



Original Article

Occupational stress and coping strategies of the nursing staff of a Public University Hospital during the COVID-19 pandemic

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ARTICLE INFO

Received 20 May 2023
Accepted 29 July 2023

Available online at:
<http://npt.tums.ac.ir>

Keywords:
nursing staff;
occupational stress;
coping strategies;
COVID-19 pandemic

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DOI:
10.18502/npt.v10i3.13429

ABSTRACT

Background & Aim: Nursing staff are exposed to high-stress levels daily due to the demanding work environment. This study examined nursing staff occupational stress and coping mechanisms during the COVID-19 pandemic.

Methods & Materials: A cross-sectional study with a sample of 108 nursing staff was carried out. The Expanded Nursing Stress Scale (ENSS), the Brief Coping Orientation to Problems Experienced (Brief COPE) Scale, and constructed questions were used for data collection. Data were analyzed using chi-square (χ^2), Pearson methods, and Multiple linear regression analysis. Statistical significance was determined at p -value ≤ 0.05 .

Results: Overall Occupational stress was assessed with a mean score of 146.8 (SD \pm 35.3). In Brief COPE Scale, a higher mean was assessed for “social support - information seeking” and lower for “substance use” or “withdrawal” ($p < 0.001$). A significant difference in response distributions was observed regarding their degree of concern or fear about COVID-19 ($p < 0.01$). Increased levels of Overall Occupational Stress (ENSS) were associated with higher levels of BCOPE. Emotional Focus and Venting and Diffusion of Emotions ($\beta = 5.15$, $p = 0.026$), younger age of the participants ($\beta = -5.78$, $p = 0.033$), years of working in the healthcare sector ($\beta = 14.46$, $p = 0.004$) or the highest fear/concern about being infected and infecting their patients ($\beta = 6.22$, $p = 0.032$).

Conclusion: Nursing staff experienced moderate levels of occupational stress, while challenges raised by the pandemic were handled through seeking social support, positive reframing and acceptance, taking protective measures, and turning to religion. Developing meaningful administrative and educational strategies for staff empowerment and resilience may reduce anxiety and occupational stress for nurses.

Introduction

As part of the working environment, the presence of people and ever-changing data causes stress. In circumstances where stress cannot be handled, it can have ramifications for a person’s physical and mental health. However, it is crucial to highlight the good effects of stress on a person, the most important of which is their motivation for growth (1). According to the World Health Organization, occupational stress is the psychosocial manifestations workers

experience when facing excessive workloads and demands (2). However, this factor is subjective because these conditions are a source of stress for some people but not for others (3).

Specifically, health professionals, particularly nurses, are more likely to experience occupational stress (4). Healthcare professions are listed among the top six most stressful jobs, with healthcare personnel, their families, and patients feeling the most



detrimental impacts of stress (4). Conditions and workload, interpersonal interactions, cycle hours, and lack of personnel are strongly linked to the onset of occupational stress and negative health impacts among nurses (5,6). These factors have a negative impact on the physical and mental health of nursing staff, as well as their productivity and quality of care (7). Typically, signs of physical and mental problems, behavioral changes, dysfunctions in efficiency, burnout, and dissatisfaction among nursing staff are observed (8).

In addition to the work factors that might lead to the manifestation of occupational stress, the periodic occurrence of epidemics, such as the COVID-19 pandemic that has plagued the worldwide population since the end of 2019, also plays a significant role. According to recent studies, the primary source of concern for nurses during the pandemic was the fear of contracting the disease and unknowingly infecting their loved ones (9,10). A high rate of exposure and an elevated risk of infection with the novel coronavirus SARS-CoV-2 place healthcare professionals on the front lines of the COVID-19 pandemic. Many nurses caring for COVID-19 patients suffer from burnout or depression, and many have encountered discrimination outside of the job (9,11). The new data that have emerged as a result of the pandemic reveal unprecedented conditions for the professional, personal, and social life of the nursing staff, while at the same time, they must deal with ever-increasing work demands and with repercussions in numerous areas of their lives, both work-related and non-work-related (2).

It is thought vital to employ approaches and strategies for managing occupational stress (3). Relevant study of strategies for coping with stress reveals those in which the individual attempts to overcome the problems and stress-inducing factors by finding and organizing alternative actions (3) and those that focus on the management of the

emotional state by denying and avoiding the problem (12). The main strategies for dealing with nurses' occupational stress are adequate logistical and psychological support of nurses, appropriate and specialized training, and the development of stress management skills and means. Therefore, stress-coping strategies are considered necessary to find alternative ways to relieve nursing staff (13).

Similar studies documented in the international literature (2,14) highlight the need to improve the working conditions of health professionals, considering the challenging, demanding, and especially dangerous work environments they encounter daily, particularly nurses in the current period.

Even though occupational stress has been a topic for many years, the special conditions caused by the pandemic in healthcare working environments necessitate the need to revisit this issue. In particular, during the Covid-19 pandemic, healthcare professionals, and especially nurses, were hampered both physically and psychologically, as the increased demands of the healthcare systems, the uncertainty, and the radical changes in organizational and clinical sectors severely increased the levels of work stress. In addition, healthcare professionals appeared to cope with this psychological strain using various strategies and gain not only negative but also positive experiences from the new working conditions (14). For these reasons, it is important to examine, identify and understand new evidence on occupational stress and the coping strategies used by the nursing staff during the pandemic era.

The aim of this study was to determine the levels of occupational stress experienced by the nursing staff at a public university hospital during the COVID-19 pandemic. In addition, the researchers intended to identify the factors related to occupational stress and the coping strategies employed by the nursing staff.

Methods

This study was carried out in the University General Hospital of Thessaloniki, using a cross-sectional design with partial correlations. This specific hospital was selected because it is one of the largest hospitals in Greece, with a capacity of 697 available beds, covering almost the entire range of medical specialties. Based on a convenience sampling strategy, a sample of 108 nurses was recruited, consisting of staff nurses and healthcare assistants (HCAs). HCAs are graduates of public or private occupational training schools with one or two years of basic education and hospital-based training prior to employment.

HCAs play a supporting role in administering patient care under the supervision of registered nurses. Most of their duties include sanitary care, feeding, dressing, grooming patients, and bed preparation. Staff nurses are graduates of universities or technological educational institutes (recently made equivalent to universities). The basic nursing curriculum in both institutions is a four-year program, with the eighth semester devoted to clinical practice. Staff nurses are primarily responsible for identifying nursing issues and developing nursing diagnoses. Staff nurses are responsible for designing, implementing, and evaluating appropriate patient care interventions, as well as monitoring patients' conditions, assessing their needs, and providing patient education and counseling. The sampling framework and the field of the study consisted of ten clinics representing the entire spectrum of adult patient medical and surgical nursing care, including a COVID-19 clinic. The data were obtained in January 2021.

Data were collected by the researchers using three anonymous self-report questionnaires. The Expanded Nursing Stress Scale (ENSS) assessed occupational stress (15). The ENSS consists of 59 items and nine

subscales. Each item is rated on a 5-point Likert scale ranging from 1, "never stressful," to 4, "extremely stressful," and 0, "does not apply." The following are the subscales: (1) dealing with death and dying (seven items with a score range of 0–28); (2) conflicts with physicians (five items with a score range of 0–20); (3) inadequate preparation to deal with the emotional needs of the patient (three items with a score range of 0–12); (4) problems with peers (six items with a score range of 0–24); (5) problems with supervisors (seven items with a score range of 0–28); (6) workload (nine items). Using subscale scores, an instrument's total (range: 0–236) score is derived from subscale scores. There is no specific score threshold for the scale and subscales. Higher scores indicate higher levels of perceived stress. For the ENSS in the current study, the overall Cronbach's α was found to be 0.95. The short version of the Coping Orientations to Problems Experienced (Brief COPE) scale was used to collect data on coping strategies (16), which consists of 30 questions categorized into 15 subscales and related to the set of strategies that can be applied. The overall Cronbach's α for the Brief COPE scale was found to be 0.86. In addition, a questionnaire containing eight questions about the pandemic, nursing staff contact with sick patients, and the anxiety/fear it causes based on relevant international literature was distributed (17,18). Specifically, the first three dichotomous questions concern nurses' interaction with ill patients, and the following five concern the fear created by the possibility of contracting or transmitting the virus. The participants' responses were formulated on a five-point Likert-type scale, with 1 representing "Not at all" and 5 representing "Extremely." The overall Cronbach's α obtained in the current study for the questionnaire concerning the pandemic was 0.74. Finally, questions were included to collect the sociodemographic and

professional characteristics of the study participants.

One hundred thirty (130) anonymous questionnaires were distributed to nurses, while one hundred eight (108) were returned completed, resulting in a satisfactory response rate (83%). The data were collected in January 2021, and the average time to complete the questionnaire was 15-20 minutes. The researchers informed the Head nurse of each department about the purpose of the research, to facilitate access to the nursing staff and support recruitment. Researchers approached nurses during their shifts, and a mutual decision was taken for the place and the time in order to complete the questionnaires without any distractions. This process allowed a high response rate.

Before the study's inception, ethical approval was granted by the Scientific Committee of the AHEPA University General Hospital of Thessaloniki (Ref. 740/21-12-2020). The participants in the study were informed about the study objectives, expected outcomes, and associated benefits and risks. They did not receive any compensation for their participation in the study. Informed consent was received from the participants before they answered the questionnaire.

Data were analyzed using SPSS software (IBM SPSS Statistics for Windows,

Version 26.0. Armonk, NY, USA: IBM Corp). Frequency distributions of the basic characteristics of the 108 participants were evaluated. Using the method of Blom (QQ plot), symmetry was calculated for the scores of total occupational stress (ENSS) & Coping with Problems (Brief COPE) scales. Correlations between ENSS & Brief COPE Scale scores, as well as with the characteristics of participants, were performed with Chi-square (χ^2) and Pearson method. Multiple linear regression analysis was also used to evaluate the overall dependency of the ENSS with the levels of the Brief COPE and the characteristics of the participants, and both unstandardized (β) and standardized (b or betas) coefficients were calculated. Statistical significance was determined at p -value ≤ 0.05 .

Results

Of the 108 nurses who participated in this study, 84.3% were female, and 43.5% were aged 45 or older. 62.0% of the participants were married, and 67.6% had children. In respect of their education, 27.8% were high school, vocational training institute, or hospital school graduates. 48.1% held a bachelor's degree in art or science, 14.8% a master's, and 2.8% a Ph.D. Regarding professional status, 72.2% were registered nurses, and 27.8% were HCAs (Table 1).

Table 1. Descriptive characteristics of nurses who participated in the study (n=108)

Variables	N	%	
Sex	Men	17	15.7
	Women	91	84.3
Age (Years)	<35	30	27.8
	35-44	31	28.7
	45+	47	43.5
Marital status	Married	67	62.0
	Single, Divorced, Widowed	41	38.0
Children	Yes	73	67.6
	No	35	32.4
Education level	Graduate of vocational training Institute /Hospital school/High school	30	27.8
	University	59	54.6
	Master's degree	16	14.8
	PhD	3	2.8
Profession	Registered nurse	9	72.2
	Healthcare assistants HCAs	30	27.8

Occupational stress and coping strategies

The ENSS defines 9 stress factors or subscales; total occupational stress (anxiety) was assessed with a mean score of 146.8 (SD±35.3); however, there are no clear bibliographic cut-offs for determining stress levels.

The mean values of responses to the 15 factors of the Brief COPE Scale differ significantly ($p < 0.001$), with higher mean levels for “social support- information seeking”

and lower for “substance use” or “withdrawal” ($p < 0.001$).

Regarding their degree of concern or fear about COVID-19 (Table 2), a significant difference in response distributions ($p < 0.01$) was observed in five questions/sentences, with a significant difference in the gradation of responses from “not at all” to “extremely” concerned.

Table 2. Items concerning the COVID-19 pandemic of the 108 nurses in the study

Items	Not at all (%)	A little (%)	Somewhat (%)	Quite a bit (%)	Extremely (%)
I am afraid of contracting COVID-19	12.0	28.7	27.8	18.5	13.0
I am afraid of transmitting COVID-19 to my family and friends	0,0	10.2	17.6	23.1	49.1
I am afraid of being quarantined	36.2	25.9	19.4	10.2	8.3
I am afraid of infecting my colleagues	9.3	13.0	27.7	23.1	26.9
I am afraid of infecting my patients or their families	8.3	11.1	32.4	18.5	29.7

Only positive significant correlations are identified between the ENSS and Brief COPE subscales (Table 3). Increases in total occupational stress are associated with parallel increases in Taking protective measures ($r=0.345, p=0.001$), Planning ($r=0.198, p=0.001$), Procrastination ($r=0.342, p=0.001$), Self-restraint ($r=0.202, p=0.001$), and

Turning to religion ($r=0.275, p=0.001$). In addition, there is a significant correlation between anxiety about “contact with death” and procrastination ($r=0.363, p=0.001$), anxiety about “workload” and religion ($r=0.357, p=0.001$), and anxiety about “uncertainty concerning treatment” and taking protective measures ($r=0.380, p=0.001$).

Table 3. Correlation of Expanded Nursing Stress Scale with Brief Coping Orientation to Problems Experienced Scale of study participants

Coping strategies	Total stress	1) in contact with death	2) in insufficient preparation to handle the emotional needs of patients and their families	3) in discrimination	4) in workload	5) uncertainty concerning treatment	6) in conflict with physicians	7) in conflict with colleagues	8) in conflict with superiors	9) in conflict with patients and their families	r – Pearson									
											Taking protective measures	0.345*	0.275*	0.131	0.125	0.339*	0.380*	0.263*	0.262*	0.194*
Planning	0.198*	0.215*	0.082	-0.003	0.286*	0.213*	0.077	0.083	0.068	0.181										
Procrastination	0.342*	0.363*	0.233*	0.077	0.351*	0.330*	0.132	0.228*	0.171	0.344*										
Self-restraint	0.202*	0.231*	0.024	0.146	0.186	0.321*	0.089	0.172	0.077	0.034										
Social support-information seeking	0.293*	0.260*	0.100	-0.003	0.282*	0.326*	0.168	0.200*	0.284*	0.224*										
Emotional, social support	0.281*	0.224*	0.130	0.030	0.281*	0.207*	0.102	0.289*	0.230*	0.297*										
Positive reframing	0.078	0.040	0.151	0.033	0.087	0.142	0.066	0.072	-0.057	0.047										

Acceptance	0.168	0.085	0.020	0.171	0.128	0.224*	0.044	0.089	0.095	0.189
Turning to religion	0.275*	0.332*	0.279*	0.149	0.357*	0.126	0.174	0.252*	0.111	0.152
Emotional focus and venting	0.266*	0.264*	0.133	-0.048	0.300*	0.130	0.034	0.215*	0.332*	0.315*
Denial	0.293*	0.237*	0.254*	0.108	0.325*	0.237*	0.171	0.263*	0.280*	0.111
Resignation	0.224*	0.144	0.235*	0.199*	0.154	0.172	0.151	0.259*	0.162	0.135
Mental detachment	0.139	0.127	0.052	0.085	0.134	0.219*	0.008	0.098	0.050	0.111
Substance use	0.131	0.130	0.157	0.041	0.124	0.056	0.063	0.214*	0.093	0.038
Humor	0.131	0.059	0.162	0.057	0.126	0.109	0.071	0.171	0.087	0.117

* p<0.001

Finally, in Table 4, high ENSS scores are associated with higher levels of Brief COPE Emotional Focus and Venting and Diffusion of Emotions ($\beta=5.15$, $p=0.026$), younger ages of the participants ($\beta=-5.78$, $p=0.033$), the most years of working in the healthcare field ($\beta=14.46$, $p=0.004$) or the highest fear/concern about being infected and infecting their patients ($\beta=6.22$, $p=0.032$).

In summary, total occupational stress appears to be strongly related to nurses' ability to express their emotions, their youth, the burden of years spent working in the healthcare industry, and the current fear that they may unintentionally infect their patients if they contract the COVID-19 virus.

Table 4. Multiple linear regression of Expanded Nursing Stress Scale Total Stress with Brief Coping Orientation to Problems Experienced Scale and its specific characteristics

Prognostic factors	Total Stress (ENSS)				P-value
	Unstandardized coeff. (β)	95% confidence interval		Standardized coeff. (b)	
BCOPE Scale					
Taking protective measures	3.88	-2.46	10.22	0.156	0.227
Planning	-0.25	-4.71	4.20	-0.013	0.910
Procrastination	3.51	-2.56	9.58	0.128	0.253
Self-restraint	2.18	-3.15	7.51	0.089	0.419
Social support - information seeking	-1.18	-7.30	4.93	-0.049	0.702
Emotional, social support	-0.54	-5.60	4.53	-0.024	0.834
Positive reframing	1.99	-2.93	6.90	0.086	0.424
Acceptance	0.62	-4.28	5.52	0.026	0.802
Turning to religion	-0.37	-4.17	3.44	-0.021	0.849
Emotional focus and venting	5.15	0.63	9.66	0.217	0.026
Denial	2.04	-3.43	7.51	0.082	0.460
Resignation	5.03	-0.55	10.60	0.187	0.077
Mental detachment	-5.92	-11.99	0.15	-0.242	0.056
Substance use	0.37	-4.92	5.66	0.015	0.890
Humor	1.08	-3.21	5.38	0.054	0.617
Sex (1: Men, 2: Women)	17.03	-2.81	36.88	0.173	0.091
Age (Year categories)	-5.78	-11.08	-0.48	-0.317	0.033
Profession (1: Registered Nurse, 2: Technological education, 3: Assistant Secondary education)	1.26	-10.12	12.64	0.020	0.826
Questions concerning the COVID-19 pandemic					
	<i>I am afraid that if I get infected, I will infect my patients (1: not at all 2: a little 3: Somewhat 4: quite a bit 5: Extremely)</i>				
	6.22	0.56	11.88	0.222	0.032
R² (adjusted)		0.459 (0.301)			

Discussion

The present study investigated the level of occupational stress and coping mechanisms of the nursing staff at a public university hospital during the COVID-19 pandemic. According to the present study's findings, the nursing staff experienced moderate levels of occupational stress. Similar results were highlighted by a relevant study that has been conducted before the pandemic (19).

In our study, the most prevalent stressors were "uncertainty concerning treatment," "workload," "conflicts with patients and their families," and "contact with death." The least frequent stressors were "discrimination" and "inadequate training to meet the emotional demands of patients and their families." This result confirmed prior research findings that measured Greek nurses' occupational stress using the ENSS (20). Similar findings are presented by relevant studies (21, 22), which also identified dealing with death, uncertainty concerning treatment, workload, and conflicts with patients as the most significant stressors in the work environment of nurses. In contrast to the above studies, a study conducted on primary care nurses in Hong Kong (23) found that dealing with the death of a patient is a less common source of stress for nurses.

Based on the connections between the ENSS subscales and the unique characteristics of the participants, the present study found that occupational stress affects both sexes, but their responses to stressful conditions may differ. Men react more dynamically and energetically to stressful events than women, according to research (24). Moreover, women assume multiple roles as employees, mothers, and housewives; hence, they demonstrate more resilience and adaptability to stressful conditions (25). In addition, in the current study, the number of years spent working in the health sector or in the existing position is positively associated with most stress

subscales, including "contact with death," "workload," and "conflicts with colleagues/supervisors."

Regarding the adoption of coping strategies, "social support-information seeking" was found to be prevalent, while "positive reframing" and "taking protective measures" were found to be relatively prevalent. In contrast, "resignation" and "substance use" were at low levels among nurses. These results are supported by a study with a sample of 160 nurses from hospitals in two major cities in Greece (26). The contribution of social support appears to have a significant impact not only on preventing the emergence of occupational stress and emotional exhaustion but also on mitigating the impacts of stress-inducing mechanisms. The results of a study (27) including 325 nurses in hospitals in the Philippines and another of 444 nurses in three hospitals in China (28) revealed that a high degree of social support as a coping mechanism was associated with lower levels of nurses' stress.

Consequently, comparing the Brief COPE subscales and the unique features of the participants, it is observed that the female gender is associated with high rates of "Procrastination," "Emotional-Social Support," and "Turning to Religion." Additionally, unmarried nursing staff are associated with high "Resignation" rates, but more years of health professional experience are associated with a high "Planning" score.

Regarding the results of the questions about the COVID-19 pandemic, a large proportion of respondents are "somewhat" to "extremely" afraid of transmitting COVID-19 to the patients they care for. In contrast, 36.1% are "not at all" fearful about entering a quarantine regime. The foregoing results are also confirmed by the findings of a similar study (29) conducted in primary care settings for doctors and nursing staff in Singapore,

which revealed that nurses and doctors were extremely concerned and fearful about the prospect of COVID-19 transmission to their loved ones. Similar results were found in a study of 263 healthcare personnel who had contact with confirmed cases of COVID-19 in Mexico, where their fear over the possibility of transmitting the coronavirus to their family was identified as the most significant reason for moderate to high stress (30).

The notion that they encounter individuals who are ill and require hospitalization correlates with more night, evening, and weekend shifts in the last month. This could be interpreted as due to the nurses' belief that the duration of coronavirus exposure is prolonged by shifts and years of duty.

Finally, through the multiple linear regression of all three tools (ENSS, Brief COPE, and questions about the COVID-19 pandemic), it was determined that Total Stress appears to be directly related to the nurses' ability to focus and release their emotions, their young age, their exhaustion caused by working for many years in the healthcare sector, and their concern of transmitting COVID-19 to their patients. A possible explanation could be that young age may be associated with elevated levels of anxiety and concern about the pandemic due to a lack of hospital-based work experience, which suggests uncertainty over adherence to personal safety measures.

This study reached important conclusions; nonetheless, a weakness of the research was the sampling technique (non-random sampling) and the limited sample size in a public tertiary hospital in a specific region of Greece. Therefore, the findings cannot be generalized to the overall nursing population in Greece. Further research is recommended to examine levels of occupational stress in broader geographical areas also involving nurse managers and directors. Future research, including larger

sample size and non-probability sampling strategy, will contribute to the expansion of knowledge in this particular field.

Conclusion

The study indicated that nursing personnel experienced moderate levels of occupational stress. The nursing staff coped with challenges by seeking social support, positive reframing, and acceptance, taking protective measures, and turning to religion. Most respondents feared that if they contracted COVID-19, they would transmit it to family/friends and patients.

By translating these findings into practice, nurse leaders may develop meaningful administrative and educational strategies aiming at staff empowerment, resilience, self-care, and well-being during periods of increased healthcare demands. This can be accomplished via stress management learning strategies and constructive and supportive management. Creating a positive working environment, educating and providing information about patient safety, offering counseling, and creating a supportive network within the workplace can be proved beneficial for nurses in terms of anxiety control and reducing levels of occupational stress.

Conflicts of Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Acknowledgment

The authors would like to express their gratitude to all the participants of the study.

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