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ABOUT COVER

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Observational Study

Relationship between nightmare distress and depressive symptoms in Chinese emergency department nurses: A cross-sectional study

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Abstract

BACKGROUND

Most of the recent research on nightmare distress and depressive symptoms has focused on adolescents and students, with less research on the nurse population. Emergency department nurses are at high risk for nightmare distress and depressive symptoms, but no studies have been conducted to explore the relationship between the two; thus, further investigation is needed.

AIM

To understand the relationship between nightmare distress and depressive symptoms among emergency department nurses in China.

METHODS

A convenience sampling method was used to select 280 emergency department nurses from nine provinces, including Jiangxi, Sichuan, Jiangsu, and Shanxi Provinces. The Chinese version of the Nightmare Distress Questionnaire and the Center for Epidemiological Studies Depression Scale (CES-D) were administered.

RESULTS

Emergency department nurses' nightmare distress scores were positively associated with depressive symptom scores ($r = 0.732$), depressed affect ($r = 0.727$), somatic symptoms ($r = 0.737$), and interpersonal difficulty ($r = 0.647$). Further multiple linear regression analyses showed that education level, work pressure, self-reported health, and CES-D scores were factors that influenced nightmare distress among Chinese emergency department nurses ($P < 0.05$).

CONCLUSION

Nightmare distress is closely associated with depressive symptoms in Chinese emergency department nurses, and early intervention is recommended for professionals with this type of sleep disorder to reduce the occurrence of depressive symptoms.

Key Words: Nightmare distress; Emergency department nurses; Depressive symptoms; Workplace violence; Observational study; China

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Core Tip: Understanding the relationship between nightmare distress and depressive symptoms in emergency department nurses and adopting effective interventions could reduce their incidence in this population. Currently, most studies on nightmare distress and depressive symptoms have focused on adolescents or students, and fewer have examined emergency department nurses. This study is the first to examine the relationship between nightmare distress and depressive symptoms among emergency department nurses, providing a theoretical basis for developing effective interventions.

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INTRODUCTION

The International Classification of Diseases, 10th Revision[1] defines a nightmare as an extremely disturbing and memorable dream, that is, recurring dreams that involve danger to the health, survival, and dignity of the individual while he or she sleeps. Nightmares are a fearful and distressing experience; when individuals wake after a nightmare, the content of the dream is clearly recalled, and they have difficulty falling asleep[2]. Studies have shown that nightmares not only affect an individual's sleep quality, including insomnia and difficulty falling asleep[3], but are also a major risk factor for suicide, depression, and posttraumatic stress disorder[3-5]. A large sample survey showed that people with nightmare distress are more likely to have depressive symptoms than healthy groups[6]. Most of the recent studies on nightmare distress and depressive symptoms have focused on adolescents and students[2,3,6], but fewer studies have been conducted on the nurse population. Nurses are a high-risk group for nightmare distress[7], especially emergency department nurses, possibly because they often witness patient deaths and severe trauma[8]. Furthermore, due to the special nature of the work environment, these professionals are often subjected to threats, verbal violence, and even physical violence from patients and families[9,10]. Therefore, the aim of this study was to explore the relationship between nightmare distress and depressive symptoms among Chinese emergency department nurses through a cross-sectional survey and to inform interventions to improve the working environment of emergency department nurses globally and reduce the occurrence of nightmare distress and depressive symptoms in this population.

MATERIALS AND METHODS

Participants and research design

This study had a multicenter cross-sectional design. In March to April 2023, a convenience sampling method was used to select emergency nurses from tertiary hospitals in nine Chinese provinces (Jiangxi, Sichuan, Jiangsu, Shanxi, Guangdong, Hebei, Zhejiang, Hainan, and Shaanxi). The inclusion criteria were as follows: (1) Employment as an emergency department nurse; and (2) Voluntary participation in this study. The exclusion criteria for nurses were as follows: (1) On leave during the survey period; (2) Trainees; or (3) Receiving further training from the hospital. The rejection criteria were as follows: (1) Completed the questionnaire incompletely; or (2) Had answers to the questionnaire that were obviously repeated. The study was approved by the Ethics Committee of the First Affiliated Hospital of Nanchang University (ethics number: IIT2023196).

Sample

This study collected sociodemographic data and work-related data, and a total of 19 independent variables were included. According to the calculation formula[11], the necessary sample size was 5-10 times that of the number of independent variables; considering the possibility of 20% invalid samples, a minimum of 114 participants were needed. A total of 300 questionnaires were distributed in this study; of these, 280 were finally included in the analysis after excluding invalid responses. The questionnaire return efficiency was 93.33%.

Measures

General information: Custom-designed questionnaires were based on published studies in the field[12,13] and expert opinions. The questionnaires covered mainly sociodemographic characteristics (such as sex, age, and marital status) and work-related factors (title, years of work, number of night shifts per month, work pressure, and frequency of violence in the workplace).

Nightmare distress: Nightmare distress was measured using the Chinese version of the Nightmare Distress Questionnaire (NDQ-CV)[14], which is an adaptation of the Nightmare Distress Questionnaire (NDQ)[15]. The NDQ-CV includes a total of 14 items in two dimensions: General nightmare distress and daytime reality perception. Each item is rated on a 5-point scale from 1 (never) to 5 (always), and the total score of the scale ranges from 14 to 70, with higher scores associated with higher levels of nightmare distress. The Cronbach's α coefficient for the total scale in this study was 0.942, and the Kaiser-Meyer-Olkin value was 0.951 ($P < 0.05$), indicating good reliability.

Depressive symptoms: Depressive symptoms were measured using the Center for Epidemiological Studies Depression Scale (CES-D). The CES-D was developed by Radloff[16] and translated into Chinese by Zhang *et al*[17]. The scale includes four dimensions: Depressed affect, positive affect, somatic symptoms, and interpersonal difficulty. It has 20 items, four of which are reverse scored. Each item is rated on a scale from 0 to 3, for a total score ranging from 0 to 60. The higher the score, the more severe the depressive symptoms. A score ≥ 20 indicates significant depressive symptoms. In this study, the Cronbach's α coefficient of the total scale was 0.866, and the KMO value was 0.956 ($P < 0.05$), indicating good reliability.

Quality control

In this study, 20 emergency department nurses were randomly selected for a pilot survey in a tertiary hospital in Jiangxi Province, and the self-report questionnaire section was modified according to the problems that emerged from the pilot survey. Before the questionnaires in the formal experiment were completed, the purpose and importance of this study and the precautions for completing the questionnaires were explained by professionals, and the questionnaires were distributed after obtaining the informed consent of the study subjects. After the questionnaires were collected, the researcher reviewed the content of the completed questionnaires, and two researchers entered the data using Excel software to ensure the accuracy of the data.

Data analysis

The data were analyzed using SPSS 25.0 statistical software. Continuous data that conformed to a normal distribution are expressed as the mean $\pm$ SD, and categorical data are expressed as frequencies and percentages. Independent sample *t* tests were used to detect differences between two groups, and one-way ANOVA was used to compare multiple groups. Pearson correlation analysis was used to explore the relationship between nightmare distress and depressive symptoms; linear regression analysis was used to explore the factors influencing the emergence of nightmare distress among nurses in the emergency department. A threshold of $\alpha = 0.05$ (two-sided) was used to indicate significant differences.

RESULTS

Descriptive statistics and correlations

A total of 280 emergency department nurses (54 men and 226 women) were included in the study. Among these nurses, most were 26-35 years old (44.3%), had a bachelor's degree (76.1%), had more than 10 years of experience (39.6%), and were married (63.2%). Additionally, most of the nurses were the nurse-in-charge (37.9%), had a monthly income of 5000 to 10000 yuan (62.5%), worked 6 to 10 shifts per month (46.4%), had high pressure (44.6%), and frequently suffered from workplace violence (46.1%). Among those included, 47.5% rated their health as average, 62.5% did not regularly exercise, and the majority were from the emergency departments of Jiangxi Province (31.1%). Further details are shown in Table 1. Using nightmare distress scores as the dependent variable and sociodemographic characteristics as independent variables, comparisons were conducted. The influence of dichotomous variables (*e.g.*, sex) was tested using independent sample *t* tests, and that of variables with multiple categories (*e.g.*, education level) were examined by one-way ANOVA to compare nightmare distress scores among emergency department nurses with different characteristics. The results of the univariate analysis showed that nightmare distress scores of emergency department nurses significantly differed according to sex, education level, working years, monthly income, work pressure, self-reported health, and province ($P < 0.05$; Table 1).

Correlation of nightmare distress with depressive symptoms

Pearson correlation analysis showed that nightmare distress total score and subscale scores were positively correlated with depressive symptom total score, depressed affect, somatic symptoms, and interpersonal difficulties and negatively correlated with positive affect ($P < 0.01$), as shown in Table 2.

Multivariate regression of nightmare distress

Multiple linear regression analysis with the NDQ-CV total score as the dependent variable and sex, education level, years of work, monthly income, work pressure, self-reported health, province, and CES-D total score as the independent variables (assignments are shown in Table 3) showed that education level, work pressure, self-reported health, and CES-

Table 1 Nightmare distress scores among emergency department nurses with different characteristics

Variable	Level	N (%)	Score (mean $\pm$ SD)	t/F	Degrees of freedom	P value
Sex	Male	54 (19.3)	42.39 $\pm$ 10.83	4.828		< 0.001
	Female	226 (80.7)	34.61 $\pm$ 10.59			
Age (yr)	$\leq$ 25	55 (19.6)	37.55 $\pm$ 12.52	0.430	3/276	0.732
	26-35	124 (44.3)	35.63 $\pm$ 11.56			
	36-45	88 (31.4)	35.78 $\pm$ 9.70			
	> 45	13 (4.6)	36.85 $\pm$ 8.36			
Educational level	Associate degree	52 (18.6)	34.12 $\pm$ 10.81	8.441	2/277	< 0.001
	Bachelor's degree	213 (76.1)	35.84 $\pm$ 10.87			
	Graduate degree or above	15 (5.4)	46.87 $\pm$ 8.90			
Marital status	Unmarried	92 (32.9)	37.13 $\pm$ 12.27	1.048	2/277	0.352
	Married	177 (63.2)	35.42 $\pm$ 10.48			
	Divorced or widowed	11 (3.9)	38.73 $\pm$ 8.87			
Years of work	< 1	10 (3.6)	33.70 $\pm$ 11.94	3.507	3/276	0.016
	1-5	98 (35.0)	38.92 $\pm$ 12.13			
	6-10	61 (21.8)	35.41 $\pm$ 11.38			
	> 10	111 (39.6)	34.23 $\pm$ 9.30			
Title	Junior nurse	44 (15.7)	33.14 $\pm$ 12.31	1.761	3/276	0.155
	Intermediate nurse	101 (36.1)	35.96 $\pm$ 11.64			
	Nurse-in-charge	106 (37.9)	36.76 $\pm$ 10.04			
	Senior nurse	29 (10.4)	38.76 $\pm$ 10.00			
Monthly income (yuan)	< 5000	55 (19.6)	34.36 $\pm$ 11.21	10.647	2/277	< 0.001
	5000-10000	175 (62.5)	34.86 $\pm$ 10.76			
	> 10000	50 (17.9)	42.42 $\pm$ 9.81			
Number of night shifts per month	0-5	69 (24.6)	36.62 $\pm$ 9.48	2.069	2/277	0.128
	6-10	130 (46.4)	37.13 $\pm$ 11.55			
	> 10	81 (28.9)	34.04 $\pm$ 11.33			
Work pressure	None	16 (5.7)	31.94 $\pm$ 8.91	4.388	3/276	0.005
	Mild	16 (5.7)	32.19 $\pm$ 10.36			
	Moderate	123 (43.9)	34.65 $\pm$ 10.31			
	Severe	125 (44.6)	38.58 $\pm$ 11.63			
Violence in the workplace	Never	6 (2.1)	34.33 $\pm$ 11.99	0.213	3/276	0.887
	Rarely	31 (11.1)	35.06 $\pm$ 11.97			
	Sometimes	129 (46.1)	36.03 $\pm$ 11.55			
	Always	114 (40.7)	36.58 $\pm$ 10.27			
Self-reported health	Poor	110 (39.3)	38.75 $\pm$ 11.62	5.517	2/277	0.004
	Average	133 (47.5)	34.65 $\pm$ 10.25			
	Good	37 (13.2)	33.49 $\pm$ 10.82			
Regular exercise	Yes	105 (37.5)	36.90 $\pm$ 9.91	0.920		0.359
	No	175 (62.5)	35.64 $\pm$ 11.69			
Province	Jiangxi	87 (31.1)	34.30 $\pm$ 10.97	8.835	8/271	< 0.001
	Sichuan	51 (18.2)	31.04 $\pm$ 9.48			

Jiangsu	41 (14.6)	33.05 ± 9.24
Shanxi	24 (8.6)	33.42 ± 7.10
Guangdong	12 (4.3)	43.00 ± 9.10
Shaanxi	15 (5.4)	45.93 ± 10.22
Hainan	19 (6.8)	43.11 ± 10.79
Zhejiang	15 (5.4)	45.07 ± 7.49
Hebei	16 (5.7)	42.94 ± 12.54

Table 2 Correlation between nightmare distress and depression symptoms among emergency department nurses

Item	NDQ-CV total score	General nightmare distress	Daytime reality perception	CES-D total score	Depressed affect	Somatic symptoms	Interpersonal difficulties	Positive affect
NDQ-CV total score	1							
General nightmare distress	0.983 ^a	1						
Daytime reality perception	0.920 ^a	0.831 ^a	1					
CES-D total score	0.732 ^a	0.722 ^a	0.667 ^a	1				
Depressed affect	0.727 ^a	0.713 ^a	0.673 ^a	0.929 ^a	1			
Somatic symptoms	0.737 ^a	0.713 ^a	0.701 ^a	0.933 ^a	0.864 ^a	1		
Interpersonal difficulties	0.647 ^a	0.628 ^a	0.612 ^a	0.828 ^a	0.792 ^a	0.770 ^a	1	
Positive affect	-0.406 ^a	-0.365 ^a	-0.447 ^a	-0.292 ^a	-0.546 ^a	-0.452 ^a	-0.460 ^a	1

^a*P* < 0.001.

NDQ-CV: Chinese version of the Nightmare Distress Questionnaire; CES-D: Center for Epidemiological Studies Depression Scale.

Table 3 Independent variables in multivariate regression analysis

Independent variable	Code
Gender	Male = 1, female = 2
Education level	Associate degree = 1, bachelor's degree = 2, graduate degree or above = 3
Years of work	< 1 year = 1, 1-5 years = 2, 6-10 years = 3, > 10 years = 4
Monthly income	< 5000 = 1, 5000-10000 = 2, > 10000 = 3
Work pressure	None = 1, mild = 2, moderate = 3, severe = 4
Self-reported health	Poor = 1, average = 2, good = 3
Province	Jiangxi = 1, Sichuan = 2, Jiangsu = 3, Shanxi = 4, Guangdong = 5, Shaanxi = 6, Hainan = 7, Zhejiang = 8, Hebei = 9

D scores were the factors influencing nightmare distress among emergency department nurses (*P* < 0.05; Table 4).

DISCUSSION

The results of this study showed a positive correlation between nightmare distress scores and depressive symptom scores, indicating that higher levels of nightmare distress among emergency department nurses are associated with more severe depressive symptoms, which is consistent with the results of previous studies[2,3,18]. Studies have shown that the amygdala, medial prefrontal cortex, hippocampus, and anterior cingulate cortex differ between patients with nightmare

Table 4 Multiple linear regression analysis results regarding nightmare distress in emergency department nurses

Item	<i>b</i>	SE	β	<i>t</i>	<i>P</i> value
Education level	2.051	0.982	0.088	2.088	0.038
Working pressure	1.154	0.543	0.085	2.124	0.035
Self-reported health	-1.338	0.649	-0.082	-2.064	0.040
CES-D total score	0.782	0.053	0.641	14.741	< 0.001

$R^2 = 0.570$, adjusted $R^2 = 0.557$; CES-D: Center for Epidemiological Studies Depression Scale.

distress and healthy individuals[18,19]. Among these areas, the amygdala is the main area involved in negative emotions such as fear and depression and is the central part responsible for emotions; the anterior cingulate cortex plays a major role in regulating emotions and selective attention; and the hippocampus is the main area supporting memory. The anterior cingulate cortex, prefrontal cortex, and amygdala exhibit high activity in patients with nightmare distress, while the hippocampus is biased toward remembering negative emotions, increasing the risk of depressive symptoms[19]. Chen and Li[20] showed that the hypothalamic-pituitary-adrenocortical axis exhibits abnormal activation in patients with nightmare distress, with altered levels of cortisol and melatonin. Changes in the circadian rhythm of melatonin secretion are closely associated with a variety of alterations in individuals; disruption of melatonin homeostasis (lower melatonin levels) is a pathological basis for the induced symptoms of depression in patients. Mahar *et al*[21] showed that chronic stress leads to attenuation of cell proliferation and neurogenesis, phosphorylation of extracellular signal-regulated kinase, substantial attenuation of 5-hydroxytryptamine (5-HT) levels and 5-HT auto-receptor sensitivity, and reduction of hippocampal inhibition of the hypothalamus-pituitary-adrenal axis, which induces depressive symptoms in nightmare-plagued patients. In addition, sleep disorders caused by nightmare disturbances lead to an abnormal increase in inflammatory factors and impairment of autophagy. Li *et al*[22] showed that the levels of inflammatory factors such as NLRP1, tumor necrosis factor- α , and interleukin-1 β in the hippocampus of sleep-disturbed mice were markedly increased, and the levels of the autophagy proteins Atg5 and Atg7 were significantly reduced, thus inducing neuroinflammation and consequently depressive symptoms. Levin and Nielsen[23] showed that patients with nightmare distress are more likely to have neurotic, stress-related symptoms and that patients with high levels of nightmare distress have stronger memories of their nightmares because they recollect the dream content during waking hours as a coping mechanism, thus increasing their risk of developing depressive symptoms[18].

In the present study, multiple regression analysis showed that education level, work pressure, self-reported health, and depressive symptoms are independent factors that influence nightmare distress among emergency department nurses. The higher the education level and work pressure, the higher the nightmare distress score of emergency department nurses, possibly because a higher education level is associated with higher self-esteem and higher levels of perceived stress, which in turn increase the risk of nightmare distress[2,24]. Emergency department nurses with poorer self-reported health have lower immunity, and sleep quality decreases when they are overworked, resulting in shorter bouts of deep sleep and increased time in light sleep stages, which are more susceptible to external stimuli, leading to insomnia and nightmare distress[25]. Studies have shown that patients with depressive symptoms have altered sleep structure and significantly impaired sleep quality[25]; impaired sleep is an important factor contributing to nightmare distress. In addition, patients with depressive symptoms exhibit long-term states of sadness and uneasiness, which affects the normal regulatory function of the cerebral cortex, thus increasing the risk of nightmare distress[3]. Therefore, it is recommended that hospital administrators should optimize the management of the emergency department, conduct regular psychological symposiums to alleviate the workplace pressure of emergency department nurses, and provide emergency department nurses with spiritual and material support to bolster their sense of professional identity. Emergency department nurses themselves should increase their exercise levels and improve physical health; those with more severe nightmare distress and depressive symptoms should seek psychotherapy treatment, such as cognitive-behavioral therapy [26], imagery rescripting, and imaginal exposure[27], to improve their mental health and psychological resilience, alleviate nightmare distress and depressive symptoms, and improve their quality of life.

Strengths and limitations

This study has several strengths. First, the sample consisted of emergency department nurses from multiple provinces, and the findings have strong generalizability. Second, this is the first study to explore the relationship between nightmare distress and depressive symptoms among Chinese emergency department nurses; our findings can inform intervention guidelines for reducing nightmare distress and depressive symptoms among emergency department nurses and even other nurses worldwide. Finally, this study adopted an anonymous survey method, which was conducive to obtaining real information about the participants and improved the reliability of its results.

Likewise, this study has some limitations. First, this was a cross-sectional study that only explored the correlation between nightmare distress and depressive symptoms among emergency department nurses; future longitudinal studies are needed to elucidate the causal relationship between the two variables. Second, the assessment instruments used were all self-report questionnaires. Self-report data are highly subjective and may contain information bias, and future studies are needed to verify the relationship between nightmare distress and depressive symptoms among emergency department nurses in conjunction with more specialized diagnostic methods. Finally, emergency department nurses were

selected from only one hospital in some provinces included this study, which may lead to selection bias, and larger sample sizes should be used in future research.

CONCLUSION

This study analyzed the relationship between nightmare distress and depressive symptoms among Chinese emergency department nurses and concluded that nightmare distress and depressive symptoms were positively correlated among these professionals. The results of the current analysis showed that emergency department nurses' nightmare distress was influenced by a variety of factors. In the future, researchers should conduct randomized controlled studies of the relationship between nightmare distress and depressive symptoms among emergency department nurses and explore related interventions to reduce the severity of nightmare distress and depressive symptoms among emergency department nurses.

ARTICLE HIGHLIGHTS

Research background

Emergency department nurses are at high risk for nightmare distress and depressive symptoms. Understanding the relationship between nightmare distress and depressive symptoms and adopting appropriate interventions can alleviate nightmare distress and depressive symptoms among emergency department nurses. Therefore, this study was conducted to explore the correlation between nightmare distress and depressive symptoms among emergency department nurses through a cross-sectional survey.

Research motivation

Mental health issues are increasingly pronounced among emergency department nurses. This study aimed to elucidate the relationship between nightmare distress and depressive symptoms among emergency department nurses and to suggest effective interventions to improve their mental health.

Research objectives

This study investigated emergency department nurses in several provinces in China to explore the relationship between nightmare distress and depressive symptoms in this population.

Research methods

In this study, 280 emergency department nurses in nine provinces were selected using a convenience sampling method. They completed the Chinese version of the Nightmare Distress Questionnaire and the Center for Epidemiological Studies Depression Scale. SPSS 25.0 statistical software was used to analyze the collected data.

Research results

The results of this study showed that more severe nightmare distress among emergency department nurses was associated with more pronounced depressive symptoms and that the severity of nightmare distress in this population was influenced by factors such as education level, work stress, and self-reported health.

Research conclusions

The severity of nightmare distress in emergency department nurses is positively correlated with depressive symptoms. Nightmare distress can cause serious psychological problems, and early interventions for this population can alleviate depressive symptoms. This study provides a theoretical basis for developing effective interventions.

Research perspectives

This study investigated emergency department nurses in only China; future studies could include those in multiple countries to achieve a comprehensive understanding of the relationship between nightmare distress and depressive symptoms among emergency department nurses and to promote mental health in this profession.

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FOOTNOTES

Author contributions: Gan QW conceived, researched, analyzed, and wrote this manuscript; Yu R was responsible for conceptualization, research design, and data protection; Lian ZR provided methodological guidance and data analysis; Zheng LL revised the manuscript and oversaw quality control; Yuan YL and Li YP conducted the investigations and data collection.

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