parras J, Jerez-Rojas M, Garcı´a-Ferna´ndez F, Carrasco-Rodrı´guez D, et al. Effectiveness of the 'sleep enhancement' nursing intervention in hospitalized mental health patients. J Adv Nurs 2012;69:1279–88.

25. Eller T, Aluoja A, Vasar V, Veldi M. Symptoms of anxiety and depression in Estonian medical students with sleep problems. Depress Anxiety 2006;23:250–6.

26. Ağargün MY, Kara H, Anlar Ö. Pittsburg The Validity and Reliability of the Pittsburgh Sleep Quality Index. Türk Psikiyatri Dergisi 1996;7:107–15.

27. Taşkın Ç, Akat Ö. Araştırma yöntemlerinde yapısal eşitlik modelleme. Bursa: Ekin yayınevi; 2010.

28. Meydan C, Şeşen H. Yapısal eşitlik modellemesi: Amos uygulamaları. Ankara: Detay yayıncılık; 2015.

29. Kamphuis J, Karsten J, Weerd A, Lancel M. Sleep disturbances

in a clinical forensic psychiatric population. Sleep Medicine 2013;14:1164–9.

30. de Niet GJ, Tiemens BG, Lendemeijer HH, Hutschemaekers GJ. Perceived sleep quality of psychiatric patients. J Psychiatr Ment Health Nurs 2008;15:465–70.

31. Özkan B, Arguvanlı-Çoban S, Saraç B, Medik K. Sleep quality and factors affecting it in patients with chronic psychiatric disorders. Erciyes Med J 2015;37:6–10.

32. Waters F, Faulkner D, Naik N, Rock D. Effects of polypharmacy on sleep in psychiatric inpatients. Schizophr Res 2012;139:225–8.

33. Prieto-Rincón D, Echeto-Inciarte S, Faneite-Hernández P, Inciarte-Mundo J, et al Quality of sleep in hospitalized psychiatric patients. Invest Clin 2006;47:5–16.

34. Kaufmann CN, Spira AP, Rae DS, West JC, et al. Sleep problems, psychiatric hospitalization, and emergency department use among psychiatric patients with medicaid. Psychiatr Serv 2011;62:1101–5.

35. Kamphuis J, Dijk DJ, Spreen M, Lancel M. The relation between poor sleep, impulsivity and aggression in forensic psychiatric patients. Physiol Behav 2014;123:168–73.

36. Vitiello M, Larsen L, Moe K. Age-related sleep change. Gender and estrogen effects on the subjective-objective sleep quality relationships of healthy, noncomplaining older men and women. J Psychosom Res 2004;56:503–10.

37. Veldi M, Aluoja A, Vasar V. Sleep quality and more common sleep-related problems in medical students. Sleep Med 2005;6:269–75.

38. Jaussent I, Dauvilliers Y, Ancelin M, Dartigues J, et al. Insomnia Symptoms in Older Adults: Associated Factors and Gender Differences. Am J Gerıatr Psychiatry 2011;19:88–97.

39. Roberts RE, Roberts CR, Xing Y. Restricted Sleep Among Adolescents: Prevalence, Incidence, Persistence, and Associated Factors. Behav Sleep Med 2010;9:18–30.

40. Ohayon M. Nocturnal awakenings and comorbid disorders in the American general population. J Psychiatr Res 2009;43:48–54.

41. Brandenberger G, Viola AU, Ehrhart J, Charloux A, et al. Age-related changes in cardiac autonomic control during sleep. J Sleep Res 2003;12:173–80.

42. Özkırış M. Kayseri'deki 14-17 yaş öğrencileri arasında allerjik rinit prevalansı. Asthma Allergy Immunol 2010;8:163–9.

43. Anderson KN, Armstrong D, Watkinson HM, Mackin P. Sleep disordered breathing in community psychiatric patients. Eur J Psychiatry 2012;26:86–95.

44. Brand S, Hermann B, Muheim F, Beck J, et al. Sleep patterns, work, and strain among young students in hospitality and tourism. Ind Health 2008;46:199–209.

45. Köroğlu E. Amerika Psikiyatir Birliği, Ruhsal Bozuklukların Tanısal ve Sayımsal Elkitabı. 5th ed. Ankara: Hekimler Yayın Birliği; 2013.

46. Horn WT, Akerman SC, Sateia MJ. Sleep in Schizophrenia and Substance Use Disorders: A Review of the Literature. Journal of Dual Diagnosis 2013;9:228–38.

47. Harvey AG, Kaplan AK, Soehner AM. Invertions for Sleep Disturbance in Bipolar Disorder. Sleep Med Clin 2015;10:101–5.

48. Walz JC, Magalhães PV, Reckziegel R, Costanzi LG, et al. Daytime sleepiness, sleep disturbance and functioning impairment in bipolar disorder. Acta Neuropsychiatr 2013:101–4.

49. Johnson E, Roth T, Breslau N. The association of insomnia with anxiety disorders and depression: exploration of the direction of risk. J Psychiatr Res 2006;40:700–8.

50. Hoffmann R, Hendrickse W, Rush AJ, Armitage R. Slow-wave activity during non-REM sleep in men with schizophrenia and major depressive disorders. Psychiatry Res 2000;95:215–25.

51. Semiz Ü, Algül A, Başoğlu C, Ateş MA, et al. The Relationship between Subjective Sleep Quality and Aggression in Male Subjects with Antisocial Personality Disorder. Türk Psikiyatri Dergisi 2008;19:373–81.