Research Paper
The Impact of Organizational Supports on Nurses' Occupational Stress in COVID-19 Pandemic: A Partial Least Squares Multigroup Analysis

Mehdi Yousefi[1], Fatemeh Salehi[2], Zahra Ebrahimi[3], Jamshid Jamali[4], Leila Mashhadi[5*]

1. Department of Health Economics and Management, School of Health, Mashhad University of Medical Sciences, Mashhad, Iran.
2. Department of Medical Records and Health Information Technology, School of Paramedical Sciences, Shiraz University of Medical Sciences, Shiraz, Iran.
3. Department of Management, Faculty of Management, North Tehran Branch, Islamic Azad University, Tehran, Iran.
4. Department of Epidemiology and Biostatistics, School of Health, Mashhad University of Medical Sciences, Mashhad, Iran.
5. Department of Anesthesiology, Faculty of Medicine, Mashhad University of Medical Sciences, Mashhad, Iran.

ABSTRACT

Background: The safety and mental health issues of frontline nurses working during the coronavirus global outbreak must be a first/top priority. The present study aimed to investigate the association between nurses' occupation stress and organizational support in both infectious and non-infectious intensive care units (ICUs) wards during the COVID-19 crisis.

Methods: This was a descriptive-analytical and cross-sectional study. The study population comprised nurses caring for COVID-19 patients in Imam Reza Hospital complex in Mashhad City, Iran. The sample size was 129 nurses selected through random quota sampling and examined with a standard questionnaire. To analyze the information and test the hypothesis, the structural equation modeling approach using Smart PLS 2.0 software has been used. Descriptive and analytical statistical tests were used in this study.

Results: The results indicated a significant negative correlation between stress and perceived organizational support for ICU nurses (P<0.001). Considering subscales in stress, the highest mean occupational stress scores were related to the "death and dying" dimension (n=21, 13.98%). Also, the difference between the two groups of nurses was statistically significant in different workloads (P<0.001) and lack of support (P<0.001).

Conclusion: The results of the present study highlighted the importance of organizational support to reduce stress in nurses. To get through this unprecedented situation, nurses need their employers and organizations to support them with action, planning, and resources.

Keywords: COVID-19, Nurse's stress, Occupational stress, Nurse, Organizational support, Intensive care units

* **Corresponding Author:**
Leila Mashhadi, Assistant Professor.
Address: Department of Anesthesiology, Faculty of Medicine, Mashhad University of Medical Sciences, Mashhad, Iran.
E-mail: mashhadil@mums.ac.ir

1. Introduction

As the new coronavirus disease 2019 (COVID-19) pandemic continues, nurses are on the front line of care in the most extreme circumstances experiencing high levels of stress [1]. Pandemics have enormous implications on health care systems, particularly on the workforce [2]. Results from many studies on COVID-19 and other pandemic infectious diseases showed nurses are experiencing pressure, fear, exhaustion, isolation, and ongoing emotional trauma, which is due to concerns about their work or disease transmission to family members in case of direct contact with a potentially lethal virus. They had the stress of balancing this concern with the ethical obligations to provide the best possible care [3-7]. Moreover, psychological conflicts between healthcare workers' responsibility to care for the ill and their right to protect themselves from a potentially lethal virus were reported [8]. Job-rRelated stress may significantly affect nurses'' quality of life and simultaneously reduce the quality of care [9]. So, organizational support of nurses to maintain their mental health should be considered the most important priority during the coronavirus outbreak. Providing organizational support will result in employees who believe that their organization appraises their services and cares about their roles [10]. If nurses do not feel supported by their organizations, they may leave the profession [11]. Therefore, supporting nurses practically and psychologically is essential to preserve their short-term and long-term health, particularly in times of crisis with high occupational stress levels.

The present study investigated the association between nurses' occupation stress and organizational support among nurses in infectious and non-infectious intensive care units (ICUs) wards during the COVID-19 crisis.

2. Methods

Study design and setting

The present study was cross-sectional research with a descriptive-analytic approach wasdone in Imam Reza Hospital Complex in Mashhad City, Iran. This study was conducted in July 2020. Imam Reza Hospital Complex was designated the largest COVID-19 referral center, in Mashhad City, Khorasan Razavi Province, Iran.

In the COVID-19 outbreak crisis, in addition to infectious disease ICU wards, surgical and medical ICU wards were also assigned to care for COVID-19 patients. Therefore, the study's statistical population included nurses in the infectious ICU wards and non-infectious ICU wards of the hospital with COVID-19 patients.

Sample size

The minimum sample size in partial least squares structural equation modeling (PLS-SEM) should be 10 times greater than the maximum number of inner or outer model links pointing at any latent variable in the model [12]. We can safely conclude that a sample size of 129 was acceptable for this study.

Study instruments

Two questionnaires were used in this study:

1. The standard questionnaire of nurse occupational stress, developed by Gray-Toft and Anderson (1981), was used to measure nurses' stress in the workplace. The scale consists of seven subscales with 34 items: death and dying (7 questions), workload (6 questions), uncertainty concerning treatment (5 questions), conflict with physicians (5 questions), conflict with nurses (5 questions), inadequate preparation (3 questions), lack of support (3 questions). Respondents used a 4-point scale for the work environment from "never'' to "very frequently happen''. The questionnaire's reliability has been tested by the test-retest coefficient. The reliability index for the total scale was 0.88, whereas internal consistency coefficients ranged from 0.78 to 0.88 for the subscales [13], with higher total scores showing greater levels of stress. The validity and reliability of the questionnaire have been confirmed in many studies in Iran, such as Rezaee et al. [14]. Sixteen experts in the Faculty of Nursing and Midwifery, Iran University of Medical Sciences, confirmed the questionnaire''s reliability and validity with some revisions.

2. The second questionnaire was a researcher-made questionnaire designed to measure satisfaction with supportive measures based on the study of Dehghan Nayeri et al. [15]. This questionnaire consists of 11 questions with two response options: "sufficient" and "insufficient". The questionnaire's validity was measured by content validity ratio (CVR=0.80) and content validity index (CVI=0.77) and was confirmed by 10 experts at Mashhad University of medical sciences. The Cronbach alpha was calculated to ensure the reliability of the tool (α=0.81).

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Data collection

The data were collected from nurses working in CO-VID-19 wards by random quota sampling. The names of nurses in infectious disease ICU and non-infectious ICU were sorted by national code, respectively. Then, the desired number of nurses from each ward was randomly selected by Excel software, and the questionnaires were arranged, coded, and delivered according to the relevant code. Oral consent of patients was taken to participate in this research.

Data analysis

Descriptive analysis and analysis of variance were performed using SPSS Software version 21 to enhance our understanding of the sample characteristics.

The proposed relationships in the conceptual model were evaluated using partial least squares multigroup analysis (PLS-SEM). The PLS-SEM is a variance-based structural equation approach that allows the analysis of mediator and moderator variables [15-17]. This method has fewer assumptions than the covariance-based structural equation method, such as no need for normality assumption and a smaller sample size [16-18]. The PLS-SEM method minimizes bias and error variance simultaneously [19]. Moreover, the factor weighting scheme for inner weighting and statistical inferences was based on the bootstrap procedure. Besides the main variables, sex, work shift, work experience, and marital status were included as control variables in the structural model to control for the effects of extraneous variables. PLS-SEM analysis was conducted using the Smart PLS version 2.0.

Partial least squares multigroup analysis (PLS-MGA)

PLS-MGA is a parametric significance test for the difference of group-specific results that is buildt on PLS-SEM bootstrapping results. In this study, Welch-Satterthwait parametric significance test was used because of unequal variances across groups.

3. Results

The response rate of the questionnaire was 84.35%. The response rate in the main variables in the complete questionnaire was almost 100% to allow us to deal with complete data. In the rare case where the data was missing, the type of missing seems random; therefore, it does not cause problems in interpreting the results. In the study, 14.5% (n=19) of nurses were male and 77% were female (n=81). The majority of nurses (83.9%) were married, and 65% of nurses had children.

There was a significant relationship between the stress score of nurses in the infectious and non-infectious ICU wards during the COVID-19 outbreak (P<0.001) (Table 1). The Mean±SD of occupational stress score was 51.86±0.03 in the infectious ICU, and 63.93±0.02 in the non-infectious ICU. The highest occupational stress mean scores were related to the "death and dying" dimension (n=21, 13.98%).

Table 1. Occupational stress score of the nurses in the infectious and non-infectious ICU wards

Stress Dimension	No. (%)			Sig. of the Difference Between A & B (Z)
	C: Total (n=129)	A: Infectious (n=55)	B: Non-Infectious (n=74)	
Death and dying	21(13.98)	21(12.43)	21(15.13)	<0.001
Workload	18 (9.72)	18 (8.36)	18 (10.72)	0.001
Uncertainty concerning treatment	15 (8.66)	15 (7.49)	15 (9.54)	<0.001
Conflict with physicians	15 (9.59)	15 (8.32)	15 (10.54)	<0.001
Conflict with nurses	15 (8.62)	15 (7.81)	15 (9.21)	0.005
Inadequate preparation	9 (5)	9 (4.25)	9 (4.48)	<0.001
Lack of support	9 (3.93)	9 (3.20)	9 (4.31)	<0.001
Total	??(59.53)	??(51.89)	??(65.2)	<0.001

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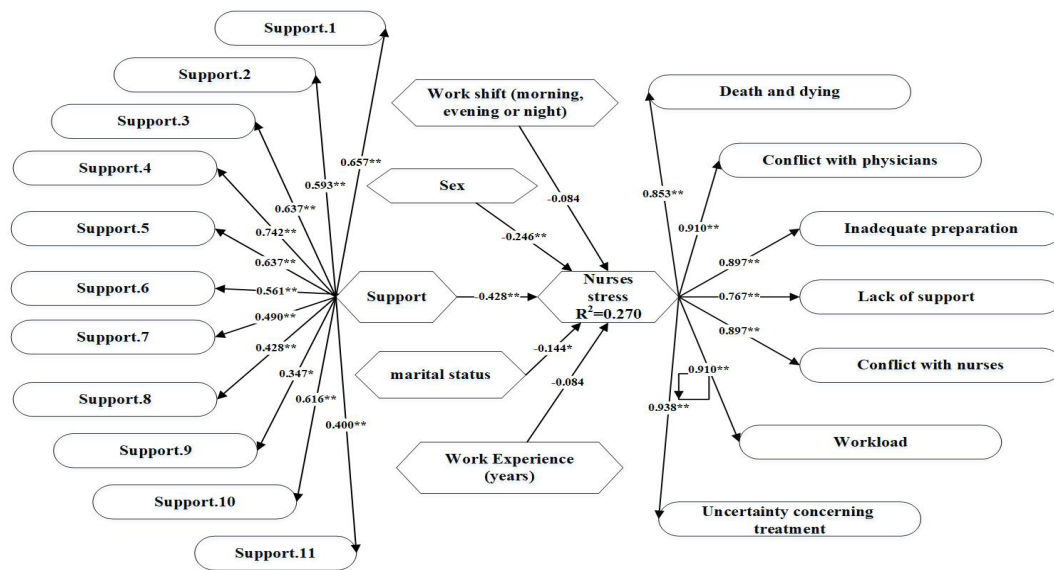
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Figure 1. Relationship between hospital supportive measures and occupational stress of nursing staff in ICU non-infection ward
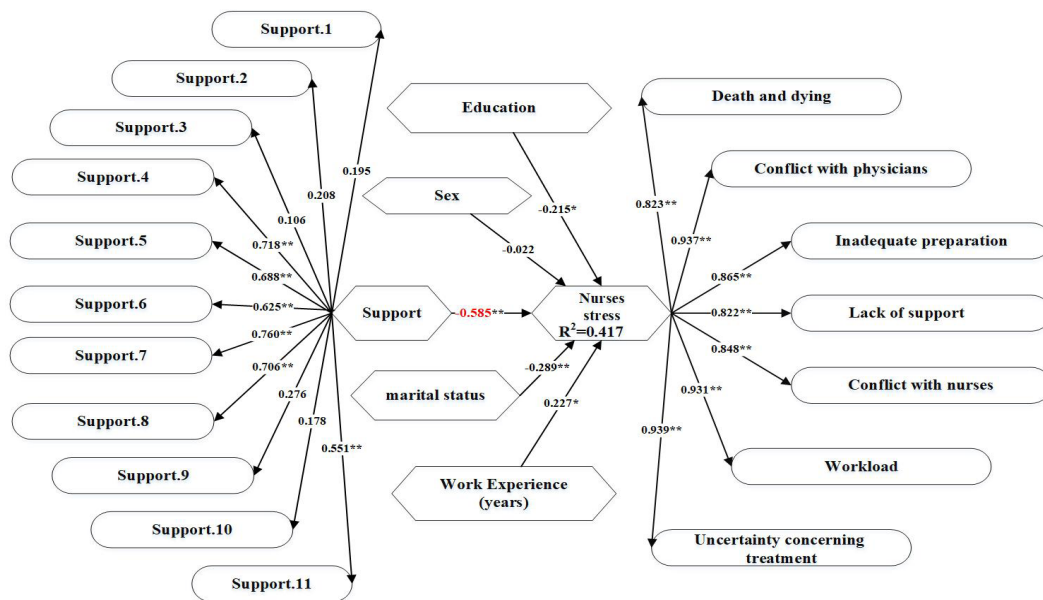

Figure 2. Relationship between hospital supportive measures and occupational stress of nursing staff in ICU infection ward

Table 2. Relationship between hospital supportive measures and nurses' occupational stress in infectious and non-infectious sectors

Samples	Original Sample	Sample Mean	Standard Deviation	Standard Error	t
Total	-0.483932	-0.496164	0.069168	0.069168	6.996436**
Nurses in infectious disease ICU	-0.584840	-0.601489	0.077206	0.077206	7.575006**
Nurses in other ICU wards	-0.483122	-0.508301	0.072238	0.072238	6.687889**

** Support→nurse-stress is significant at the 0.01 level.

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Table 3. Comparison of nurses' satisfaction level with the hospital's supportive measures in the infectious disease and other ICU wards

N. of Skill	Supportive Measures	No. (%)			Correlation Coefficient			Sig. of the Difference Between A & B (Z)
		Total	Infectious	Non-in-fectious	C: total (n=129)	A: Infectious (n=55)	B: Non-Infectious (n=74)	
Support-1	Provide appropriate, timely and continuous training and information	62 (47.65)	20 (37.0)	42 (58.3)	-0.1000	-0.140	-0.204	0.227
Support-2	Provide just-in-time training to reinforce knowledge and skills about nurses safety in exposure	54 (41.65)	18 (33.3)	36 (50.0)	-0.145	-0.170	-0.249*	0.266
Support-3	The provision of appropriate measures to control the spread of COVID-19	46 (73.7)	12 (22.2)	34 (51.5)	0.023	-0.115	0.004	-0.316
Support-4	Providing personal protective equipment for nursing staff	62 (48.35)	26 (48.1)	36 (48.6)	-0.237**	-0.522**	0.080	-2.427
Support-5	Implementation of well-being and motivational support programs for nursing staff	26 (21.55)	16 (29.6)	10 (13.5)	-0.345**	-0.501**	0.000	-1.175
Support-6	Provide a plan for housing and compensating staff who need to isolate	24 (19.25)	10(18.5)	14(20.0)	-0.189*	-0.0393**	0.26	-1.409
Support-7	Possibility of quick access to an infectious disease specialist and screening of nurses if needed	48 (40.25)	26 (48.1)	22 (32.4)	-0.220*	-0.391**	0.081	-1.594
Support-8	Provide access to mental health support for staff feeling overwhelmed or concerned	46 (37.8)	20 (38.5)	26 (37.1)	-0.346**	-0.637**	-0.015	-2.308
Support-9	Exemption of high-risk nurses for direct care of patients with Covid-19	94 (74.35)	34 (63)	60 (85.7)	-0.195*	-0.276*	-0.276*	0
Support-10	Timely increase the number of nurses and nurses' aides needed	92 (73.15)	40 (74.1)	52 (72.2)	-0.082	-0.011	-0.171	0.742
Support-11	Reorganization of the hospital in accordance with the crisis, such as the creation of new wards and etc.	86 (68.05)	36 (66.7)	50 (69.4)	-0.238**	-0.316*	-0.189	-0.598

*Correlation is significant at the 0.05 level (2-tailed). ** Correlation is significant at the 0.01 level (2-tailed).

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A significant relationship was observed between nurses' occupational stress in the two groups. This finding was true for all stress dimensions, including death and dying (P<0.001), uncertainty concerning treatment (P<0.001), conflict with physicians (P<0.001), conflict with nurses (P<0.005), inadequate preparation and lack of support (P<0.001). The difference between the two groups of nurses in different workloads was also statistically significant (P<0.001).

The evaluation of path coefficients indicated that increasing supportive measures will decrease occupational stress in all ICU wards by 0.428 and 0.528 standard deviations, respectively, if all other variables are kept constant (Figures 1 and 2).

The results showed that hospital support measures had a significant effect on nurses' occupational stress (P<0.01) (Table 2).

The highest satisfaction score in the infectious disease ICU was related to a "timely increase in the number of nurses and nurses' aides" (n=40, 74.1%) and "exemption of sick and high-risk nurses for the direct

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care of COVID-19 patients" (n=60, 85.7%) in other ICUs (Table 3). The lowest satisfaction score obtained for "providing a plan for housing patients had staff highest who needed to be isolated away from family members" (n=10, 18.5%) in infectious disease ICU and "implementation of well-being and motivational support programs for nursing staff" (n=10, 13.5%) in other ICU wards.

4. Discussion

This study described the association between nurses' occupation stress and organizational support in infectious disease and non-infectious disease ICU wards during the COVID-19 crisis. The results indicated a significant negative correlation between stress and perceived organizational support for all ICU ward nurses. These findings are consistent with the literature showing that high-stress levels are related to relatively low organizational support [20-22]. Organizational support from the hospital creates a positive attitude in nurses and helps them make more ethical decisions and have less job stress [23].

One of the organizational supports was to reduce gaps in critical knowledge. As COVID-19 is a newly identified disease, effective vaccines and treatments were unknown at the time. Healthcare providers must be educated about preventive measures, proper use of personal protective equipment, proper personal hygiene practices, and related environmental measures [24, 25].

Psychological and social support for nurses and healthcare professionals is another key challenge faced by nursing professionals during COVID-19. During outbreaks of a new pandemic such as coronavirus, pressure and exhaustion, anxiety, and fear spread among individuals. Therefore, supporting healthcare staff having the disease and those under isolation is necessary [25].

The study indicated a significant relationship between occupational stress in nurses in all ICU wards and the nurses working in non-infection ICUs wards experiencing a lot ofmany psychological problems while providing care services for patients with COVID-19. Consistent with our result, many other studies have reported high levels of psychological distress among nurses during outbreaks [26-28]. According to the result of the study, a significant relationship was observed between the occupational stress of the two groups of nurses and all related stress dimensions, including death and dying, workload, uncertainty concerning treatment, conflict with physicians, conflict with nurses, and inadequate preparation. Our results are consistent with those of Wang et al. in Hong Kong, where nurses cited workload, lack of support, insufficient preparedness, and conflict with other nurses as the highest sources of stress [29]. In this study, nurses' occupational satisfaction with the supportive actions of the crisis management team was also measured. Job satisfaction of nurses is an important factor in maintaining the mental health of nurses in the COVID-19 crisis [30, 31].

5. Conclusion

This study showed that organizational support is important to reduce stress in nurses. Some resilience is needed to get through this unexpected situation; however, nurses need their employers" and organizations" practical support and resources. Therefore, managers and organizations need to adopt appropriate policies in their programs and pay special attention to the physical and mental health of nurses, addressing their problems, and generating a work atmosphere with valuable support. This issue can motivate and sustain human resources abilities within the organization in crisis status. Our study had some limitations. Only one teaching hospital was selected for this study, and it is recommended that this study be repeated with a larger sample size in different centers. Additionally, we had no data concerning the nurses" stress levels before the COVID-19 crisis.

Ethical Considerations

Compliance with ethical guidelines

This study was approved by the Ethics Committee of Mashhad University of Medical Sciences, Mashhad (Ethical Code: IRMUMSREC.1399.019).

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Authors' contributions

Conceptualization, Methodology, Data collection, Data analysis, and Investigation: Mehdi Yousefi, Fatemeh Salehi, Zahra Ebrahimi, Jamshid Jamali, Leila Mashhadi; Writing–original draft: Mehdi Yousefi, Fatemeh Salehi, Zahra Ebrahimi, Jamshid Jamali, and Leila Mashhadi; Writing–review & editing and approval of the final version: Mehdi Yousefi, Fatemeh Salehi, Zahra Ebrahimi, Jamshid Jamali, and Leila Mashhadi.

Conflict of interest

The authors declared no competing interests.

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