ORIGINAL ARTICLES

Stress among nurses and associated factors during the COVID-19 pandemic in Hanoi, Vietnam, in 2022

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ABSTRACT

Objective: To describe the stress prevalence and associated factors among clinical nurses at Saint Paul General Hospital in Hanoi during the COVID-19 epidemic in 2022.

Methods: This study applied a cross-sectional study design and was a baseline of an original randomized controlled trial. Data of 400 Saint Paul General Hospital nurses were collected from March 2022 to April 2022 in Hanoi. Self-reported questionnaires included the stress component of the 21-item Depression, Anxiety and Stress Scale (DASS-21) and several demographic and work-related variables. Bivariate and multivariate logistic regression was performed to identify factors associated with nurses' stress using SPSS 20.0.

Results: The prevalence of stress in Saint Paul General Hospital nursing staff was 11.8%. The mean stress score was 7.8 (SD=6.3). Multivariate logistic analysis showed that anxiety and depression were significantly associated with the increased risk of stress among nurses (OR=6.6, 95% CI = 2.3-19.1 and OR=12.5, 95% CI = 5.3-29.5, respectively).

Conclusion: Stress was observed among nurses. Its association with anxiety and depression calling for hospital management to consider mental health interventions such as stress management for all nurses to improve their well-beings and quality of services.

Keywords: Associated factors, COVID-19, nurse, stress, Vietnam.

INTRODUCTION

The outbreak of the COVID-19 pandemic has increased the stressful nature and threatens the well-beings and working ability of healthcare workers (1). On May 24, 2021, the World Health Organization estimated that at least 115,000 healthcare workers (HCWs) had died from COVID-19 (2). Vietnam was among the first countries affected by the pandemic, with the first case confirmed on January 22, 2020 (3). Various strategies have been deployed in Vietnam to counterattack the COVID-19 (3). Before 2023, the first generation (F1) who were in close contact with a confirmed COVID-19 (F0) were tested and quarantined for at least 14 days at quarantine camps. Second-generation (F2) contacts were required to self-isolate at home and monitored by primary care professionals. As such, the burden of healthcare services increased due to the need to manage both confirmed cases and contacts while other health services were remained as usual under restricted conditions to prevent the spread of the disease.

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The COVID-19 pandemic had a detrimental impact on life and work of healthcare workers in general and nurses in Vietnam (4-6). Accounting for 70% of the workforce at medical facilities, nurses are among the most susceptible to COVID-19 infection when providing screening, care, and direct contact with COVID-19 patients.

Saint Paul General Hospital is a level I hospital in Hanoi with over 850 beds and over 1,000 healthcare workers (7). The annual number of patients who come to the hospital is more than 500,000, of which, the number of inpatients is more than 80,000 visits (8). During the COVID-19 spread in Hanoi, the hospital established a special treatment unit for COVID-19 patients, participated in screening for high-risk cases in the community, COVID-19 vaccination, mobilized medical staff to support the South of Vietnam (7) while maintained usual services. Around the end of 2021, Hanoi continuously recorded more than 1,000 COVID-19 cases per day and over 2,000 new cases per day in early 2022 (9). This condition created an enormous workload on hospital healthcare workers and nurses. The Hanoi University of Public Health and the University of Tokyo, Japan, conducted a randomized controlled trial (RCT) titled "International collaborative study on stress management for nurses after the COVID-19 pandemic in Asia" to investigate the effectiveness of the internet-based Cognitive Behavior Therapy (iCBT) stress management program among nurses in Vietnam and Thailand during and after the COVID-19 pandemic. The Saint Paul General Hospital was among the two Vietnamese hospitals in the original RCT. This paper, "**Stress among nurses and associated factors during the COVID-19 pandemic in Hanoi, 2022**", analyzed data from the baseline survey of the original RCT to identify the prevalence of stress and related factors among clinical nurses in Saint Paul General Hospital.

METHODS

Study design: This cross-sectional study.

Study site and time: The study was conducted at Saint Paul General Hospital in Hanoi from March to April 2022 as a part of the original RCT baseline survey.

Study population: This paper used baseline data from Saint Paul general hospital nurses who participated in the original study. Inclusion criteria included being full-time registered nurses and having access to the internet via a smartphone or similar devices. Exclusion criteria included 1) Sick leave or maternity leave at baseline or plan to leave/ change the job or take maternity leave in the next six months, 2) Being assistant nurses and helpers, 3) Being part-time employment, 4) Sick leave for ten or more days for any health reason in the previous four weeks, and 5) Currently receiving mental health treatment from any health professional).

Sample size and sampling: A formula to estimate the sample size for one proportion was used to calculate the necessary sample size for this paper. The estimated sample size needed was 296, with the anticipated population proportion of stress as 0.26 (10) and the absolute precision required as 0.05.

The original study invited all eligible nurses in Saint Paul General Hospital and 400 nurses participated (97.8% response rate). Therefore, this paper selected the entire sample size of the original study at Saint Paul General Hospital.

Study variables

Dependent variable: The stress level within the last two weeks was collected using the 7-item stress component of the 21-item Depression Anxiety and Stress scale (DASS-21). The sum of seven item score was multiplied by two to make the final stress score. The score ranged from less than 15, 15-18, 19-25, 26-33, and 34+, indicating normal, mild, moderate, severe, and extremely severe levels of stress, respectively. Nurses with stress score lower than 15 had no stress (11).

Independent variables: Three groups of variables were collected to examine their association with nurses' stress, namely personal, family and work-related factors. Personal characteristics included

age (less than 37 vs. 37 and above) (12, 13), sex (male vs. female) (12, 14), marital status (living with a spouse vs others)(13), children (yes/no) (15), education (college and lower vs. undergraduate and postgraduate) (13), monthly income (less than 6.3 million VND, 6.3-8.4, and over 8.4 million VND) (16), chronic illness (yes/no) (13), anxiety (yes/no) (17), depression (yes/no) (18), and number of COVID-19 vaccine doses administered (3 shots vs. less than 3 shots). Anxiety and depression were measured by the DASS-21's Anxiety and Depression subscales. Nurses with Anxiety score from 8 and over and Depression score from 10 and over were categorized as Anxiety and Depression groups (11).

Family related factors included living condition (alone vs. with someone), care for under 5 years old children (yes/no) (16), care for elders/ sick family member (yes/no) (19), family financial pressure (medium to high vs. little/ no pressure), and family relationship (normal vs. good/ very good) (16).

Work related factors included number of years working as nurse (less than 10 vs. 10 and above) (20), type of labor contract (contract with no time limit vs. with time limit), contact with COVID-19 patient (unknown vs. yes) (15, 16) and COVID related violence (yes vs. never).

Data collection: At Saint Paul General Hospital, participants directly filled in a self-administered questionnaire in the original study. The investigators provided an information sheet, a consent form, and a set of questionnaires to study participants and came back to the hospital after one week to collect the filled questionnaires.

Data analysis: The data on stress and related factors of Saint Paul hospital nurses were extracted from the original study's dataset and put into a separate dataset. Data were checked for completeness before analysis using SPSS statistical software version 20.0. We used the frequency (n) and percentage (%) to describe categorical variables; mean, median, and standard deviation values to describe the stress scores. For bivariate logistic regression, Chi-squared/Fisher exact test was used to evaluate the associations between stress in nurses and related factors. The results were presented as OR, 95% CI, and significance level p. The study used multivariate logistic regression, Enter method, to identify factors associated with stress in nurses at the significance level of 0.05.

To control potential confounders or effect modifiers, Breslow Day test for homogeneity was used with independent variables being included as layers. The variables were interactions if p was less than 0.05. If p was over 0.05, crude ORs and adjusted OR were compared. If the difference was ≥10%, that variable was a confounder. If the difference was less than 10%, it was not a confounder and could be included in the regression model. Results showed that all independent variables were not confounders nor interactions. Therefore, we put all variables with p less than 0.2 in the binary analysis into the multivariate logistic regression.

Ethical approval: The Institutional Review Board of the Hanoi University of Public Health approved the original study under Decision No. 332/2021/YTCC-HD3 dated August 6, 2021. Participation was voluntary, and nurses could withdraw anytime.

RESULTS

Demographic characteristics

Data of 400 nurses from 31 clinical departments of Saint Paul General Hospital was analyzed in this study. The average age of nurses was 36.5 (SD±8.4). Most participating nurses were female (78.0%), and most were married (76.8%). Regarding average monthly income, 41.8% of nurses have an income of less than 6.3 million VND per month, and 32.5% have an income of 6.3-8.4 million per month (Table 2).

The prevalence of stress among nurses during the COVID-19 pandemic

The mean stress score among nurses was 7.8 (SD±6.3), ranging from 0 to 36. Among seven items, "thinking too much" had the highest mean score (1.7), followed by "very sensitive" (1.4) and "hard time controlling oneself" (1.4).

Table 1. Assessment of stress among nurses using the DASS-21 Stress subscale (n=400)

Statement	Mean	SD
I have a hard time controlling myself (0-6)	1.4	1.3
I tend to overreact to something (0-6)	0.8	1.1
I find myself thinking too much (0-6)	1.7	1.4
I find myself restless (0-6)	0.7	1.2
I find it difficult to relax (0-6)	0.9	1.3
I can't stand it when my work is interrupted (0-6)	1.1	1.3
I feel very sensitive (0-6)	1.4	1.4
Stress (0-42)	7.8	6.3

The prevalence of stress among nurses in the study was 11.8%. among nurses with stress, 6.3% had mild (n=25); 3% had moderate (n=12), 2.3% had severe (n=9), and 0.2% had extremely severe stress (n=1) (Figure 1).
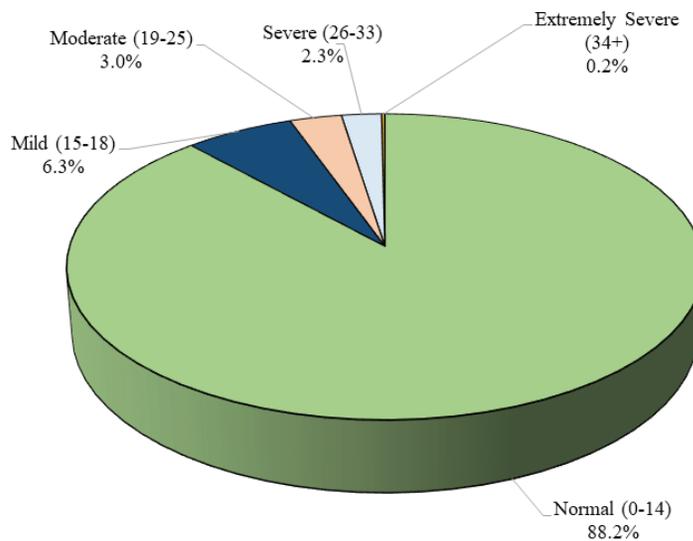

Figure 1. The severity level of stress among participants

Factors associated with stress among nurses during the COVID-19 pandemic

Table 2 presents results of bivariate and multivariate logistic regression. Nurses with anxiety were 14.1 times more likely to experience stress than nurses without this symptom (95% CI: 6.1–32.4, $p<0.01$). Nurses with depression had a 25.4 times higher risk of stress than those without depression (95% CI: 12.2–52.8, $p<0.01$). Results also shows that nurses who were not aware of patients' COVID-19 status/ not in contact with someone with COVID-19 had a 6.3 times higher risk of stress than those who have been in contact with a patient with COVID-19 (95% CI: 1.4–1.6, $p<0.01$). Nurses' stress was significantly associated with the family financial pressure. Nurses with moderate or higher financial pressure were 2.7 times more likely to be stressed than those with little/no financial pressure (95% CI: 1.0–7.0, $p= 0.04$).

Table 2. Factors associated with nurse stress: Results of bivariate and multivariate logistic regression (N = 400)

Variable	Group	Stress status				Bivariate test		Multivariate test	
		Yes		No		p	Crude OR (95% CI)	p	Adjusted OR (95% CI)
		N	%	N	%				
Family financial pressure	Medium to high	40	13.2	262	86.8	0.04	2.7 (1.0-7.0)	0.43	1.6 (0.5-4.9)
	Little/ No pressure*	5	5.4	88	94.6				
Anxiety	Yes	40	28.2	102	71.8	<0.01	14.1 (6.1-32.4)	<0.01	6.6 (2.3-19.1)
	No*	7	2.7	251	97.3				
Depression	Yes	34	50.7	33	49.3	<0.01	25.4 (12.2-52.8)	<0.01	12.5 (5.3-29.5)
	No*	13	3.9	320	96.1				
Contact with COVID patient	Unknown	3	42.9	5	57.1	<0.01	6.3 (1.4-1.6)	0.05	0.1 (0.0-1.0)
	Yes*	41	10.7	343	89.3				

*Note: * = reference group, Hosmer and Lemeshow Test: p = 0.11 > 0.05*

Variables with p less than 0.2 in the bivariate analysis were put into the multivariate logistic regression, namely chronic disease, anxiety, depression, contact with COVID-19 patients, and family financial pressure. Only anxiety and depression were significantly associated with stress (OR=6.6, 95% CI=2.3-19.1 and OR=12.5, 95% CI=5.3-29.5, respectively).

DISCUSSION

The prevalence of stress among nurses during the COVID-19 pandemic

In this study, 11.8% of Saint Paul General Hospital nurses reported mild, moderate, severe, and extremely severe stress. This figure was lower than that of previous studies conducted before 2022. Zheng et al. reported a high prevalence of nurse stress in March, 2020 (21). Another study in Iran (2020) also showed that the prevalence of nurse stress was 17.4% (22). In Jordan, 50.1% of nurses reported being stressed during the COVID-19 pandemic in 2020(15). Other studies in Vietnam during the pandemic period also reported an increased stress among nurses (6, 13, 23-25) and the stress prevalence was higher than our study findings. For example, the prevalence of stress among nurses of Binh Duong General Hospital in 2020 was 35.5% (26). The mean stress score in this study was 7.8 (SD ±6.3), lower than the results of Sheikhbardsiri H et al. (2021) (9.6) (27), Nadeem F et al. (2021) in Pakistan (8.0) (28) and Zakeri MA et al. (2021) in Iran (9.5) (29).

The lower stress prevalence among nurses in our studies could be explained by the difference in data collection time. The COVID-19 pandemic had been a catastrophic crisis worldwide, causing great fear at its rapid, sudden onset due to inadequate knowledge, high mortality rate and absence of vaccine. The above studies were conducted during the high peak time of the COVID-19 pandemic with a rapidly increased number of COVID-19 cases. During that period, healthcare workers and nurses faced tremendous workload and pressure. Meanwhile, our study was conducted in March and April 2022 when many mitigation measures had been applied to offset the pandemic, for example the country achieved the vaccination rate of 80%, and gradually had the pandemic under control (30). Vaccination provided healthcare workers with a sense of protection and improved their mental health while managing patients with COVID-19 (31). This condition might significantly contribute to the stress relief among hospital nurses in our study.

Factors associated with stress among nurses during the COVID-19 pandemic

Our study found a statistically significant association between anxiety, depression, and stress. Gherardi-Donato EC et al. showed that depressive symptoms were strongly associated with high-stress levels among nurses. Nurses with high levels of work stress had a prevalence of depression 2.69 times higher than those without work stress (32). Another study by Hou Y et al. (2022) reported that work-related stress could directly affect anxiety and indirectly associated with anxiety through the sense of control (33). Studies also revealed the biological links between stress and anxiety (17) and depression (18). These findings were consistent with results of previous studies reporting the comorbidity of common health disorders among nurses exposed to stressors (34). Our resutls imply the need of interventions such as stress management to improve nurses' mental well-beings (35).

Our study did not find a significant association between other demographic and work-related factors and stress conditions among nurses in a multivariate regression analysis. However, collecting this information was essential to control interactions among factors in an analysis.

The present study had several limitations. Firstly, the self-reported data collection method might result in bias information due to misunderstanding of the questions or personal perspectives. Secondly, is was impossible to identify the leading causes of nurse stress with the cross-sectional study design. Thirdly, this study focused on only one level I hospital in Hanoi, so the generalization of the study's results was limited to nurses in context similar to Saint Paul general hospital in our study.

CONCLUSION

The prevalence of nurse stress was 11.8% and associated with anxiety (OR=6.6, 95% CI=2.3-19.1) and depression (OR=12.5, 95% CI=5.3-29.5). Our findings calls for hospital management to consider mental health screening and interventions for all nurses, irrespective of their present working departments.

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