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ORIGINAL RESEARCH

Relationship among anxiety, depression, social and self-efficacy in night-shift nurses

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Abstract

Night shift disturbs normal circadian rhythm, thus leads to several psychological problems. We aim to investigate the anxiety, depression, social support and self-efficacy of night-shift nurses compared with day-shift nurses and explore the association between emotional status and social support as well as the combined influence of social support and self-efficacy on emotional status. We conducted this quantitative comparative study in a hospital from January 1, 2019 to August 31, 2020, using the Hospital Anxiety and Depression Scale (HADS), Perceived Social Support Scale (PSSS), and General Self-Efficacy Scale (GSES). The HADS-A and HADS-D scores were higher for the night-shift nurses than for the day-shift nurses (7.38 $\pm$ 3.228 vs. 5.81 $\pm$ 3.180 and 6.79 $\pm$ 3.444 vs. 5.43 $\pm$ 3.155, respectively, $P < 0.01$). The family support, friend support, other support and total social support scores were lower for the night-shift nurses than for the day-shift nurses. In both groups, these scores were lower for nurses with suspected anxiety than for those without anxiety (61.16 $\pm$ 12.208 vs. 66.35 $\pm$ 9.976, $P < 0.01$) and were lower for nurses with suspected depression than for those without depression (59.91 $\pm$ 11.606 vs. 66.77 $\pm$ 10.320, $P < 0.01$). The item scores, total scores and total mean score for the night-shift nurses were significantly lower than those for the day-shift nurses ($P < 0.01$). Social support and self-efficacy had noticeable regression effects on nurses' anxiety and depression, and both variables had significant negative effects on anxiety and depression. This study suggests that night-shift nurses may have higher anxiety and depression than day-shift nurses. Nurses with suspected anxiety and depression nurses may have lower social support than those without anxiety and depression.

Keywords

Nurses; Anxiety; Depression; Social support; Self-efficacy

1. Introduction

Night-shift nurses assume enormous pressure both mentally and physically as a result of special occupational requests. It has been shown that nightwork could induce depression [1]. Sircar *et al.* [2] investigated whether long-term nightwork could interrupt the circadian rhythm and induce anxiety and depression. Letvak *et al.* [3] investigated that night-shift nurses have higher depression prevalence and symptoms than nation norms.

In China, due to more expectation from public and more clinical and experimental tasks, nurses were all under lots of pressure. Also, violence against nurses made it more complicated. According to a survey in a province in northeast China, 7.8% of the nurses reported physically violent experiences, while 71.9% reported non-physically violent experiences [4]. Besides, due to a smaller number of night-shift nurses, they always have to care about more patients per person than day-shift nurses, which means they have to pay more attention to what happened in the inpatient area. Thus, it's important for us to care about nurses' mental health, especially those who went night-shift.

However, most studies on anxiety and depression of nurse have only discussed one influencing factor of anxiety and depression; while the systemic conditions of anxiety, depression, social support and self-efficacy are still unknown. In this study, we investigated the anxiety, depression, social support and self-efficacy conditions of night-shift and day-shift nurses, and studied the association between emotional status and social support, as well as the combined influence of social support and self-efficacy on emotional status.

2. Methods

2.1 Study population

This study was a quantitative comparative research using a cross-sectional descriptive design. Six qualitative open-ended questions were used to compliment the quantitative responses.

The study included all night shift nurses. Night shifts were defined as regular working hours between 7:00 PM and 7:00

AM including those starting at 3:00 PM. Besides, day shifts meant regular working hours from 7:00 AM to 7:00 PM. The population of relevance to this study is nurses employed in hospital settings in the affiliated hospital of Fudan University. 506 nurses were included in the final analysis. All participants were informed consent prior to the study.

2.2 Data collection

The 12-item PSSS is used to measure perceived support from family, friends, and others. Each item ranges from 1 ("definitely disagree") to 7 ("definitely agree") and thus the total score ranges from 12 to 84 by adding all item scores together. A higher score indicates more social support.

The HADS is a 14-tem self-report screening instrument to measure the symptom domains of anxiety and depression (seven items each). Nurses respond to each item on a 4-point Likert scale ranging from 0 to 3. The scores are summed to form a total score, anxiety score, and depression score.

The General Self-Efficacy Scale (GSES) is a common 10-items scale used to evaluate a person's self-efficacy. Each item has four answers, which gives a score from 1 to 4. The total score is the sum of every items' score and divided by 10. Higher score usually means higher self-efficacy. The questionnaire is a reliable tool to measure nurses' general self-efficacy, and the Cronbach's alpha coefficient was 0.871.

The Index of Well-being is structured using a 7-point Likert-type scale, where a value of 1 was equated to "strongly disagree" and a value of 7 was equated to "strongly agree", of which 4 was the midpoint.

The Back Depression Inventory (BDI) is a 13-item self-report questionnaire. Its intended use is with nurses, and administration time is short, at approximately 5 to 10 min. According to BDI assesses negative thoughts, feelings of sadness, and the physiological symptoms of depression. Participants rate each of 13 statements on a 4-point scale of never, sometimes, often, and always, indicating how applicable each statement is to them. All items are phrased in a consistent negative valence, with higher scores reflecting greater depressive symptoms; summated scores range from 0 to 60.

The BAI is a measure of prolonged state anxiety that has respondents rating the severity of each of 21 anxiety symptoms over the past week on a 4-point scale ranging from 0 (Not at all) to 3 (Severely—I could barely stand it). It has proven adequately reliable and has correlated positively with other measures of anxiety and subjective distress in both clinical populations and nonclinical populations.

2.3 Statistical analysis

All analyses were conducted using the R environment. General linear models, nurses' product moment correlation coefficients, and χ^2 tests of independence were used to analyze sample characteristics and raw scores. Where appropriate, χ^2 tests of independence were followed up with adjusted standardized residuals (ASR), which represent the degree of difference between the observed cell frequency and the expected frequency under the null hypothesis in Z-score units. Absolute ASR values N2 were considered statistically significant.

The data were tabulated to find the mean, Standard Deviation (SD), frequency, and percentages. The final scores were used to depict the responses of nurses.

3. Results

The characteristics of the participants are shown in Table 1. The mean age of the night-shift nurses was younger than that of the day-shift nurses, but the night-shift nurses had more years of education than the day-shift nurses. In addition, more night-shift nurses had a monthly salary greater than 3 thousand Renminbi (RMB), while fewer night-shift nurses lived in the city or had children (Table 1).

The HADS-A and HADS-D scores were higher for the night-shift group than for the day-shift group, but the family support, friend support, other support and total social support scores were lower for the night-shift group (Table 2).

As for the GSES scores, night-shift nurses' scores showed significant decrease in most items compared to day-shift nurses. So, we can see total scores and total mean score were all lower for the night-shift group than for the day-shift group (Table 3).

The PSSS scores were compared between nurses with and without suspected anxiety and depression. The nurses were divided into those with and without suspected anxiety and depression based on their HADS-A and HADS-D scores. The results indicated that the nurses with suspected anxiety or depression had lower family support, friend support, other support, total social support and self-efficacy scores than those without suspected anxiety or depression (Tables 4,5).

The results of the univariate analysis of the relationships of the PSSS and GSES scores with anxiety and depression are shown in Table 6. The analysis indicated that anxiety and depression had significant negative correlations with social support and self-efficacy.

To discuss the influence of social support and self-efficacy on anxiety and depression, we considered social support and self-efficacy to be the independent variables and the anxiety and depression total scores to be the dependent variables (Tables 7,8). As shown in Tables 7,8, social support and self-efficacy had significant negative effects on anxiety and depression. We obtained the following regression equations:

Anxiety = 15.280 – 0.09 × social support – 0.112 × self-efficacy;

Depression = 16.702 – 0.107 × social support – 0.148 × self-efficacy.

4. Discussion

Our study showed that anxiety and depression scores were higher among night-shift nurses; while both the night-shift nurses and day-shift nurses had some anxiety and depression. The levels of anxiety and depression were higher among the night-shift nurses. This finding is consistent with those of previous studies [5–9]. In current hospital conditions, nurses not only must provide laborious nursing services but also experience stress from patients and their families. In addition, night-shift work induces abnormalities in the biologic clock, resulting in a series of disturbances to their stability, eventually affecting the health of night-shift nurses and making them more

TABLE 1. Demographic characteristics of the participants and the differences between the two groups (n = 506).

Variable	Night-shift group	Day-shift group	T value/χ^2
	(n = 307)	(n = 199)	
Mean age (years)	25.49 ± 4.47	36.14 ± 9.87	–16.48**
Mean years of education	14.55 ± 2.03	14.41 ± 2.34	0.75
Monthly salary (¥)			34.51**
≤1000	6 (2)	5 (3)	
1001–3000	90 (29)	102 (51)	
3001–5000	102 (33)	61 (31)	
5001–10,000	103 (34)	27 (14)	
>10,000	6 (2)	4 (2)	
Place of residence			11.38**
City	260 (85)	188 (94)	
Country	47 (15)	11 (6)	
Children			155.35**
Yes	98 (32)	176 (88)	
No	209 (68)	23 (12)	

*Note: **P < 0.01.*

TABLE 2. Comparison of the scale scores between the two groups.

Variable	Night-shift group	Day-shift group	T value
	(n = 307)	(n = 199)	
HADS-A	7.38 ± 3.228	5.81 ± 3.180	5.37**
HADS-D	6.79 ± 3.444	5.43 ± 3.155	4.49**
Family support	22.02 ± 4.559	23.08 ± 4.105	–2.73**
Friend support	21.04 ± 4.265	21.85 ± 3.655	–2.21*
Other support	20.81 ± 4.260	21.53 ± 3.923	–1.92
Total social support	63.86 ± 11.383	66.46 ± 10.153	–2.61**

*Notes: *P < 0.05; **P < 0.01.*

TABLE 3. Comparison of the GSES scores.

Item	Night-shift group	Day-shift group
	(n = 307)	(n = 199)
1	2.75 ± 0.67	2.92 ± 0.66**
2	2.19 ± 0.76	2.21 ± 0.79
3	1.79 ± 0.82	1.97 ± 0.86*
4	2.23 ± 0.79	2.50 ± 0.80**
5	2.12 ± 0.78	2.37 ± 0.79**
6	2.67 ± 0.80	2.86 ± 0.79**
7	2.40 ± 0.82	2.79 ± 0.75**
8	2.25 ± 0.78	2.67 ± 0.79**
9	2.42 ± 073	2.75 ± 0.78**
10	2.08 ± 0.81	2.33 ± 0.82**
Total score	22.89 ± 5.65	25.36 ± 5.59**
Total mean score	2.29 ± 0.57	2.54 ± 0.56**

*Notes: *P < 0.05; **P < 0.01.*

likely to experience anxiety and depression [10].

However, recent researches had found controversial results in anxiety and depression. Ulas *et al.* [11] found no significant difference ($P > 0.5$) between day shift and night shift nurses by using State-Trait Anxiety Inventory index. A Norwegian cross-sectional study also discovered that anxiety and depression were not associated with night work [12]. Though we discovered different results, we had to make it clear that psychological health is affected by lots of variables, especially social circumstances, which varies enormously between China and other developed countries. Thus it could explain the differences between our discoveries and others.

In our study, the level of social support among nurses with depression and anxiety was lower than that among nurses without anxiety or depression. This finding indicated that the level of psychological health was positively correlated with social support and that social support had a protective effect on nurses' psychological health. The better the social support was, the better the nurses' psychological health. The incidence rate of anxiety and depression in nurses could be decreased, or the severity could be alleviated. Kroenke *et al.* [13] researched

TABLE 4. Comparison of the PSSS scores between nurses with and without suspected anxiety.

Social support	Night-shift group			Day-shift group		
	Suspected anxiety	No anxiety	*T* value	Suspected anxiety	No anxiety	*T* value
	(n = 147)	(n = 160)		(n = 63)	(n = 136)	
Family support	21.12 ± 4.949	22.84 ± 4.012	3.32**	21.30 ± 4.737	23.90 ± 3.500	3.90**
Friend support	20.14 ± 4.566	21.86 ± 3.799	3.60**	20.67 ± 3.565	22.40 ± 3.578	3.18**
Other support	19.89 ± 4.460	21.65 ± 3.895	3.69**	19.95 ± 4.136	22.26 ± 3.609	4.00**
Total social support	61.16 ± 12.208	66.35 ± 9.976	4.10**	61.92 ± 10.501	68.56 ± 9.300	4.49**
Self-efficacy	21.89 ± 5.596	23.81 ± 5.567	3.01**	24.03 ± 5.218	25.98 ± 5.669	2.31*

*Notes: *P < 0.05; **P < 0.01.*

TABLE 5. Comparison of the PSSS scores between nurses with and without depression.

Social support	Night-shift group			Day-shift group		
	Suspected depression	No depression	*T* value	Suspected depression	No depression	*T* value
	(n = 130)	(n = 177)		(n = 52)	(n = 147)	
Family support	20.92 ± 4.648	22.82 ± 4.333	3.67**	21.10 ± 4.721	23.43 ± 3.821	2.02*
Friend support	19.83 ± 4.436	21.93 ± 3.915	4.38**	21.17 ± 3.445	22.09 ± 3.708	1.56
Other support	19.15 ± 4.352	22.02 ± 3.764	6.17**	20.13 ± 3.985	22.02 ± 3.793	3.04**
Total social support	59.91 ± 11.606	66.77 ± 10.320	5.46**	63.40 ± 10.447	67.54 ± 9.857	2.56*
Self-efficacy	21.24 ± 5.484	24.11 ± 5.481	4.53**	23.46 ± 5.359	26.03 ± 5.534	2.91**

*Notes: *P < 0.05; **P < 0.01.*

TABLE 6. Univariate analysis of the relationship of the PSSS and GSES scores with anxiety and depression.

	Social support	Self-efficacy
Anxiety	–0.366**	–0.297**
Depression	–0.429**	–0.367**

*Note: **P < 0.01.*

the relationship between social support and survival in women with breast cancer. They found that the more isolated from society a patient was, the higher the risk of death. This finding indicated that social support was an important factor in maintaining physical and mental health. In Hill's study [14], low social support was found to be an independent predictive factor. In conclusion, good social support relieves the anxiety and depression of nurses, as they gain support from family, friends and colleagues.

In our study, we found that each item score, the total scores and the mean total self-efficacy scores were lower for the night-shift nurses than for the day-shift nurses. Agard and Maindal [15] found that night-shift nurses in intensive care units faced important and challenging problems. Compared with day-shift nurses, night-shift nurses had more work and stress and less self-confidence. This finding was similar to those of our study. Paukert *et al.* [16] studied the roles of social support and self-efficacy in the impact of physical health on depression and anxiety symptoms in older adults. They found that decreases in anxiety and depression were related to social support and self-efficacy. In Muris's [17] study, self-efficacy had an important effect on decreased anxiety and depression. Also, patient's death is common in nurses' daily clinical practice and will bring more pressure to the nurses in charge. Zheng *et al.* [18] discovered that there was a positive relationship between coping with death and death efficacy, a negative correlation between death self-efficacy and death anxiety in new graduate nurses Besides, as partners in clinical practice, Ding *et al.* [19] found that medical residents' depression was negatively correlated with self-efficacy. In our study, we tried to determine the relationship between anxiety and depression and social support and self-efficacy in nurses. This finding indicated that social support and self-efficacy had significant negative correlations with anxiety and depression among nurses, especially among night-shift nurses, which is in consistency of previous researches. As shown by a regression analysis, social support and self-efficacy had significant negative effects on anxiety and depression. The regression equations were as follows: anxiety = 15.280 – 0.09 × social support – 0.112 × self-efficacy and depression = 16.702 – 0.107 × social support – 0.148 × self-efficacy.

Self-efficacy is one's belief in one's ability to succeed in specific situations. One's self-efficacy can play a major role in how one approaches goals, tasks, and challenges [20]. The higher the nurses' self-efficacy was, the more confident they were; in addition, the more clearly they could identify their sources of stress in their surroundings and disadvantageous factors, the better they could decrease their anxiety and depression, resulting in increased positivity at work. Recent studies have shown that education has positive effects on self-efficacy [21]. Therefore, we suggest that hospitals should organize communications for nursing services. They should allow nurses to receive continuous education in planning for

TABLE 7. Logistic regression analysis of the relationship of the PSSS and GSES scores with anxiety.

Variables	Multiple correlation coefficient, R	Coefficient of determination, R^2	Constant, B	F value	Standardized regression coefficient
Social support	0.41	0.168	15.280	50.74**	–0.090
Self-efficacy					–0.112

*Note: **$P < 0.01$.*

TABLE 8. Logistic regression analysis of the relationship of the PSSS and GSES scores with depression.

Variables	Multiple correlation coefficient, R	Coefficient of determination, R^2	Constant, B	F value	Standardized regression coefficient
Social support	0.49	0.240	16.702	79.27**	–0.107
Self-efficacy					–0.148

*Note: **$P < 0.01$.*

increased self-efficacy. In addition, night-shift nurses should seek social support and communicate with their families, friends, colleagues or leaders about problems and stress at work; they should identify and eliminate sources of anxiety and depression and seek more social support [22]. There are several limitations in our study. Firstly, the sample size in our study is small. Secondly, these observations in our study were simply listed, yet we neither analyzed the probable mechanism nor made the validation. Thirdly, it was a retrospective study, and further prospective studies with a larger sample size are desirable in order to verify the above results.

AUTHOR CONTRIBUTIONS

Conception and design: HXL; HZ; Administrative support: JP; Provision of study materials: HZ; Collection and assembly of data: HZ; HHL; Data analysis and interpretation: HZ; HHL; Manuscript writing: HXL; Final approval of manuscript: HZ; JP.

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

All participants were informed consent prior to the study. The study protocol was approved by the ethics committee of the Huashan Hospital, Fudan University (KY-02045).

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CONFLICT OF INTEREST

The authors declare no conflict of interest.

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