A Survey of Sleep Quality in Patients With 13 Types of Mental Disorders

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ABSTRACT

Objective: To investigate the sleep characteristics of a community sample of patients with 13 types of mental disorders.

Method: Subjects aged 18 years and older were sampled from the Epidemiologic Sites Survey of Mental Illness at a mental health center in Hebei Province, Baoding, China, from October 2004 to March 2005. The study group included 1,874 subjects who met the diagnostic criteria of 13 types of mental disorders according to the Structured Clinical Interview for DSM-IV-TR Axis I Disorders-Patient Edition (major depressive disorder, panic disorder, generalized anxiety disorder, posttraumatic stress disorder, dysthymic disorder, bipolar affective disorder, somatoform disorder, obsessive-compulsive disorder, specific phobia, schizophrenia, adjustment disorder, social phobia, and alcohol abuse and dependence.) The control group included 15,117 subjects without mental disorders. The Pittsburgh Sleep Quality Index (PSQI) was used to assess sleep quality, and the Global Assessment of Functioning (GAF) was used to assess social life function.

Results: The prevalence of sleep disorders was 11.6% in the survey respondents. The prevalence of sleep disturbances in the group with 13 types of mental disorders ranged from 19.30% to 69.92%. There was a significant difference in the prevalence of sleep disorders between the study group (48.61%) and the control group (5.55%; P < .01). The prevalence of sleep disturbance in subjects with major depressive disorder and generalized anxiety disorder was 69.92% and 58.27%, respectively. Longer sleep latency and shorter sleep duration were the most common features of low quality sleep in patients with mental disorders. There was a significant difference in sleep latency and duration in subjects with major depressive disorder (P < .01), dysthymic disorder (P < .01), and generalized anxiety disorder (P < .01) compared to control subjects. Sleep medication was used most by subjects with schizophrenia and least by those with social phobia. Daytime dysfunction was most notable in subjects with major depressive disorder. Subjects with mental disorders with sleep disorders tended to be older than those with mental disorders without sleep disorders. The prevalence of sleep disorders was higher in patients with mental disorders who were female, older, less educated, retired or farmers, and widowed. There was no relation between the severity of depression and sleep disorders.

Conclusions: The prevalence of sleep disorders in subjects with mental disorders was high. Longer sleep latency and shorter sleep duration were the most common characteristics of low quality sleep in the patients with mental disorders and were most notable in those with depression.

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Submitted: February 23, 2011; accepted February 29, 2012. Published online: December 13, 2012. Corresponding author: Li Ke-qing, PhD, Health Center of Hebei Province, Baoding 071000, China (like1002@sina.com). A sleep disorder (somnipathy) is a disruption of a person's sleep patterns. International epidemiology studies showed that the rate of sleep quality disorder was 15% to 35% in adults.^{1,2} Some sleep disorders are serious enough to interfere with normal physical, mental, and emotional functioning. However, the effects of mental disorders on the sleeping period and rhythm have been less reported. In this study, we investigated the sleep characteristics of a community sample of patients with 13 common types of mental disorders in Hebei Province, Baoding, China.

METHOD

Subjects

All of the participants were sampled from the Epidemiologic Sites Survey of Mental Illness conducted from October 2004 to March 2005 at the Mental Health Center of Hebei Province. The sample included 24,000 individuals, 20,716 of whom completed the survey. In addition to the 13 types of mental disorders, this survey also measured physical illness associated with mental disorders, unspecified anxiety disorder, unspecified depressive disorder, mental retardation, senile dementia, and other diseases that were not included in the study group.

The study group included 1,874 subjects aged 18–86 (mean \pm SD = 47 \pm 13) years with 13 common types of mental disorders according to the Structured Clinical Interview for *DSM-IV-TR* Axis I Disorders–Patient Edition. Of those, 899 were male and 975 were female, with an education level of 0–17 (mean \pm SD = 6 \pm 4) years. Marital status included single (n = 122), married (n = 1,506), remarried (n = 45), separated or divorced (n = 44), and widowed (n = 157). Subjects reported living alone (n = 1,726). Professional status included farmer/fisher (n = 1,367), worker/servicer (n = 79), professional technician/administrative staff (n = 57), self-employed/contractor (n = 150), retiree (n = 51), unemployed (n = 55), student (n = 5), housewife (n = 109), and other (n = 1).

The 13 types of mental disorders included major depressive disorder (n = 399), panic disorder (n = 55), generalized anxiety disorder (n = 127), posttraumatic stress disorder (PTSD; n = 66), dysthymic disorder (n = 411), bipolar affective disorder (n = 36), somatoform disorder (n = 106), obsessive-compulsive disorder (n = 29), specific phobia (n = 139), schizophrenia (n = 106), adjustment disorder (n = 26), social phobia (n = 32), and alcohol abuse and dependence (n = 342).

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- There is a high prevalence of sleep disorders in patients with mental disorders.
- Longer sleep latency and shorter sleep duration were the most common characteristics of low quality sleep in patients with mental disorders and were most notable in those with depression.

The control group comprised 15,117 subjects with no mental disorders according to the survey and included 7,514 females and 7,603 males, with a mean \pm SD age of 43 \pm 15 years.

This study was censored and permitted by the Hospital Ethics Committee of the Mental Health Center of Hebei Province. The respondents or their guardian signed the informed consents.

The Evaluation of Sleep Quality

The revised Chinese edition of the Pittsburgh Sleep Quality Index (PSQI)⁴ was used to evaluate the sleep quality of the respondents in the last month. The PSQI is composed of 19 self-rated questions and 5 questions rated by others. Only the self-rated items are included in the test scores (18 questions, as the 19th self-rated item is not scored) and are divided into 7 categories inquiring about subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, use of sleep medications, and daytime dysfunction. Each item score ranges from 0 (no difficulty) to 3 (severe difficulty). The component scores are summed to produce a global score that ranges from 0–21, and a higher global score indicates worse sleep quality. A PSQI global score is the standard used to evaluate sleep quality. A PSQI global score >7 is considered to be suggestive of significant sleep disturbance, and a PSQI global score ≤ 7 is considered to be qualified sleep. The scale was administered by psychiatrists and nurses who asked respondents each survey item.

The Evaluation of Social Life Function

The evaluation of social life function was conducted by psychiatrists with the Global Assessment of Functioning (GAF),³ which scores in the range of 1–100. A higher GAF score indicates good functioning. The application of the scale achieved good homogeneity after training, with the mean κ value above 0.85.

Statistical Analysis

All data were input into SPSS 11.0 (SPSS Inc, Chicago, Illinois) for analysis. Subjects with mental disorders with sleep disturbance were compared with the control respondents. The measurement data were analyzed via applied *t* test. Due to nonnormal distribution of data, nonparametric Mann-Whitney *U* was used to analyze sleep latency and sleep duration among study and control subjects, χ^2 test was used

to compare general data, and exact probability was applied to analyze the existence of sleep disturbance among different subtypes of schizophrenia.

RESULTS

Comparison of the Incidence Rate of Sleep Disturbances

Of 20,716 survey respondents, 2,411 were found to have a sleep disorder as assessed by the PSQI (11.64%). The incidence rate of sleep disturbance was 48.61% (n=911) in the study group, which was higher than the rate in the control group (5.55%, n=839; P < .01). The comparison of sleep quality between the study group and the control group is shown in Table 1.

Table 1 indicates that the total PSQI scores of the patients with mental disorders were higher than those of the control group (P < .01 - .05), and the patients with major depressive disorder, panic disorder, and generalized anxiety disorder had the highest scores. The patients with major depressive disorder, generalized anxiety disorder, panic disorder, PTSD, dysthymic disorder, somatoform disorder, and bipolar affective disorder had higher scores on the incidence rate of sleep disturbances than the control group (P < .01). The proportion of patients taking hypnotic drugs was highest for patients with schizophrenia and lowest for those with social phobia or alcohol abuse and dependence. The daytime function of the patients with major depressive disorder was the lowest of all groups.

Comparison of Sleep Characteristics

Table 2 shows that the control group fell asleep within 10 minutes after going to bed and woke up at 6:30 AM, and the actual sleep duration was 8 hours. However, the patients with mental disorders had different sleep characteristics compared to the control group. Their time to fall asleep $(50 \pm 60 \text{ minutes})$ was longer (P < .01) than the control group. The patients with major depressive; disorder or panic disorder had a delayed time to fall asleep the patients with major depressive disorder, or dysthymic disorder had the earlier wakeup time (P < .01 - .05); and the actual sleep duration was shorter among the patients with major depressive disorder or PTSD (P < .01). Difficulty falling asleep, earlier wakeup time, and shorter sleep duration were characteristic of major depressive disorder according to our findings.

Comparison of Characteristics of Subjects With Mental Disorders and Sleep Problems

Tables 3 and 4 indicate that those patients with mental disorders who were older; who had lower education levels, lower incomes, and fewer family members; who were farmers, retired, or students/housewives; or who were widowed had more sleep problems than other subjects with mental disorders. The patients with undifferentiated type schizophrenia had fewer sleep disorders (P < .01); however, there was no relation between the severity of depression and sleep disorders.

Table 1. Comparison of Pittsburgh Sleep Quality Index Scores Between the Study Group and the Control Group (mean \pm SD)												
										Total	Incidence	
										Scores	Rate of Sleep	
		Sleep	Sleep	Sleep	Sleep	Sleep	Hypnotic	Daytime	Total	>7	Disturbance,	
Group	n	Quality	Latency	Duration	Efficiency	Disorders	Drugs	Function	Scores	Points, n	%	χ^2
Study group	1,874	1.6 ± 0.9	1.6 ± 1.2	0.9 ± 1.1	1.2 ± 1.3	0.8 ± 0.6	0.4 ± 0.9	1.3 ± 1.2	7.7 ± 5.0	911	48.61	33*
Major depressive	399	1.9 ± 0.8	2.1 ± 1.1	1.4 ± 1.2	1.6 ± 1.3	1.0 ± 0.5	0.5 ± 1.0	1.8 ± 1.2	10.3 ± 4.6	279	69.92	2,409*
disorder												
Panic disorder	55	1.8 ± 0.7	2.0 ± 1.1	1.2 ± 1.2	1.4 ± 1.4	1.0 ± 0.6	0.3 ± 0.8	1.4 ± 1.3	9.1 ± 4.8	30	54.54	243*
Generalized anxiety disorder	127	1.8 ± 0.9	1.9 ± 1.1	1.1 ± 1.1	1.4 ± 1.3	0.6 ± 0.6	0.5 ± 1.0	1.4 ± 1.1	8.9 ± 4.8	74	58.27	621*
Posttraumatic stress disorder	66	1.8 ± 0.8	1.7 ± 1.2	1.1 ± 1.1	1.4 ± 1.3	0.9 ± 0.5	0.3 ± 0.7	1.4 ± 1.0	8.5 ± 4.4	35	53.03	273*
Dysthymic disorder	411	1.7 ± 0.8	1.9 ± 1.1	1.0 ± 1.0	1.3 ± 1.3	0.9 ± 0.6	0.3 ± 0.8	1.4 ± 1.1	8.3 ± 4.4	220	53.53	1,449*
Bipolar affective disorder	36	1.6 ± 0.9	1.5 ± 1.2	0.9 ± 1.1	1.2 ± 1.3	0.8 ± 0.6	0.7 ± 1.3	1.6 ± 1.3	8.2±5.1	17	47.22	117*
Somatoform disorder	106	1.7 ± 0.8	1.8 ± 1.1	0.9 ± 1.1	1.2 ± 1.3	0.9 ± 0.6	0.4 ± 1.0	1.2 ± 1.2	8.1 ± 4.9	52	49.06	362*
Obsessive-compulsive disorder	29	1.5 ± 0.8	1.7 ± 1.0	0.8 ± 1.0	0.8 ± 1.2	1.1 ± 0.6	0.6 ± 1.2	1.2 ± 1.1	7.5 ± 4.7	11	37.90	57**
Special phobia	139	1.5 ± 0.9	1.6 ± 1.2	0.8 ± 1.0	1.1 ± 1.3	0.9 ± 0.6	0.3 ± 0.8	1.2 ± 1.2	7.4 ± 4.9	62	44.60	229*
Schizophrenia	106	1.4 ± 1.0	1.5 ± 1.2	0.6 ± 1.0	0.9 ± 1.2	0.6 ± 0.6	1.0 ± 1.4	0.9 ± 1.1	6.8 ± 5.3	46	43.40	275*
Adjustment disorder	26	1.3 ± 0.8	1.6 ± 1.0	0.7 ± 0.9	0.8 ± 1.2	0.6 ± 0.5	0.3 ± 0.8	0.9 ± 1.1	6.2 ± 4.4	10	38.46	34*
Social phobia	32	1.3 ± 0.9	1.3 ± 1.2	0.5 ± 0.8	0.8 ± 1.2	0.7 ± 0.6	0.1 ± 0.5	1.0 ± 1.1	5.7 ± 4.4	9	28.12	31*
Alcohol abuse and	342	1.0 ± 0.8	1.0 ± 1.1	0.5 ± 0.9	0.7 ± 1.2	0.4 ± 0.5	0.1 ± 0.5	0.6 ± 0.9	4.4 ± 4.0	66	19.30	115*
dependence												
Control group	15,117	0.6 ± 0.6	0.6 ± 0.8	0.3 ± 0.5	0.4 ± 0.8	0.2 ± 0.4	0.0 ± 0.3	0.3 ± 0.6	2.4 ± 2.6	839	5.55	
			-									

^aValues are presented as mean ± SD unless otherwise specified.

*P<.01; the rate of Pittsburgh Sleep Quality Index total score >7 was significantly higher in the study group than in the control group.

**P<.05 for the comparison between the study group and the control group.

Table 2. Sleep Characteristics	of the Stu	idy Group an	d the Con	trol Grou	p Wakeup Tin	20			
		Sleep Latency (min)			(Beijing Time, h)		Sleep Duration (h)		
Group	n	Mean ± SD	Median	Za	Mean (AM)±SD	t	Mean ± SD	Median	Z^{a}
Study group									
Major depressive disorder	399	68 ± 86^{b}	60	21.16	6.1 ± 1.3	4.78 ^b	6.1 ± 2.3^{b}	6	20.11
Panic disorder	55	57 ± 43^{b}	40	8.42	6.1 ± 1.5	1.48	6.6 ± 2.6^{b}	6	5.17
Generalized anxiety disorder	127	52 ± 42^{b}	30	11.36	6.2 ± 1.1	2.08 ^c	6.7 ± 2.1^{b}	7	9.78
Posttraumatic stress disorder	66	52 ± 54^{b}	30	6.70	6.1 ± 1.4	1.74	6.1 ± 1.4^{b}	7	6.43
Dysthymic disorder	411	51 ± 41^{b}	30	18.65	6.2 ± 1.2	3.07 ^b	6.9 ± 2.1^{b}	7	15.32
Bipolar affective disorder	36	45 ± 41^{b}	30	4.02	6.0 ± 1.3	1.61	6.9 ± 2.1^{b}	8	3.93
Somatoform disorder	106	52 ± 51^{b}	30	9.82	6.3 ± 1.2	0.60	7.0 ± 2.1^{b}	7	8.65
Obsessive-compulsive disorder	29	45 ± 36^{b}	30	5.60	6.3 ± 1.2	0.39	7.2 ± 2.0^{b}	8	3.10
Special phobia	139	48 ± 46^{b}	30	9.03	6.2 ± 1.3	1.92	7.1 ± 2.1^{b}	8	7.27
Schizophrenia	106	46 ± 100^{b}	30	6.17	6.5 ± 1.5	0.42	$7.7 \pm 2.1^{\circ}$	8	8.65
Adjustment disorder	26	39 ± 44^{b}	25	2.41	5.9 ± 1.8	1.89	7.5 ± 2.0^{b}	8	3.10
Social phobia	32	36 ± 3^{b}	28	3.26	6.2 ± 0.9	0.77	$7.7 \pm 1.7^{\circ}$	8	2.64
Alcohol abuse and dependence	342	30 ± 36^{b}	20	6.60	6.5 ± 1.3	0.93	7.8 ± 1.8^{b}	8	5.44
Control group	15,117	20 ± 26	10		6.4 ± 1.4		8.4 ± 2.4	8	

^aData were analyzed using the Mann-Whitney U.

 ${}^{b}P < .01$ for the comparison between the study group and the control group. ${}^{c}P < .05$ for the comparison between the study group and the control group.

DISCUSSION

In this study, the incidence rate of sleep disorders was 11.6% in a community group, which resembles the rate of 10.8% reported by Yawen et al.⁴ The rate of sleep disturbance in the control group was 5.55%, and the rate of 13 types of mental disorders was 19.30%-69.2%, with a mean incidence rate of 48.6%, which is similar to the results of Roth et al⁵ (47.8%–53.7%) and Chuanyuan et al (41.86%).⁶

Mental disorders play an important role in sleep problems within the community, and major depressive disorder (69.92%) and generalized anxiety disorder (58.27%) were common among these mental disorders in our study but

were lower than the result (80%) reported by Armitage.⁷ The sleep problems of the patients with the 13 common types of mental disorders had similar characteristics, such as difficulty falling asleep and shorter duration of sleep; moreover, patients with major depressive disorder (P < .01), dysthymic disorder (P < .01), and generalized anxiety disorder (P < .05) experienced early awakening. This study showed that sleep quality problems were higher in patients with mental disorders who were female, older, less educated, retired or farmers or students/housewives, and widowed, similar to the results of Rocha et al.8

This study indicates that there were disturbances in sleep quality in the patients with anxiety disorder, which involved

Table 3. Comparison of the Characteristics of Patients	
With Mental Disorders With and Without Sleep Problem	15

	With Sleep	Without Sleep	
Characteristic	Problem, n (%)	Problem, n (%)	χ^2
Sex			54.81ª
Female	554 (60.81)	421 (43.72)	
Male	357 (39.19)	542 (56.28)	
Marital status			19.58 ^a
Single	43 (4.72)	79 (8.20)	
Married	730 (80.13)	776 (80.58)	
Remarried	19 (2.09)	26 (2.70)	
Separated/divorced	23 (2.52)	21 (2.18)	
Widowed	96 (10.54)	61 (6.33)	
Living arrangement	. ,	. ,	5.00 ^b
Alone	77 (8.45)	57 (5.92)	
Dormitory	8 (0.88)	6 (0.62)	
With family	826 (90.67)	900 (93.46)	
Current profession	. ,	. ,	51.58 ^a
Farmer/fisherman	694 (76.18)	673 (69.89)	
Worker/servicer	24 (2.63)	55 (5.71)	
Professional technician/	17 (1.87)	40 (4.15)	
administrative staff			
Self employed/contractor	49 (5.38)	101 (10.49)	
Retired	34 (3.73)	17 (1.77)	
Unemployed	23 (2.52)	32 (3.32)	
Student/housewife	69 (7.57)	45 (4.67)	
Other	1 (0.11)	0 (0)	
Depression			3.75
Mild	15 (5.38)	11 (9.17)	
Moderate	106 (37.99)	52 (43.33)	
Severe	158 (56.63)	57 (47.5)	
Subtype of schizophrenia			8.92 ^a
Paranoid	31 (67.39)	32 (53.33)	
Disorganized	6 (13.04)	9 (15.0)	
Undifferentiated	0 (0)	10 (16.67)	
Residual	9 (19.57)	9 (15.0)	
aP < 01	. /		
$^{b}P < .05.$			
r <.03.			

longer sleep latency and shorter actual sleep duration. Moreover, the patients with social phobia, whose sleep disturbance rate was 28.12%, had lower daytime function than healthy controls. Buckner et al⁹ reported that social anxiety was positively correlated with syndromes of insomnia, especially with sleep dissatisfaction, sleep-related functional impairment, perception of a sleep problem to others, and distress about sleep problems. So, our findings support the hypothesis that social anxiety is related to sleep quality. The rate of patients with PTSD with sleep disturbance was 53.03%, and all of the factors of the PSQI showed that the patients with PTSD had distinct sleep quality disturbance. However, sleep problems are a common symptom of patients with PTSD.

The present study showed that the time to fall asleep was 60 minutes on average in patients with major depressive disorder; furthermore, the patients with major depressive disorder were waking up earlier and had weaker daily function than the control population. However, sleep quality was not significantly correlated with severity of depression, which indicates that sleep problems might emerge in early periods of depression. So, our findings suggest that the sleep problems had a marked relationship with depression and anxiety disorders. Problems of sleep quality might increase the risk of depression and anxiety, and symptoms

Table 4. Comparison of the Characteristics of Patients With Mental Disorders With and Without Sleep Problems

	With Sleep Problem,	Without Sleep Problem,					
Group	$mean \pm SD$	$mean \pm SD$	t				
Age, y	49.43 ± 13.08	43.95 ± 13.01	9.07 ^a				
Education, y	4.78 ± 3.84	6.22 ± 3.61	8.34 ^a				
Total income, US\$	$750 \pm 1,098$	$1,129 \pm 5,946$	1.89				
No. of family members	3.07 ± 1.32	3.25 ± 1.24	2.97 ^a				
Global Assessment of Functioning score	55.37 ± 10.11	62.05 ± 13.22	12.24 ^a				
^a <i>P</i> < .01.							

of a sleeping problem might be one of the symptoms of depression, which resembles the findings of studies both domestic and abroad.¹¹⁻¹⁴

The incidence rate of sleep problems was 43.40% in patients with schizophrenia. Shorter sleeping time and a higher score on the neuroleptic drugs factor of the PSQI indicate that neuroleptics might keep these patients' sleeping time normal; however, the time to fall asleep was longer than that of the control population. In addition, sleeping problems seldom happen in the undifferentiated subtype; however, there were differences among the other subtypes of schizophrenia, with paranoid ranking first (67.39%), residual ranking second (19.57%), and disorganized ranking third (13.04%).

A limitation to this study is that sleep duration and sleep latency on the PSQI were subjectively assessed by patients. The scores were affected by the patient's emotional impact, so there were some deviations between the patient's actual situation and score. But, because of the large sample size and a variety of common mental disorders quantitatively assessed by the SCID and PSQI and good consistency among the raters, the results were reliable.

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