

# The Moderating Effect of Organizational Identification on Occupational Stress and Insomnia Among Nurses

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**Abstract:** *Objective:* To explore the relationship between organizational identification, occupational stress, and insomnia among nurses and to analyze the moderating role of organizational identification between occupational stress and insomnia. *Methods:* Through stratified sampling, 720 nurses working in a tertiary A-level hospital in Shandong Province from March to May 2021 were surveyed using an effort-reward imbalance questionnaire, an organizational identification questionnaire, and the Athens Insomnia scale. *Results:* Organizational identification was negatively correlated with occupational stress and insomnia ( $r_1 = -0.121$ ,  $P_1 < 0.01$ ;  $r_2 = -0.144$ ,  $P_2 < 0.01$ ). Occupational stress was positively correlated with insomnia ( $r = 0.379$ ,  $P < 0.01$ ). Organizational identity significantly moderated nurses' occupational stress and insomnia ( $\beta = -0.192$ ,  $t = -2.558$ ,  $P < 0.05$ ). *Conclusion:* Occupational stress and organizational identification can predict insomnia. Organizational identification could negatively mediate the relationship between occupational stress and insomnia. Improving organizational identification may help alleviate insomnia symptoms by relieving occupational stress.

**Keywords:** Nurse; Occupational stress; Insomnia; Organizational identification; Moderating effect

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## 1. Introduction

Occupational stress, also known as work stress and professional stress, refers to the negative physiological and psychological reactions an employee experiences when they are unable to fulfill their responsibilities or when their needs are not met<sup>[1]</sup>. The prevalence of occupational stress among Chinese nurses is 12.13–40%<sup>[2,3]</sup>. Nurses experience occupational stress Due to factors such as heavy workload, shift work system, tense doctor-patient relationship, and mismatch between work and wages, leading to them developing psychological problems<sup>[4-9]</sup>. Insomnia is one of the common psychological problems. Insomnia refers to difficulty falling asleep, irregular sleep patterns, and inability to return to sleep after waking up<sup>[10]</sup>. Studies show that the insomnia rate among medical

staff is 28.75–52.8%, among which nurses have the highest insomnia rate <sup>[5,11-14]</sup>. Insomnia can negatively affect a nurse’s quality of life <sup>[15]</sup>, daily cognitive performance <sup>[16]</sup>, work efficiency, ultimately endangering the patients <sup>[17]</sup>. Previous studies have shown that there is a positive correlation between occupational stress and insomnia; that is, occupational stress can positively predict the incidence of insomnia <sup>[9,18]</sup>. With the development of positive organizational psychology, organizational identification has been receiving more attention from scholars. Organizational identification is the psychological and behavioral consistency between individuals and organizations <sup>[19]</sup>. According to the job demands-resources model, the characteristics of a job encompass job demands and job resources. Job demands refer to factors that are energy-consuming at work, such as overload, role conflict, time pressure, etc. Organizational identification is a positive factor for job resources that can effectively reduce job demands and related psychological and physiological costs. No research has been done on the relationship between organizational identification, occupational stress, and insomnia from the perspective of positive psychology. Therefore, this study explores the moderating effect of organizational identification between occupational stress and insomnia based on the job demands-resources model and provides a theoretical basis for nursing managers to take effective measures to improve insomnia among nurses.

## 2. Objectives and methods

### 2.1. Respondents

Using a stratified sampling method by department, 720 nursing staff in a tertiary A-level hospital in Shandong Province from March to May 2021 were selected as the survey subjects. Inclusion criteria: (1) Clinical registered nurses, working experience  $\geq 1$  year; (2) signed informed consent and participated in this study voluntarily. Exclusion criteria: (1) nurses under training or intern nurses, (2) nurses on sick leave or maternity leave, during the study period. This study was reviewed by the Ethics Committee of Qianfoshan Hospital of Shandong Province (Ethics No.: 2022-S007). A total of 720 questionnaires were distributed in this study, and 658 valid questionnaires were recovered, with an effective recovery rate of 91.39%.

### 2.2. Survey tools

#### 2.2.1. General information questionnaire

The researchers used self-compiled patient general information questionnaires, including gender, age, department, position, employment method, etc.

#### 2.2.2. Effort-reward imbalance questionnaire

The effort-reward imbalance questionnaire (ERI) was compiled by a German <sup>[20]</sup> and was Chineseized and revised by a Chinese researcher <sup>[21]</sup>. The questionnaire has a total of 23 items, including 3 dimensions: extrinsic effort (6 items), reward (11 items), and intrinsic investment (6 items), and is used to measure occupational stress among nurses. A 5-point Likert scale was used, with 1 to 5 representing “strongly disagree” to “strongly agree,” respectively. In this study, the effort-reward imbalance index was used to evaluate occupational stress.

$$\text{Effort - Reward imbalance index} = \frac{\text{Mean of each dimension of external effort}}{\text{Mean of each dimension of return} \times C}$$

where  $C$  represents the number of external effort items/rewards. The number of entries was  $6/11 = 0.5454$ . If the effort-return imbalance index was  $\leq 1$ , it meant there was no occupational stress; if the effort-return imbalance was  $> 1$ , it meant there was occupational stress. This scale is reliable and has been validated <sup>[22]</sup>. The Cronbach’s  $\alpha$  coefficient of this scale in this study was 0.736.

### 2.2.3. Organizational identification scale

The Organizational Identification Questionnaire (QIQ) was compiled by Mael *et al.* [23] and was Chineseized and revised by Li *et al* [24]. The scale contains a single dimension with 6 items. A 5-point Likert scale was used, with 1 to 5 representing “completely disagree” to “completely agree,” respectively. The higher the score, the higher the organizational identification. This scale has been used in nursing and has good reliability and validity [25]. The Cronbach’s  $\alpha$  coefficient of this scale in this study was 0.916.

### 2.2.4. Athens Insomnia Scale

The Athens Insomnia Scale (AIS) was compiled by Soldatos *et al.* [26] and was used to measure the subjects’ sleep status within a month. The scale has 8 items in total that are scored using a 4-level scoring system, with 0 to 3 points representing the degree of insomnia from “none” to “severe,” respectively, with a total score of 24 points. The higher the score, the more severe the degree of insomnia. A score greater than 6 points indicates insomnia. This scale has been widely used clinically and is recognized as a standard for evaluating insomnia. In this study, the Cronbach’s  $\alpha$  coefficient for this scale was 0.882.

## 2.3. Data collection methods

Before the investigation, all investigators were given standardized training and a thorough explanation of the research’s purpose, significance, content, and requirements. The head nurse of the department arranged a special place to distribute the questionnaires face-to-face and collected them uniformly. Invalid questionnaires such as missing items and duplicate questionnaires were eliminated.

## 2.4. Statistical analysis methods

SPSS 26.0 was used for statistical analysis of the data. Measurement data that were normally distributed or approximately normally distributed were expressed as mean  $\pm$  standard deviation; count data were expressed as frequency and composition ratio (%). The insomnia scores of nurses with different characteristics were compared using the t-test or analysis of variance; the correlation between organizational identification, occupational stress, and insomnia was analyzed using Pearson correlation. Multiple linear hierarchical regression was used to analyze the moderating effect of organizational identification on occupational stress and insomnia, and simple slopes were drawn to further visualize the moderating effect. The difference was considered statistically significant if  $P < 0.05$ .

## 3. Result

### 3.1. General information and comparison of insomnia scores among nurses with different characteristics

658 nurses were included in this study, of which 83.4% were women, 71.9% were aged  $\leq 30$  years old, 32.4% were in the surgical department; 96.2% were nurses, 3.8% were head nurses; and 48.2% were under long-term contracts. The insomnia scores of nurses under different categories were compared. The results showed that the differences in insomnia scores of nurses in different departments, employment methods, and positions were statistically significant ( $P < 0.05$ ). Further details are shown in **Table 1**.

**Table 1.** Comparison of insomnia scores among nurses with different characteristics ( $n = 658$ , points)

Item	Number of cases ( $n$ [%])	Insomnia score (mean $\pm$ standard deviation)	$t$ or $F$	$P$
Gender			-0.001	0.999
Male	109 (16.6)	7.700 $\pm$ 5.051		
Female	549 (83.4)	7.700 $\pm$ 4.535		
Age (years)			0.371	0.690
$\leq 30$	473 (71.9)	7.620 $\pm$ 4.419		
30–40	132 (20.1)	8.010 $\pm$ 5.379		
$> 40$	53 (8.1)	7.620 $\pm$ 4.395		
Department			3.077	0.006
Internal Medicine	109 (16.6)	7.720 $\pm$ 4.380		
Surgery	213 (32.4)	7.800 $\pm$ 4.667		
Obstetrics and Gynecology	61 (9.3)	6.230 $\pm$ 4.656		
Pediatrics	42 (6.4)	7.070 $\pm$ 5.004		
Emergency	39 (5.9)	9.080 $\pm$ 4.515		
Operating room	84 (12.8)	6.870 $\pm$ 3.751		
ICU	110 (16.7)	8.670 $\pm$ 4.959		
Position			2.322	0.021
Nurse	633 (96.2)	7.780 $\pm$ 4.628		
Head nurse	25 (3.8)	5.600 $\pm$ 3.969		
Recruitment method			2.762	0.041
Temporary contract system	237 (36.0)	7.360 $\pm$ 4.729		
Long-term contract system	317 (48.2)	8.200 $\pm$ 4.550		
Personnel agency	18 (2.7)	7.440 $\pm$ 4.817		
Public sector	86 (13.1)	6.810 $\pm$ 4.391		

### 3.2. Correlation analysis of occupational stress, organizational identification, and insomnia among nurses

The results showed that the occupational stress score was  $0.76 \pm 0.42$  points, the organizational identification score was  $25.26 \pm 4.61$  points, and the insomnia score was  $7.70 \pm 4.62$  points. The Person correlation results showed that organizational identification was significantly negatively correlated with occupational stress and insomnia ( $r_1 = -0.121$ ,  $P_1 < 0.01$ ;  $r_2 = -0.144$ ,  $P_2 < 0.01$ ); there was a significant positive correlation between occupational stress and insomnia ( $r = 0.379$ ,  $P < 0.01$ ).

### 3.3. Analysis of the moderating effect of organizational identification on occupational stress and insomnia

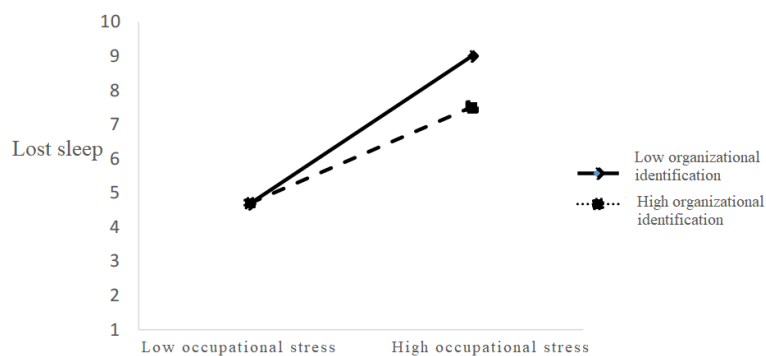
The moderating effect analysis method of Fang *et al.* was adopted in this study<sup>[27]</sup>. To avoid possible collinearity problems, the independent variable, occupational stress, and the moderating variable, organizational identification, were decentralized. Multiple linear regression was used to analyze the relationship between occupational tension and organizational identification. The moderating effect of insomnia is shown in **Table 2**.

**Table 2.** Analysis results of the moderating effect of organizational identification ( $n = 658$ )

Model	Variable	$\beta$	$t$	$P$	$F$	$R^2$	$\Delta R^2$
Model 1	Constant	0.067	0.872	0.384	109.791*	0.143	-
	Occupational stress	4.122	10.478	< 0.001			
Model 2	Constant	7.180	7.096	< 0.001	59.230*	0.153	0.010
	Occupational stress	3.990	10.118	< 0.001			
	Organizational identity	-0.100	-2.751	0.006			
Model 3	Constant	0.047	0.616	0.538	42.002*	0.162	0.008
	Occupational stress	4.209	10.472	< 0.001			
	Organizational identity	-0.080	-2.177	0.030			
Occupational tension $\times$ Organizational identification		-0.192	-2.558	0.011			

Note: \* $P < 0.05$

The moderating effect of occupational stress and organizational identification was analyzed after centralization, with occupational stress as the independent variable, insomnia as the dependent variable, and organizational identification as the moderating variable. The results showed that when the moderating variable organizational identification was not considered, the independent variable, occupational stress, significantly impacted insomnia ( $t = 10.478$ ,  $P < 0.001$ ). When the moderating variable of organizational identification was added, the independent variable, occupational stress, and the moderating variable in Model 3 were analyzed. The interaction term between occupational stress and organizational identification demonstrated a significant difference ( $t = -2.558$ ,  $P = 0.011$ ). At the same time, the  $R^2$  of the regression equation increases by 0.008 ( $P < 0.05$ ). The interaction term of occupational identification significantly and negatively affected insomnia. In order to further verify the moderating effect of organizational identification, occupational stress, and organizational identification were grouped according to the mean  $\pm 1$  standard deviation, and a moderating effect diagram (**Figure 1**) was drawn to more intuitively reflect the moderating effect of organizational identification between occupational stress and insomnia. As shown in **Figure 1**, the prediction of occupational stress on insomnia showed obvious differences at different levels of organizational identification. As the degree of occupational stress increased, the severity of insomnia symptoms of the low organizational identification group (slope = 5.094,  $t = 8.732$ ,  $P < 0.001$ ) increased at a higher rate than that of the high organizational identification group (slope = 3.324,  $t = 7.052$ ,  $P < 0.001$ ). This suggests that with increasing organizational identification, the impact of occupational stress on insomnia is smaller. Therefore, organizational identification can negatively moderate the effect of occupational stress on insomnia, which further verifies the negative moderating effect of organizational identification.



**Figure 1.** The moderating effect of low and high organizational identification on the relationship between occupational stress and insomnia

## 4. Discussion

### 4.1. Analysis of the current situation of occupational stress, organizational identification, and insomnia among nurses

The occupational stress score in this study was  $0.76 \pm 0.42$ . The number of people with occupational stress accounted for 18.5% of the total number of participants, which was more than the numbers reported by Zhang *et al.*<sup>[3]</sup> on occupational stress among medical staff in Qingpu Community Health Service Center in Shanghai (12.13%). However, it is lower than that of Chen *et al.*<sup>[28]</sup> on the occupational stress of nursing staff in tertiary-level hospitals in Nantong City 40.6% and that reported by Gao *et al.*<sup>[29]</sup> in Wuhan City.

The reported occupational stress among female nurses in tertiary general hospitals is 51.69%, which can be attributed to several reasons: (1) There may be differences in occupational stress in hospitals at different levels in different provinces and cities<sup>[30]</sup>. (2) The state and governments at all levels should provide nurses with more support in terms of economy, professional title promotion, children's education, etc., to reduce occupational stress among nurses. The organizational identification score of this study was  $25.26 \pm 4.61$ , which is at an upper-middle level (compared to the median of the scale of 18 points). This result is consistent with that of Wang *et al.*'s<sup>[31]</sup> research on standardized training of nurses in special departments, which was  $26.16 \pm 1.86$ . These results may be attributed to several reasons: (1) The hospital where the study was conducted is a prestigious hospital, thus the staff are proud of their working place<sup>[25]</sup>, and their families could be provided with better medical services. (2) Most of the nurses in this hospital have a bachelor's degree or higher qualifications, with relatively high income and status. Besides, the hospital values and adopts new ideas and opinions of their staff, which provides the nurses with a sense of self-worth. The incidence rate of insomnia among nurses in this study was 57.3%, which was lower than the survey results of Chu *et al.*<sup>[32]</sup> on insomnia among medical staff in Tianjin during the COVID-19 epidemic 63.44%. The possible reasons for a higher insomnia rate during the pandemic could be the shortage of prevention materials in the early stage, insufficient understanding of the virus, shortage of professional personnel, heavy workload, high virus risk coefficient, etc., which caused nursing staff to face high risk, work intensity, psychological pressure, leading to insomnia<sup>[33]</sup>.

### 4.2. The correlation between occupational stress, organizational identification, and insomnia

Our results showed that occupational stress was positively correlated with insomnia ( $P < 0.01$ ), which means that the higher the degree of occupational stress among nurses, the more severe the insomnia. The results are consistent with previous studies<sup>[11,34,35]</sup>. The possible reason is that long-term occupational stress can cause activation of the hypothalamic-pituitary-adrenocortical and sympathetic-adrenal medulla systems, making it difficult to fall asleep and causing insomnia<sup>[11,36-38]</sup>. Organizational identification was negatively related to occupational stress ( $P < 0.01$ ), which was consistent with the research results of Wang *et al.*<sup>[39]</sup>, that is, the higher the organizational identification, the lighter the occupational stress. According to the job demand-resource model, organizational identification is a vital work resource<sup>[40]</sup>. A heightened sense of organizational identification and increased motivation can contribute to a reduction in the physical and psychological costs associated with work demands, particularly in roles characterized by excessive workload. The lower the physical energy expended, the lesser the psychological pressure experienced, thereby aiding in alleviating insomnia. Consequently, a stronger sense of organizational identification proves beneficial in mitigating occupational stress and promoting improvements in insomnia.

### 4.3. The moderating effect of organizational identification on the relationship between occupational stress and insomnia

Our research showed that organizational identification can negatively regulate the relationship between occupational stress and insomnia, which means that the higher the level of organizational identification,



the smaller the effect of occupational stress on insomnia. Resource conservation theory [42] believes that individuals tend to seek external resources when their internal resources are depleted. Failure to obtain these external resources can lead to psychological pressure and tension. Given the daily demands of high-intensity, high-pressure, and high-risk nursing work, nurses invest significant time, energy, and resources. When these efforts are not reciprocated, creating an imbalance between effort and reward, it results in professional stress. Organizational identification, recognized as a crucial work resource, plays a significant role in assisting nurses in managing occupational stress arising from the imbalance of effort and reward, ultimately contributing to alleviating the issue of insomnia among nurses.

## 5. Conclusion

Occupational stress and insomnia are important factors affecting the physical and mental health of nurses. This study proved the moderating effect of organizational identification by analyzing the moderating effect of organizational identification on occupational stress and insomnia. This study provides new ideas that can be adopted in hospital management to reduce occupational stress and insomnia among nurses. However, since the participants of this study were all from one tertiary-level hospital in Shandong Province, there are limitations in terms of sample size and geological demographics. In the future, large-sample, multi-regional research can be carried out to further verify the moderating effect of organizational identification on occupational stress and insomnia.

## Disclosure statement

The authors declare no conflict of interest.

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