

The relationship between sleep quality and psychological distress and job burnout among Chinese psychiatric nurses

Bin WANG¹, Qinghua LU^{2*}, Feifei SUN² and Rui ZHANG³

¹Psychological Department of Shandong Provincial Hospital, China

²Nursing Department of Shandong Mental Health Center, China

³School of Nursing, Shandong First Medical University & Shandong Academy of Medical Sciences, China

Received December 2, 2020 and accepted May 19, 2021

Published online in J-STAGE September 27, 2021

DOI <https://doi.org/10.2486/indhealth.2020-0249>

Abstract: This cross-sectional study aimed to investigate the sleep quality of psychiatric nurses in China and explore the risk factors affecting it. This study used the stratified random sampling method. The general data questionnaire was conducted using the 10-item Kessler Psychological Distress Scale (K10), the Maslach Burnout Inventory (MBI), and the Pittsburgh Sleep Quality Index (PSQI) were used to investigate the prevalence and risk factors of sleep quality among 812 psychiatric nurses in China. There were statistically significant differences in sleep quality among different shift frequency. Surveys demonstrated that sleep quality among psychiatric nurses was positively correlated with psychological distress and job burnout. Multiple logistics regression analysis showed that high psychological distress (odds ratio, OR=0.907, $p<0.001$, 95% confidence interval, CI=0.885–0.931), high emotional exhaustion (OR=0.946, $p<0.001$, 95% CI=0.921–0.972), low depersonalization (OR=1.061, $p=0.004$, 95% CI=1.019–1.104), and low personal accomplishment (OR=0.972, $p=0.018$, 95% CI=0.949–0.995) were the contributing factors of sleep quality. Future studies should investigate effective measures to relieve psychological distress and alleviate burnout, particularly for psychiatric nurses with poor sleep quality.

Key words: Psychiatric nurse, Sleep quality, Psychological distress, Burnout, China

Introduction

Sleep is one of the most important physiological needs of human beings. Poor sleep quality refers to the physical and psychological states that trigger a series of detrimental effects because of the abnormal amount of sleep or low sleep

quality¹). Sleep disorders may lead to reduced immunity, reduced adaptive ability, anxiety, depression, and other physical and mental disorders²). Previous studies have demonstrated a significant discrepancy between actual and expected sleep duration, with insomnia being common among nurses, particularly psychiatric nurses in China³). Negative emotions, such as anger and irritability, among nurses may be caused by poor sleep quality⁴). At the same time, negative emotions could result in reduced quality of work⁵). Recently, numerous studies have demonstrated that poor sleep quality among nurses can lead to health prob-

*To whom correspondence should be addressed.

E-mail address: 1172869296@qq.com

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lems with a high risk of adverse events⁶), which may influence the continuity of care delivered to patients and threaten patients' safety⁷. With the worldwide increase in life expectancy and incidence of chronic diseases, such as mental illness, the demand for nurses has also grown steadily, while the number of available nurses is unable to meet the growing demand⁸. Studies have shown that nurses' health was negatively affected by insufficient sleep, resulting in problems such as diabetes, hypertension, and heart disease⁹. With the increase in work pressure, sleep disorders have become a prominent public health concern. Therefore, the impact of sleep quality merits further investigation.

Studies have identified a number of factors associated with sleep, including antenatal psychological distress, stress, and lifestyle behaviors¹⁰. A survey of undergraduate students revealed that anxiety and psychological distress were significant independent predictors of poor sleep quality¹¹. A study of German adolescents suggested that poor sleep quality was associated with psychological distress¹². Studies have reported that dissatisfaction with sleep patterns was associated with emotional exhaustion and a high level of depersonalization among nursing workers. Studies showed that severe burnout was closely related to psychological stress¹³. Burnout affects mental and physical health, it may cause depression, anxiety, and alcohol dependence¹⁴. Studies have shown that psychological distress can affect sleep quality, such causing as insomnia and short periods of sleep (fewer than 6 hours), which were reported by individuals with high levels of Burnout Syndrome¹⁵. However, other studies found that average daily sleep was not affected by burnout¹⁶. In addition, job stress is strongly associated with depression¹⁷. Individual sleep quality can be disturbed and sleep disorders may be caused or aggravated by psychological disturbances, such as anxiety and depression¹⁸. Psychiatric nurses are a special professional group who served for the people with mental disorders. They often face situations involving patient abuse, attacks, escape, suicide, self-harm, and other emergencies¹⁹. Psychiatric nurses have heavy work burdens, high risk, and psychological pressure²⁰. Some studies showed that the incidence of sleep problems among psychiatric nurses was 21.6%, which affected their mental health²¹), aggravating their sleep problems. To date, there has been no extensive research on the relationship between psychological distress, burnout, and sleep quality from the perspective of psychiatric nurses.

This study aimed to examine the correlation between sleep and psychological distress and burnout among psy-

chiatric nurses in order to provide a theoretical basis for nursing management, improve sleep quality, and ensure patient safety.

Materials and Methods

Participants

According to the statistics of Shandong Province of China, there were approximately 8,000 registered psychiatric nurses in Shandong Province as of 2019. According to the finite population sampling formula, set $K=1.96$, $p=0.5$, $\alpha=0.05$, the number of samples investigated should be over 367. This study selected 904 nurses. The convenience sampling method was applied in this study. There are six natural regions in Shandong Province: northwest Shandong, southwest Shandong, south Shandong, north Shandong, middle Shandong and Shandong peninsula. A total of 904 clinical nurses were randomly selected from a tertiary psychiatric hospital in each region. Inclusion criteria included nurse managers and clinical psychiatric nurses with the National Qualified Certificate of Practice Nursing who had worked for more than one year and were voluntarily investigated. Exclusion criteria included nursing interns, nurses who engaged in advanced studies, and nurses who had been on sick leave for more than three months. After obtaining the consent of the ethics committee of the investigated unit, the researchers consulted the director of the nursing department and the full-time investigator of the investigated unit, who distributed paper questionnaires to the participants. The methods and important points were explained to the participants. The participants filled out the questionnaires anonymously and returned the results within one week. A total of 904 questionnaires were distributed, 812 of which were valid, and the effective rate was 89.82%.

Ethical considerations

The questionnaires strictly followed the principle of informed consent, and the study was approved by the Ethics Committee of Shandong Mental Health Center. The investigators introduced the purpose and the basic information. During the whole study process, the privacy and anonymity of participants were fully protected. The respondents gave their written informed consent to participate in this study.

Measurement of psychological distress

The 10-items Kessler Psychological Distress Scale (K10) includes 10 items established by Kessler and Mroczek²²) and is widely used to assess individual's psychological distress. The 10 items were rated on a 5-point

Likert from 1 (hardly) to 5 (very much). Higher scores indicated higher levels of psychological distress. A total score of greater than 16 indicated psychological distress²³. The reliability and internal validity have been verified²⁴, the Cronbach's α in the present study was 0.930.

The Maslach Burnout Inventory was mainly used to evaluate job burnout. The 22 items of the scale included three aspects: emotional exhaustion, depersonalization, and low personal accomplishment²⁵. The Chinese version comprised 22 items, involves emotional exhaustion (nine items), depersonalization (five items), and personal accomplishment (eight items)²⁶. All items were scored on a scale of 0 to 6. Emotional exhaustion consisted of nine items, measuring feelings of being emotionally overextended and exhausted by one's work. The scoring range was 0–54 points. Depersonalization included five items, which were mainly used to evaluate an unfeeling and impersonal response toward recipients of one's service, care treatment, or instruction by work pressure. The score ranged from 0 to 30 points. Items in the above two aspects were scored positively, that is, the higher the score, the more serious the job burnout. Personal accomplishment included eight items. Main evaluation caused by view of competence and successful achievement in one's work, with the score range of 0–48 points. An entry in this category was scored in reverse, meaning the lower the score, the greater the job burnout. The Cronbach's α was 0.872, 0.801 and 0.819 for the subscales in this study.

The Pittsburgh Sleep Quality Index (PSQI) was a measure of subjective Sleep Quality in the last month. Including the subjective sleep quality, sleep latency, sleep continuity, habitual sleep efficiency, sleep disorders and hypnotic drugs, daytime function seven factors, each factor was rated on a 4-point Likert from 0 (no difficulties) to 3 (very difficult). The cumulative score of each factor was the total score of the Pittsburgh Sleep Quality Index Scale, with the total score ranging from 0 to 21. The higher the score, the worse the sleep quality. Scores greater than 5 indicated poor sleep quality. Sufferers were defined as those who scored more than 5 points, while those who scored less than or equal to 5 points were defined as non-sufferers. The Chinese version of the PSQI was considered a reliable and valid measure of sleep quality^{27, 28}. The Cronbach's α was 0.839.

Statistical analysis

Data input and statistical analysis were carried out using SPSS 21.0 statistical software and $p < 0.05$ was considered statistically significant. The continuous variables were ex-

pressed as mean and standard deviation. The categorical variables were expressed by frequency and percentage and the univariate analysis was performed by t-test or single-factor chi-square test to assess the sample characteristics and relationships among variables. Pearson correlation was used to analyze the relationship between sleep quality, psychological distress, and burnout. Multivariate logistic regression analysis was conducted, with sleep quality as the dependent variable, while the item work shift with statistical significance in univariate analysis, Psychological Distress (K10), and the Maslach Burnout Inventory (MBI) were independent variables.

Results

Descriptive and correlational analysis

The 812 psychiatric nurses were between 18 and 58 years old, with an average age of 32.69 ± 8.07 years. Years of Psychiatric nursing were between one and 40. Median working years were 6 ($p_{25} = 3$ years, $p_{75} = 15$ years). Overall, 208 respondents were men (25.6%) and 604 were women (74.4%). Regarding education, 341 (42.0%) had college degree or below, and 471 (58.0%) with bachelor's degree or above. In addition, 630 were married (77.6%), 182 were not married (22.4%). Regarding professional titles, 283 were nurses (34.9%), 294 were junior nurses (36.2%), 193 were senior nurses (23.8%), 42 were associate superintendent nurses (5.2%). The average number of night shift days per week was 2.20 ± 1.19 .

Characteristics of the participants and the comparisons of the scores on PSQI are presented in Table 1. The average PSQI score was 9.10 ± 2.78 , which included 431 participants (53.08%) with a PSQI > 5. Poor sleep quality was statistically correlated with work shift ($p < 0.05$). There was a significant difference in poor sleep quality among different work shifts, while there were no significant differences based on age, sex, marital status, educational level, professional title, income, and years of psychiatric nursing.

The mean psychological distress score was 17.88 (SD=6.57, range 10–47) and the PSQI scores < 5 were 46.92%. The emotional exhaustion score was 20.77 (SD=8.71, range 1–47). The depersonalization score was 9.17 (SD=5.63, range 0–28). The low personal accomplishment score was 18.90 (SD=7.35, range 0–46). Compared with the non-sufferer group (PSQI scores < 5), the mean psychological distress score of the sufferer group was 24.31 (SD=8.15, range 10–50, $t = -12.427$, $p = 0.000$). Participants who suffered from poor sleep quality exhibited significantly higher mean scores for psychological distress ($t = -12.427$,

Table 1. Characteristics of the participants and the comparisons of the scores on PSQI

Variables		N	PSQI > 5	Prevalence (%)	χ^2	<i>p</i>
Age	<30 years	379	198	52.24	0.307	0.858
	30–39 years	254	135	53.15		
	≥40 years	179	98	54.75		
Sex	Male	208	105	50.48	0.758	0.384
	Female	604	326	53.97		
Marital status	married	630	327	51.90	1.556	0.212
	single	182	104	57.14		
Educational level	Junior school or under	341	182	53.37	0.020	0.887
	Bachelor's degree or above	471	249	52.87		
Professional title	nurse	283	147	51.94	3.771	0.287
	junior nurse	294	158	53.74		
	senior nurse	193	109	56.48		
	Associate superintendent nurse	42	17	40.48		
Income	≤3,000 yuan	243	127	52.26	0.567	0.753
	3,000–5,000 yuan	384	209	54.43		
	>5000 yuan	185	95	51.35		
Work shift	day shift only	130	54	41.54	8.277	0.004
	three-shift rotation	682	377	55.28		
Years of working	1–4 years	297	147	49.49	2.444	0.295
	5–9 years	203	111	54.68		
	≥10years	312	173	55.45		

Note: 'three-shift rotation' is a fixed rotating shift schedule, which consists of an 8-hour day shift, an 8-hour swing shift and an 8-hour night shift.

$p < 0.001$), emotional exhaustion ($t = -8.929$, $p < 0.001$), depersonalization ($t = -4.644$, $p < 0.001$), and low personal accomplishment ($t = -3.660$, $p < 0.001$) (Table 2).

The psychological distress of psychiatric nurses was positively correlated with subjective sleep quality ($r = 0.456$, $p < 0.01$), sleep latency ($r = 0.371$, $p < 0.01$), sleep continuity ($r = 0.318$, $p < 0.01$), habitual sleep efficiency ($r = 0.158$, $p < 0.01$), sleep disorders ($r = 0.420$, $p < 0.01$), hypnotic drugs ($r = 0.212$, $p < 0.01$), and daytime function ($r = 0.447$, $p < 0.01$).

Emotional exhaustion was positively correlated with subjective sleep quality ($r = 0.366$, $p < 0.01$), sleep latency ($r = 0.309$, $p < 0.01$), sleep continuity ($r = 0.235$, $p < 0.01$), habitual sleep efficiency ($r = 0.129$, $p < 0.01$), sleep disorders ($r = 0.242$, $p < 0.01$), hypnotic drugs ($r = 0.169$, $p < 0.01$), and daytime function ($r = 0.392$, $p < 0.01$). Depersonalization was positively correlated with subjective sleep quality ($r = 0.170$, $p < 0.01$), sleep latency ($r = 0.170$, $p < 0.01$), sleep continuity ($r = 0.077$, $p < 0.05$), sleep disorders ($r = 0.113$,

$p < 0.01$), hypnotic drugs ($r = 0.134$, $p < 0.01$), and daytime function ($r = 0.222$, $p < 0.01$). Low personal accomplishment was positively correlated with subjective sleep quality ($r = 0.116$, $p < 0.01$), sleep latency ($r = 0.111$, $p < 0.01$), sleep disorders ($r = 0.136$, $p < 0.01$), and daytime function ($r = 0.124$, $p < 0.01$) (Table 3).

To quantify the influence of sleep quality on psychiatric nurses, multiple logistic regression model was used to analyze the factors influencing poor sleep quality (Table 4). The risk factors for poor sleep quality among psychiatric nurses were high psychological distress (OR=0.907, $p < 0.001$, 95% CI=0.885–0.931), high emotional exhaustion (OR=0.946, $p < 0.001$, 95% CI=0.921–0.972), low depersonalization (OR=1.061, $p = 0.004$, 95% CI=1.019–1.104), and high levels of low personal accomplishment (OR=0.972, $p = 0.018$, 95% CI=0.949–0.995).

Discussion

Current situation of sleep quality among psychiatric nurses

In this study, the average PSQI score was (9.10 ± 2.78), which included 431 participants (53.08%) with a PSQI > 5. The average PSQI score was higher than the normal population and nurses in other specialized hospitals. For instance, a survey of 636 nurses from seven hospitals of different levels in Spain showed 6.80 ± 3.39 ²⁹. A study in Japan found that 109 nurses in general hospitals had a sleep score of 6.0 ± 2.1 ³⁰. This may be associated with a strong hidden risk of mental diseases. Patients often have violent attacks and other emergencies under the influence of mental symptoms, such as hallucinations and delusions. Therefore, the sleep quality of nurses is affected to some extent. It may also be related to the differences in the region and environment of the nurses under investigation. In addition, univariate analysis of socio-demographic factors showed that poor sleep quality had no significant difference based on age, gender, marital status, educational level, professional

title, income, and working years. However, it was significantly associated with work shift. Shift-work nurses were more likely to experience sleep disturbance than day nurses. This study showed that 55.28% of shift-work nurses had sleep disturbances compared to 41.54% among day nurses. This may be related to fewer nurses working at night. Most psychiatric hospitals in this study assigned 2 nurses to work at night. The ratio of nurses to patients was significantly lower at night than in the daytime. In case of a violent attack, escape, suicide, or other emergencies, there may not have been enough nurses to deal with the situation. Therefore, nurses working at night were highly stressed. As such, shift-work nurses were more likely to be in a state of stress than daytime nurses. At the same time, shift-work forcefully disrupts the normal sleep-wake cycle. As such, sleep is more likely to be disrupted in the daytime, potentially leading to shorter sleep periods³¹. This was in line with previous studies indicating that specific characteristics of shift-work nurses can lead to poor sleep quality^{32, 33}. A previous study of sleep quality among shift nurses found that it was difficult for nurses to stay awake for 36.0% of shift time, which doubled their risk of errors³⁴. Therefore, shift-work psychiatric nurses require special attention.

Correlation between sleep quality and psychological distress among psychiatric nurses

This study demonstrated a statistically significant difference between the scores of psychological distress and sufferers and non-sufferers of poor sleep. Psychological distress was positively correlated with scores of sleep dimensions. That is, higher psychological distress was correlated with worse sleep, such as insomnia and early waking¹⁰. Psychological distress referred to an emotional state characterized by depression and anxiety. Studies have shown that psychological distress has a negative impact on sleep quality³⁵. There is a two-way interaction between sleep quality, anxiety, and depression, and insomnia is an

Table 2. Relationship between psychological distress, job burnout and poor sleep quality among psychiatric nurses

Factor	Sufferers	Non-sufferers	<i>t</i>	<i>p</i>
	PSQI > 5	PSQI ≤ 5		
	Mean ± SD	Mean ± SD		
Psychological distress (K10)	24.31 ± 8.15	17.88 ± 6.57	-12.427	0.000
Emotional exhaustion	26.37 ± 9.10	20.77 ± 8.71	-8.929	0.000
Depersonalization	10.97 ± 5.36	9.17 ± 5.63	-4.644	0.000
Low personal accomplishment	20.67 ± 6.21	18.90 ± 7.35	-3.660	0.000

Table 3. Relationship between various dimensions of sleep quality and psychological distress and job burnout among psychiatric nurses

	Subjective sleep quality	Sleep latency	Sleep continuity	Habitual sleep efficiency	Sleep disorders	Hypnotic drugs	Daytime function	Psychological distress	Emotional exhaustion	Depersonalization	Low personal accomplishment
Subjective sleep quality	1										
Sleep latency	0.575**	1									
Sleep continuity	0.426**	0.359**	1								
Habitual sleep efficiency	0.221**	0.202**	0.541**	1							
Sleep disorders	0.502**	0.434**	0.277**	0.126**	1						
Hypnotic drugs	0.265**	0.187**	0.175**	0.128**	0.240**	1					
Daytime function	0.490**	0.374**	0.231**	0.061	0.449**	0.290**	1				
Psychological distress	0.456**	0.371**	0.318**	0.158**	0.420**	0.212**	0.447**	1			
Emotional exhaustion	0.366**	0.309**	0.235**	0.129**	0.242**	0.169**	0.392**	0.570**	1		
Depersonalization	0.170**	0.170**	0.077*	0.057	0.113**	0.134**	0.222**	0.412**	0.699**	1	
Low personal accomplishment	0.116**	0.111**	0.048	0.037	0.136**	0.018	0.124**	0.155**	0.012	0.072*	1

Note: ** $p < 0.01$, * $p < 0.05$

Table 4. Logistic regression analysis of multiple factors influencing sleep quality in psychiatric nurses

	B	SE	Wald	<i>p</i>	OR	95% CI for OR	
						Lower	Upper
Emotional exhaustion	-0.055	0.014	16.245	0.000	0.946	0.921	0.972
Depersonalization	0.059	0.021	8.123	0.004	1.061	1.019	1.104
Low personal accomplishment	-0.028	0.012	5.634	0.018	0.972	0.949	0.995
Psychological distress	-0.097	0.013	56.546	0.000	0.907	0.885	0.931
Work shift	-0.079	0.049	2.549	0.110	0.924	0.839	1.018

important predictor of depression recurrence and uncured depression³⁶). This may be related to anxiety, depression, and other psychological factors, which may extend fast wave sleep, cause sleep disorders, and activate the body's stress system. Remaining in this state for an extended period may lead to anxiety, depression, and other psychological problems. In addition, these emotional problems may alternatively increase the incidence of sleep disorder. This is in line with previous research¹⁰).

This study showed a positive correlation between job burnout and sleep disorders. The logistic regression analysis showed that psychological distress, low personal accomplishment, emotional exhaustion, and depersonalization were associated with the development of poor sleep quality, which is consistent with previous studies^{37, 38}). This may be associated with higher risks in psychiatric care, as nurses often face patients with violent attacks, suicide, self-injury, and other emergencies²⁰). However, nurses have fewer requirements for difficult nursing operation skills. To some extent, this may hinder the work enthusiasm of psychiatric nurses, resulting in feelings of low personal accomplishment and negative emotions, such as anxiety and depression. This further leads to the disharmony of the nurse-patient relationship and a decline of work efficiency and quality, which may in turn affect the attitude of psychiatric nurses toward work, causing apathy and insensitivity to emotional exhaustion. In addition, burnout may be a risk factor for poor sleep. Exposure to long-term job stress and insufficient rest can affect individuals' health³⁹). A lack of adequate rest leads to depletion of the energy reserves of individuals exposed to chronic job stress. According to previous research, long term exposure to job stress and decreased ability to recover from burnout may lead to cognitive deficits and dysregulation of the HPA axis⁴⁰), which in turn affect sleep. On the other hand, effective sleep can refresh brain function, regulate physiological function, and regulate and reorganize mood, behavior, cognition, and memory. Sleep disorders are more likely to cause individuals to suffer from depression, anxiety, inattention, and other symptoms of burnout, interacting in a vicious circle.

This study had some limitations. First, this study used a convenience sample method to recruit psychological nurses from six tertiary hospitals in Shandong Province. Consequently, the generalization may be limited. Future studies should include more provinces in China. Second, this study used only self-reported subjective measures and all data were collected by self-report questionnaires, which may affect the results. Third, as this was a cross-sectional survey, no causal relationships could be established.

Conclusions and implications

This study demonstrated a high incidence of sleep disorders among psychiatric nurses. Psychological distress and job burnout were correlated with sleep disorders and were the risk factors of sleep disorders. Therefore, psychiatric nursing managers should focus on the improvement of nurses' occupational burnout. In order to improve the overall level of mental health among psychiatric nurses, group intervention strategies, such as mindfulness and interpersonal relationship therapy, should be adopted to cultivate positive mood and behavior patterns, reduce anxiety, depression, and other psychological problems, alleviate mental fatigue, and improve sleep quality.

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